
Contents

1 An Exact Solution of the Term Structure of Interest Rate under Regime-Switching Risk

<i>Shu Wu, Yong Zeng</i>	1
1.1 Introduction	1
1.2 A new representation for modeling regime shift	3
1.3 The model	5
1.3.1 Two state variables	5
1.3.2 Pricing kernel	5
1.3.3 The risk-neutral probability measure	5
1.3.4 The term structure of interest rates	8
1.4 A tractable specification with exact solution	9
1.4.1 Affine regime-switching models	9
1.5 Conclusions	13
References	13

2 The Term Structure of Interest Rates in a Hidden Markov Setting

<i>Robert J. Elliott, Craig A. Wilson</i>	15
2.1 Introduction	15
2.2 The Model	17
2.2.1 The Markov chain	17
2.2.2 The short-term interest rate	20
2.2.3 The zero-coupon bond value	21
2.3 Implementation	22
2.4 Results	25
2.5 Conclusion	30
References	30

3 On Fair Valuation of Participating Life Insurance Policies With Regime Switching

<i>Tak Kuen Siu</i>	31
3.1 Introduction	31
3.2 The model dynamics	33
3.3 Dimension reduction to regime-switching PDE	38
3.4 Further investigation	42
References	42

4 Pricing Options and Variance Swaps in Markov-Modulated Brownian Markets

<i>Robert J. Elliott, Anatoliy V. Swishchuk</i>	45
4.1 Introduction	45
4.2 Literature review	47
4.3 Martingale characterization of Markov processes	48
4.4 Pricing options for Markov-modulated security markets	51
4.4.1 Incompleteness of Markov-modulated Brownian security markets	51
4.4.2 The Black-Scholes formula for pricing options in a Markov-modulated Brownian market	53
4.5 Pricing options for Markov-modulated Brownian markets with jumps	58
4.5.1 Incompleteness of Markov-modulated Brownian (B, S) -security markets with jumps	58
4.5.2 Black-Scholes formula for pricing options in Markov- modulated Brownian (B, S) -security market with jumps	60
4.6 Pricing of Variance swaps for stochastic volatility driven by Markov process	62
4.6.1 Stochastic volatility driven by Markov process	62
4.6.2 Pricing of variance swaps for stochastic volatility driven by Markov process	63
4.6.3 Example of variance swap for stochastic volatility driven by two-state continuous Markov chain	64
A Some auxiliary results	64
A.1 A Feynmann-Kac formula for the Markov-modulated process $(y_s(t), x_s(t))_{t \geq s}$	64
A.2 Formula for the option price $f_T(S_T)$ for the market combined Markov-modulated (B, S) -security market and compound geometric Poisson process (see Section 4.4.2)	66
References	67

5 Smoothed Parameter Estimation for a Hidden Markov Model of Credit Quality

<i>Małgorzata W. Korolkiewicz, Robert J. Elliott</i>	69
5.1 Introduction	69
5.2 Dynamics of the Markov chain and observations	70
5.3 Reference probability	71
5.4 Recursive filter	71
5.5 Parameter estimates	72
5.6 Smoothed estimates	75
A Appendix	80
References	90

6 Expected Shortfall Under a Model With Market and Credit Risks

<i>Kin Bong Siu, Hailiang Yang</i>	91
6.1 Introduction	91
6.2 Markov regime-switching model	94
6.3 Weak Markov-regime switching model	98
6.4 Concluding remarks	99
References	99

7 Filtering of Hidden Weak Markov Chain -Discrete Range Observations

<i>Shangzhen Luo, Allanus H. Tsoi</i>	101
7.1 Introduction	101
7.2 Basic Settings	103
7.3 Change of Measure	105
7.4 A general unnormalized recursive filter	107
7.5 Estimation of states, transitions and occupation times	109
7.5.1 State estimation	109
7.5.2 Estimators for the number of jumps	109
7.5.3 Estimators for 1-state occupation times	110
7.5.4 Estimators for 2-state occupation times	111
7.5.5 Estimators for state to observation transitions	111
7.6 Parameter re-estimations	112
7.7 Error analysis	116
7.8 Conclusion	117
References	118

8 Filtering of a Partially Observed Inventory System

<i>Lakhdar Aggoun</i>	121
8.1 Introduction	121
8.2 Model description	123
8.3 Reference probability	124
8.4 Filtering	125
8.5 Filters for $G_n^{m\ell i}$, and $S_n^{\ell i}$	128

8.6	Parameter re-estimation	131
	References	131

9 An empirical investigation of the unbiased forward exchange rate hypothesis in a regime switching market

	<i>Emilio Russo, Fabio Spagnolo and Rogemar Mamon</i>	133
9.1	Introduction	134
9.2	Stylised features and statistical properties of foreign exchange rates	135
9.3	Stationary and nonstationary time series	139
9.4	Cointegration and the unbiased forward exchange rate (UFER) hypothesis	142
9.5	Evidence from exchange rate market via a Markov regime-switching model	146
9.6	Concluding remarks	151
	References	151

10 Early Warning Systems for Currency Crises: A Regime-Switching Approach

	<i>Abdul Abiad</i>	155
10.1	Introduction	155
10.2	A Markov-switching approach to early warning systems	159
10.3	Data description and transformation	162
10.4	Estimation results	168
	10.4.1 Indonesia	168
	10.4.2 Korea	170
	10.4.3 Malaysia	170
	10.4.4 The Philippines	171
	10.4.5 Thailand	175
10.5	Forecast assessment	176
10.6	Conclusions	180
	References	182



<http://www.springer.com/978-0-387-71081-5>

Hidden Markov Models in Finance

Mamon, R.S.; Elliott, R.J. (Eds.)

2007, XX, 186 p., Hardcover

ISBN: 978-0-387-71081-5