

Contents

1	Introduction	1
1.1	Institutions, Models and Empirics.....	2
1.2	Dynamic Programming as Solution Method.....	4
1.3	Previous Work.....	5
1.4	Outline and Results	7
2	Forecasting and Low Frequency Movements of Asset Returns	9
2.1	Introduction	9
2.2	Limits on Forecasting Asset Returns.....	9
2.3	The Use of Periodic Returns.....	14
2.4	Conclusions	17
3	Portfolio Modeling with Sustainability Constraints.....	19
3.1	Introduction	19
3.2	Mean-Variance Portfolio Models.....	21
3.3	Description of Statistical Properties of Returns Data	27
3.3.1	Computing Expected Real Returns on Risky Assets.....	27
3.3.2	Variance-Covariance and Correlation Matrices and Volatility of Real Returns.....	30
3.3.3	Eigenvalue and Eigenvector Properties of the Empirical Covariance and Correlation Matrix	33
3.4	Estimation Results of the Portfolio Models.....	37
3.5	Conclusion	47
	Appendix	48
4	Dynamic Saving and Portfolio Decisions-Theory.....	53
4.1	Introduction	53
4.2	The Model with One Asset and Constant Returns.....	53
4.2.1	Numerical Results for the Benchmark Model	55
4.2.2	Variation of Risk Aversion, Returns and Discount Rate	57

4.3	Dynamic Consumption and Portfolio Decisions: Two Assets and Time Varying Returns	61
4.3.1	The Model with Time Varying Returns	62
4.3.2	Numerical Results on a Benchmark Case	64
4.3.3	Variation of Risk Aversion	66
4.3.4	Variation of Returns	67
4.3.5	Variation of Time Horizon	69
4.4	A Stochastic Model with Mean Reversion in Returns.....	73
4.5	Conclusions	76
	Appendix	77
5	Asset Accumulation with Estimated Low Frequency Movements of Asset Returns.....	81
5.1	Introduction	81
5.2	The Literature and Results.....	82
5.3	The Dynamic Programming Solution	85
5.4	Varying Risk Aversion Across Investors	86
5.5	Varying Time Horizon Across Investors	90
5.6	Some Conclusions	95
6	Asset Accumulation and Portfolio Decisions with Time Varying Asset Returns and Labor Income	97
6.1	Introduction	97
6.2	Literature and Results.....	100
6.3	Business Cycles, Asset Returns and Labor Income	103
6.4	Dynamic Decisions on Asset Accumulation.....	106
6.5	Wealth Disparities.....	112
6.6	Conclusions	113
7	Continuous and Discrete Time Modeling	115
7.1	Introduction	115
7.2	Literature and Results.....	116
7.3	Discrete-Time Approximation.....	119
7.3.1	Euler Method.....	119
7.3.2	Milstein Method	120
7.3.3	New Local Linearization Method	120
7.3.4	Equivalence of the Euler and NLL Predictors	121
7.4	Empirical Results on Modeling Short Term Interest Rates	122
7.4.1	Specification Test	123
7.4.2	Results of Estimating CKLS Model	124
7.5	Searching for New Models	126
7.5.1	Improvement in the Continuous-Time Framework.....	126
7.5.2	Modeling Autocorrelations in the Estimated Noise	127
7.5.3	Modeling Thick-Tails in the Estimated Noise	129

7.5.4	Model Identification	129
7.5.5	Results	130
7.6	Conclusions	133
	Appendix	134
8	Asset Accumulation and Portfolio Decisions Under Inflation Risk	139
8.1	Introduction	139
8.2	A New Multi-factor Model for Nominal and Inflation-Indexed Bonds	142
8.2.1	The Factors	142
8.2.2	The Nominal Bonds	143
8.2.3	The Inflation Indexed Bonds (IIB)	144
8.2.4	The No-Arbitrage Pricing	145
8.3	Intertemporal Asset Accumulation with Inflation Risk	148
8.3.1	The Intertemporal Asset Allocation Model	148
8.3.2	The Systematic Factors	149
8.3.3	The Investment Opportunity Set	149
8.3.4	Agents' Action	150
8.3.5	Dynamic Programming Approach	151
8.3.6	Solving for the Intertemporal Portfolio	155
8.4	Model Estimation	157
8.4.1	The Term Structure of Real Yields	157
8.4.2	The Term Structure of Nominal Yields	160
8.4.3	Estimation of Realized Inflation Dynamics	164
8.4.4	Estimation of Stock Return Dynamics	166
8.5	Application of Intertemporal Optimal Portfolios	167
8.5.1	Example 1: Expected Optimal Final Utility and the Factors	167
8.5.2	Example 2: Asset Allocation and Risk Aversion Parameter γ	169
8.5.3	Example 3: Asset Allocation and Investment Horizon	171
8.6	Conclusions	172
	Appendix	173
9	Concluding Remarks	179
A	Dynamic Programming as Solution Method	181
	Bibliography	183