

Contents

Preface	xi
Acknowledgments	xiv
PART 1 Revenue Models of High-Frequency Trading	1
<hr/>	
CHAPTER 1 High-Frequency Trading and Existing Revenue Models	3
What Is High-Frequency Trading?	3
Why High-Frequency Trading Is Important	5
Major High-Frequency Trading Firms in the United States	6
Existing Revenue Models of High-Frequency Trading Operations	8
Categorizing High-Frequency Trading Operations	9
Conclusion	10
CHAPTER 2 Roots of High-Frequency Trading in Revenue Models of Investment Management	13
Revenue Model 1: Investing	14
Revenue Model 2: Investment Banking	17
Revenue Model 3: Market Making	18
Revenue Model 4: Trading	18
Revenue Model 5: Cash Management	19
Revenue Model 6: Mergers and Acquisitions	20
Revenue Model 7: Back-Office Activities	20

Revenue Model 8: Venture Capital	20
Creating Your Own Revenue Model	21
How to Achieve Success: Four Personal Drivers	22
Conclusion	27
CHAPTER 3 History and Future of High-Frequency Trading with Investment Management	29
Revenue Models in the Future	30
Investment Management and Financial Institutions	31
High-Frequency Trading and Investment Management	32
Technology Inventions to Drive Financial Inventions	34
The Ultimate Goal for Models and Financial Inventions	34
Conclusion	37
PART II Theoretical Models as Foundation of Computer Algos for High-Frequency Trading	39
<hr/>	
CHAPTER 4 Behavioral Economics Models on Loss Aversion	41
What Is Loss Aversion?	41
The Locus Effect	41
Theory and Hypotheses	45
Study 1: The Locus Effect on Inertia Equity	49
Study 2: Assumption A_1 and A_2	51
General Discussion	53
Conclusion	55
CHAPTER 5 Loss Aversion in Option Pricing: Integrating Two Nobel Models	57
Demonstrating Loss Aversion with Computer Algos	57
Visualizing the Findings	59
Computer Algos for the Finding	61
Explaining the Finding with the Black-Scholes Formula	63
Conclusion	64

CHAPTER 6 Expanding the Size of Options in Option Pricing	65
The NBA Event	66
Web Data	67
Theoretical Analysis	69
The NBA Event and the Uncertainty Account	72
Controlled Offline Data	77
General Discussion	80
Conclusion	82
CHAPTER 7 Multinomial Models for Equity Returns	85
Literature Review	87
A Computational Framework: The MDP Model	89
Implicit Consumer Decision Theory	94
Empirical Approaches	102
Analysis 1: Examination of Correlations and a Regression Model	102
Analysis 2: Structural Equation Model	106
Contributions of the ICD Theory	111
Conclusion	115
CHAPTER 8 More Multinomial Models and Signal Detection Models for Risk Propensity	117
Multinomial Models for Retail Investor Growth	117
Deriving Implicit Utility Functions	131
Transforming Likeability Rating Data into Observed Frequencies	140
Signal Detection Theory	143
Assessing a Fund's Performance with SDT	146
Assessing Value at Risk with Risk Propensity of SDT for Portfolio Managers	147
Defining Risk Propensity Surface	148
Conclusion	149

CHAPTER 9 Behavioral Economics Models on Fund Switching and Reference Prices	151
What Is <i>VisualFunds</i> for Fund Switching?	151
Behavioral Factors That Affect Fund Switching	152
Theory and Predictions	157
Study 1: Arbitrary Anchoring on Inertia Equity	164
Study 2: Anchor Competition	166
Study 3: Double Log Law	169
Conclusion	179
PART III A Unique Model of Sentiment Asset Pricing Engine for Portfolio Management	181
<hr/>	
CHAPTER 10 A Sentiment Asset Pricing Model	185
What Is the Sentiment Asset Pricing Engine?	185
Contributions of SAPE	187
Testing the Effectiveness of SAPE Algos	190
Primary Users of SAPE	191
Three Implementations of SAPE	191
SAPE Extensions: TopTickEngine, FundEngine, PortfolioEngine, and TestEngine	193
Summary on SAPE	194
Alternative Assessment Tools of Macro Investor Sentiment	194
Conclusion	200
CHAPTER 11 SAPE for Portfolio Management—Effectiveness and Strategies	201
Contributions of SAPE to Portfolio Management	202
Intraday Evidence of SAPE Effectiveness	203
Trading Strategies Based on the SAPE Funds	206
Case Study 1: Execution of SAPE Investment Strategies	206
Case Study 2: The Trading Process with SAPE	214
Case Study 3: Advanced Trading Strategies with SAPE	217

Creating a Successful Fund with SAPE and High-Frequency Trading	221
Conclusion	223
PART IV New Models of High-Frequency Trading	225
<hr/>	
CHAPTER 12 Derivatives	227
What Is a Derivative?	228
Mortgage-Backed Securities: Linking Major Financial Institutions	229
Credit Default Swaps	230
Options and Option Values	231
The Benefits of Using Options	234
Profiting with Options	234
New Profitable Financial Instruments by Writing Options	236
The Black-Scholes Model as a Special Case of the Binomial Model	237
Implied Volatility	238
Volatility Smile	238
Comparing Volatilities over Time	239
Forwards and Futures	240
Pricing an Interest Rate Swap with Prospect Theory	241
Behavioral Investing Based on Behavioral Economics	243
Conclusion	244
CHAPTER 13 Technology Infrastructure for Creating Computer Algos	245
Web Hosting versus Dedicated Web Servers	245
Setting Up a Dedicated Web Server	246
Developing Computer Algos	248
Jump-Starting Algo Development with PHP Programming	256
Jump-Starting Algo Development with Java Programming	266
Jump-Starting Algo Development with C++ Programming	273
Jump-Starting Algo Development with Flex Programming	274
Jump-Starting Algo Development with SQL	274

Common UNIX/LINUX Commands for Algo Development	276
Conclusion	277
CHAPTER 14 Creating Computer Algos for High-Frequency Trading	279
Getting Probability from Z Score	279
Getting Z Scores from Probability	281
Algos for the Sharpe Ratio	282
Computing Net Present Value	284
Developing a Flex User Interface for Computer Algos	286
Algos for the Black-Scholes Model	290
Computing Volatility with the ARCH Formula	292
Algos for Monte Carlo Simulations	293
Algos for an Efficient Portfolio Frontier	294
Algos for Signal Detection Theory	296
Conclusion	298
Notes	299
References	303
About the Author	313
Index	315