

Contents

1 Overview of the Study	1
I Modeling and Estimation Principles	5
2 Stochastic Environment	7
3 State Space Notation	11
4 Filtering Algorithms	15
4.1 Linear Filtering	16
4.2 MMSE	17
4.3 MMSLE	21
4.4 Filter Recursions	22
4.5 Extended Kalman Filtering	24
5 Parameter Estimation	29
II Pricing Equities	35
6 Introduction	37
6.1 Opening Remarks	37
6.2 The Case of Closed-End Funds	38
7 Valuation Model	43
7.1 Characteristics of Closed-End Funds	43
7.2 Economic Foundation	47
7.3 Pricing Closed-End Fund Shares	50

8 First Empirical Results	55
8.1 Sample Data	55
8.2 Implemented Model	60
8.3 State Space Form	61
8.4 Closed-End Fund Analysis	64
9 Implications for Investment Strategies	71
9.1 Testing the Forecasting Power	71
9.1.1 Setup of Forecasting Study	71
9.1.2 Evidence on Forecasting Quality	73
9.2 Implementing Trading Rules	75
9.2.1 Experimental Design	75
9.2.2 Test Results on Trading Strategies	77
10 Summary and Conclusions	83
 III Term Structure Modeling	 85
11 Introduction	87
11.1 Overview	87
11.2 Bond Prices and Interest Rates	88
11.3 Modeling an Incomplete Market	92
12 Term Structure Model	97
12.1 Motivation for a Stochastic Risk Premium	97
12.2 Economic Model	100
13 Initial Characteristic Results	105
13.1 Valuing Discount Bonds	105
13.2 Term Structures of Interest Rates and Volatilities	112
13.2.1 Spot and Forward Rate Curves	112
13.2.2 Term Structure of Volatilities	113
13.3 Analysis of Limiting Cases	116
13.3.1 Reducing to an Ornstein-Uhlenbeck Process	116
13.3.2 Examining the Asymptotic Behavior	118
13.4 Possible Shapes of the Term Structures	120
13.4.1 Influences of the State Variables	121

13.4.2	Choosing the Model Parameters	123
14	Risk Management and Derivatives Pricing	129
14.1	Management of Interest Rate Risk	129
14.2	Martingale Approach	131
14.3	Bond Options	133
14.4	Swap Contracts	141
14.5	Interest Rate Caps and Floors	143
15	Calibration to Standard Instruments	147
15.1	Estimation Techniques for Term Structure Models	147
15.2	Discrete Time Distribution of the State Variables	150
15.3	US Treasury Securities	153
15.3.1	Data Analysis	153
15.3.2	Parameter Estimation	160
15.3.3	Analysis of the State Variables	165
15.4	Other Liquid Markets	169
15.4.1	Appropriate Filtering Algorithm	169
15.4.2	Sample Data and Estimation Results	170
16	Summary and Conclusions	175
IV	Pricing Electricity Forwards	177
17	Introduction	179
17.1	Overview	179
17.2	Commodity Futures Markets	179
17.3	Pricing Commodity Futures	183
18	Electricity Pricing Model	189
18.1	Pricing Electricity Derivatives	189
18.2	Model Assumptions and Risk Neutral Pricing	191
18.3	Valuation of Electricity Forwards	194
19	Empirical Inference	201
19.1	Estimation Model	201
19.1.1	Distribution of the State Variables	201

19.1.2 State Space Formulation and Kalman Filter Setup . .	205
19.2 Data Analysis and Estimation Results	208
20 Summary and Conclusions	221
List of Symbols and Notation	223
List of Tables	227
List of Figures	229
Bibliography	231