

# Contents

---

<b>1</b>	<b>The Options Market</b>	<b>1</b>
	Introduction	1
	What Is an Option?	2
	An Option Example	3
	Moneyness	4
	American and European Options	5
	Why Trade Options?	6
	The Options Contract	7
	The Options Market	7
	Reading Options Prices	7
	Options Exchanges	8
	Exchange Diversity and Market Statistics	11
	Options Trading Procedures	16
	Types of Traders	18
	Other Trading Systems	21
	Types of Orders	22
	Order Routing and Execution	22
	The Clearinghouse	23
	Margins	24
	Commissions	26
	Taxation	27
	Long a Call	28
	Short a Call	28
	Long a Put	29
	Short a Put	29
	The Organization of the Text	30
	Summary	31
	Review Questions	31
	Notes	32
<b>2</b>	<b>Options Payoffs and Options Strategies</b>	<b>35</b>
	Introduction	35
	Stocks and Bonds	36

Arbitrage	38
Options Notation	40
European and American Options Values at Expiration	41
Buy or Sell a Call Option	41
Call Options at Expiration and Arbitrage	47
Buy or Sell a Put Option	48
Moneyness	52
Options Combinations	53
The Straddle	53
The Strangle	55
Bull and Bear Spreads with Call Options	58
Bull and Bear Spreads with Put Options	61
The Box Spread	64
The Butterfly Spread with Calls	65
The Butterfly Spread with Puts	68
The Condor with Calls	71
The Condor with Puts	72
Ratio Spreads	75
Summary	77
Combining Options with Bonds and Stocks	77
The Covered Call: Stock plus a Short Call	80
Portfolio Insurance: Stock plus a Long Put	81
Mimicking and Synthetic Portfolios	87
Summary	94
Review Questions	94
Notes	97

### **3 Bounds on Options Prices 101**

Introduction	101
The Boundary Space for Call and Put Options	102
The Boundary Space for a Call Option	103
The Boundary Space for a Put Option	105
Relationships Between Call Prices	105
Relationships Between Put Prices	115
Summary	124
Options Prices and the Interest Rate	126
Call Prices and Interest Rates	126
Put Prices and Interest Rates	126
Options Prices and Stock Price Movements	129
The Call Price	130
The Put Price	131
Options Prices and the Riskiness of Stocks	133
Options Prices for Riskless Stock	135
Riskier Stocks Result in Higher Options Prices	135
Summary	136

Review Questions	137
Notes	139

#### **4 European Options Pricing 141**

Introduction	141
The Single-Period Binomial Model	142
The Role of Probabilities	145
Summary	146
The Multi-Period Binomial Model	147
The Multi-Period Binomial Call Pricing Model	149
Binomial Put Options Pricing	152
Stock Price Movements	153
The Binomial Approach to the Black-Scholes Model	160
The Black-Scholes Options Pricing Model	162
The Black-Scholes Call Option Pricing Model	162
Computing Black-Scholes Options Prices	163
The Black-Scholes Put Option Pricing Model	165
Inputs for the Black-Scholes Model	166
Estimating the Risk-Free Rate of Interest	166
Estimating the Stock's Standard Deviation	167
European Options and Dividends	170
The Effect of Dividends on Options Prices	171
Adjustments for Known Dividends	172
Adjustments for Continuous Dividends—Merton's Model	173
The Binomial Model and Dividends	175
Summary	181
Tests of the Options Pricing Model	182
The Black-Scholes Study	183
The Galai Studies	183
The Bhattacharya Study	184
The MacBeth-Merville Study	185
The Rubinstein Study	185
Summary	185
Summary	186
Review Questions	186
Notes	189

#### **5 Options Sensitivities and Options Hedging 195**

Introduction	195
Options Sensitivities in the Merton and Black-Scholes Models	195
DELTA	200
DELTA-Neutral Positions	202
THETA	205
VEGA	207

RHO	209
GAMMA	210
Positive and Negative GAMMA Portfolios	213
Creating Neutral Portfolios	216
Options Sensitivities and Options Trading Strategies	218
The Straddle	218
The Strangle	220
The Butterfly Spread with Calls	222
The Bull Spread with Calls	224
A Ratio Spread with Calls	225
The Calendar Spread	227
Summary	231
Review Questions	232
Note	233

## **6 American Options Pricing 235**

Introduction	235
American versus European Options	236
American versus European Puts	236
American versus European Calls	238
Pseudo-American Call Option Pricing	240
Exact American Call Option Pricing	242
Analytical Approximations of American Options Prices	247
The Binomial Model and American Options Prices	252
No Dividends	253
The Basic Strategy	253
Continuous Dividends	257
Known Dividend Yields	261
Known Dollar Dividends	263
Summary	267
Review Questions	268
Notes	270

## **7 Options on Stock Indexes, Foreign Currency, and Futures 271**

Introduction	271
European Options Pricing	272
Merton's Model	272
The Binomial Model	273
Options on Stock Indexes	274
Options on Foreign Currency	275
Options on Futures	277
Options on Futures versus Options on Physicals	280
Options Sensitivities	282
Pricing American Options	284

Analytical Approximations	285
The Binomial Model	289
Summary	298
Review Questions	300
Notes	301
<b>8 The Options Approach to Corporate Securities</b>	<b>303</b>
Introduction	303
Equity and a Pure Discount Bond	304
Common Stock as a Call Option	304
The Options Analysis of Corporate Debt	306
Senior and Subordinated Debt	309
Callable Bonds	311
Convertible Bonds	313
Warrants	315
Summary	316
Review Questions	317
Notes	319
<b>Solutions to Chapter Questions and Problems</b>	<b>321</b>
<b>Appendix</b>	<b>365</b>
<b>Index</b>	<b>367</b>