Alexandre Ziegler

Incomplete Information and Heterogeneous Beliefs in Continuous-time Finance

With 43 Figures
and 8 Tables

Springer

Table of Contents

Incomplete Information: An Overview 1
1.1 Introduction 1
1.2 Portfolio Choice 1
1.2.1 Gennotte's Model 2
1.2.2 The Inference Process 4
1.2.3 Optimal Portfolio Choice 4
1.2.4 An Example 7
1.2.5 The Short Interest Rate 9
1.3 The Term Structure of Interest Rates 10
1.3.1 Dothan and Feldman's Models 10
1.3.2 A Characterization of the Term Structure 11
1.4 Equilibrium Asset Pricing 15
1.4.1 Honda's Model 16
1.4.2 The Equilibrium Price Process 17
1.5 Conclusion and Outlook 19

The Impact of Incomplete Information on Utility, Prices, and Interest Rates 23
2.1 Introduction 23
2.2 The Model 25
2.3 Equilibrium 27
2.3.1 The Equilibrium Expected Lifetime Utility 27
2.3.2 The Equilibrium Price 28
2.3.3 The Equilibrium Interest Rate 30
2.4 Logarithmic Utility 31
2.4.1 The Equilibrium Expected Lifetime Utility 31
2.4.2 The Equilibrium Price 32
2.4.3 The Equilibrium Interest Rate 33
2.5 Power Utility 35
2.5.1 The Equilibrium Expected Lifetime Utility 35
2.5.2 The Equilibrium Price 40
2.5.3 The Equilibrium Interest Rate 48
2.5.4 Hedging Demand and the Equilibrium Price of Estimation Risk 50
2.6 Information, Utility, Prices, and Interest Rates: A Synthesis . 51

2.6.1 Expected Lifetime Utility . . . 51
2.6.2 Share Prices . . . 52
2.6.3 Interest Rates . . . 53
2.7 Time-Varying Parameters . . . 55
2.7.1 The Equilibrium Expected Lifetime Utility . . . 56
2.7.2 The Equilibrium Price . . . 58
2.7.3 The Equilibrium Interest Rate . . . 58
2.8 Conclusion . . . 61

3 Optimal Portfolio Choice Under Heterogeneous Beliefs . . . 65
3.1 Introduction . . . 65
3.2 The Model . . . 67
3.3 The Deviant Agent's Problem . . . 70
3.4 Optimal Portfolio Choice . . . 71
3.5 An Example . . . 74
3.6 Conclusion . . . 78

4 Optimal Consumption Under Heterogeneous Beliefs . . . 81
4.1 Introduction . . . 81
4.2 The Cox-Huang Methodology . . . 82
4.3 Heterogeneous Beliefs . . . 84
4.4 An Example . . . 86
4.4.1 The Model . . . 86
4.4.2 Optimal Consumption Patterns Under Heterogeneous Beliefs . . . 87
4.4.3 An Algebraic Solution . . . 95
4.4.4 The Effect of the Time Horizon . . . 102
4.5 Portfolios and Consumption: A Synthesis . . . 105
4.6 Conclusion . . . 107

5 Equilibrium Asset Pricing Under Heterogeneous Beliefs . . . 109
5.1 Introduction . . . 109
5.2 The Model . . . 111
5.3 Equilibrium Consumption . . . 113
5.4 Equilibrium Prices . . . 116
5.4.1 The Equilibrium State-Price Density . . . 117
5.4.2 The Equilibrium Short Rate . . . 123
5.4.3 The Equilibrium Yield Curve . . . 128
5.4.4 The Equilibrium Share Price . . . 133
5.4.5 Equilibrium Option Prices and the "Smile Effect" . . . 139
5.5 Implied Risk Aversion . . . 145
5.6 Conclusion . . . 146

6 Costly Information, Imperfect Learning, and Information Aggregation . . . 149
6.1 Introduction . . . 149
6.2 The Model . . . 151
6.2.1 The Economy . . . 151
6.2.2 The Inference Process: Imperfect Learning . . . 152
6.3 Portfolio Choice under Costly Information . . . 154
6.3.1 The Agent's Problem . . . 154
6.3.2 The Agent's Optimal Investment and Research Policy . 155
6.3.3 Determinants of the Demand for Information . . . 157
6.3.4 Diversification and Information Costs . . . 160
6.4 Equilibrium Asset Pricing . . . 161
6.5 Information Aggregation and the Equity Premium . . . 165
6.6 Conclusion . . . 170

7 Summary and Conclusion . . . 173

A Conditional Mean and Variance of ln(jEs) . . . 179

B Conditional Mean and Variance of \n(x_8) with Time-Varying Parameters . . . 181

C The Short Rate Under Heterogeneous Beliefs . . . 183

References . . . 187

List of Figures . . . 191

List of Tables . . . 193

List of Symbols . . . 195