Financial Decisions and Markets: A Course in Asset Pricing

John Y. Campbell

Princeton University Press Princeton and Oxford

Contents

	Figu	res		xiii
	Tab	les		XV
	Pref	ace		xvii
Pa	ırt I	Static Po	ortfolio Choice and Asset Pricing	
1	Cho	ice unde	er Uncertainty	3
	1.1	Expec	cted Utility	3
		1.1.1	Sketch of von Neumann-Morgenstern Theory	4
	1.2	Risk A	Aversion	5
		1.2.1	Jensen's Inequality and Risk Aversion	5
		1.2.2	Comparing Risk Aversion	7
		1.2.3	The Arrow-Pratt Approximation	9
	1.3	Tracta	able Utility Functions	10
	1.4	Critiq	ues of Expected Utility Theory	12
		1.4.1	Allais Paradox	12
		1.4.2	Rabin Critique	13
		1.4.3	First-Order Risk Aversion and Prospect Theory	14
	1.5	Comp	baring Risks	15
		1.5.1	Comparing Risks with the Same Mean	16
		1.5.2	Comparing Risks with Different Means	18
		1.5.3	The Principle of Diversification	19
	1.6	Soluti	ion and Further Problems	20
2	Stati	c Portfo	lio Choice	23
	2.1	Choos	sing Risk Exposure	23
		2.1.1	The Principle of Participation	23
		2.1.2	A Small Reward for Risk	24
		2.1.3	The CARA-Normal Case	25
		2.1.4	The CRRA-Lognormal Case	27
		2.1.5	The Growth-Optimal Portfolio	30
	2.2	Comb	pining Risky Assets	30
		2.2.1	Two Risky Assets	31

		2.2.2	One Risky and One Safe Asset	33
		2.2.3	N Risky Assets	34
		2.2.4	The Global Minimum-Variance Portfolio	35
		2.2.5	The Mutual Fund Theorem	39
		2.2.6	One Riskless Asset and N Risky Assets	39
		2.2.7	Practical Difficulties	42
	2.3	Soluti	ons and Further Problems	43
3	Statio	c Equilit	orium Asset Pricing	47
	3.1	The C	Capital Asset Pricing Model (CAPM)	47
		3.1.1	Asset Pricing Implications of the Sharpe-Lintner CAPM	48
		3.1.2	The Black CAPM	50
		3.1.3	Beta Pricing and Portfolio Choice	51
		3.1.4	The Black-Litterman Model	54
	3.2	Arbitr	rage Pricing and Multifactor Models	55
		3.2.1	Arbitrage Pricing in a Single-Factor Model	55
		3.2.2	Multifactor Models	59
		3.2.3	The Conditional CAPM as a Multifactor Model	60
	3.3	Empi	rical Evidence	61
		3.3.1	Test Methodology	61
		3.3.2	The CAPM and the Cross-Section of Stock Returns	66
		3.3.3	Alternative Responses to the Evidence	72
	3.4	Soluti	ion and Further Problems	77
4	The	Stochas	tic Discount Factor	83
	4.1	Comp	plete Markets	83
		4.1.1	The SDF in a Complete Market	83
		4.1.2	The Riskless Asset and Risk-Neutral Probabilities	84
		4.1.3	Utility Maximization and the SDF	85
		4.1.4	The Growth-Optimal Portfolio and the SDF	85
		4.1.5	Solving Portfolio Choice Problems	86
		4.1.6	Perfect Risksharing	87
		4.1.7	Existence of a Representative Agent	88
		4.1.8	Heterogeneous Beliefs	89
	4.2	Incor	nplete Markets	90
		4.2.1	Constructing an SDF in the Payoff Space	90
		4.2.2	Existence of a Positive SDF	92
	4.3	Prope	erties of the SDF	93
		4.3.1	Risk Premia and the SDF	93
		4.3.2	Volatility Bounds	95
		4.3.3	Entropy Bound	100
		4.3.4	Factor Structure	102
		4.3.5	Time-Series Properties	102
	4.4	Gene	ralized Method of Moments	103
		4.4.1	Asymptotic Theory	104
		4.4.2	Important GMM Estimators	105
		4.4.3	Traditional Tests in the GMM Framework	107
		4.4.4	GMM in Practice	109

	4.5	Limits of Arbitrage	112
	4.6	Solutions and Further Problems	114
Pa	rt II	Intertemporal Portfolio Choice and Asset Pricing	
5	Pres	ent Value Relations	121
	5.1	Market Efficiency	121
		5.1.1 Tests of Autocorrelation in Stock Returns	124
		5.1.2 Empirical Evidence on Autocorrelation in Stock Returns	125
	5.2	Present Value Models with Constant Discount Rates	127
		5.2.1 Dividend-Based Models	127
		5.2.2 Earnings-Based Models	131
		5.2.3 Rational Bubbles	132
	5.3	Present Value Models with Time-Varying Discount Rates	134
		5.3.1 The Campbell-Shiller Approximation	134
		5.3.2 Short-and Long-Term Return Predictability	137
		5.3.3 Interpreting US Stock Market History	140
	- A	5.3.4 VAR Analysis of Returns	143
	5.4	Fredictive Return Regressions	144
		5.4.1 Statiloaugii Dias 5.4.2 Recent Responses Using Einancial Theory	145
		5.4.3 Other Predictors	140
	55	Drifting Steady-State Models	140
	5.5	5.5.1 Volatility and Valuation	150
		5.5.2 Drifting Steady-State Valuation Model	151
		5.5.3 Inflation and the Fed Model	153
	5.6	Present Value Logic and the Cross-Section of Stock Returns	153
		5.6.1 Quality as a Risk Factor	154
		5.6.2 Cross-Sectional Measures of the Equity Premium	154
	5.7	Solution and Further Problems	156
6	Con	sumption-Based Asset Pricing	161
	6.1	Lognormal Consumption with Power Utility	162
	6.2	Three Puzzles	163
	()	6.2.1 Responses to the Puzzles	166
	6.3	Beyond Lognormality	168
	61	5.3.1 Time-Varying Disaster Risk	1/3
	0.4	Epstein-Zin Preferences	1/0
	65	Long Pup Pisk Models	1/0
	0.5	6.5.1 Predictable Consumption Growth	182
		6.5.2 Heteroskedastic Consumption	182
		6.5.3 Empirical Specification	186
	6.6	Ambiguity Aversion	187
	67	Habit Formation	191
	0.7	6.7.1 A Ratio Model of Habit	192
		6.7.2 The Campbell-Cochrane Model	193
		6.7.3 Alternative Models of Time-Varying Risk Aversion	198
		· -	

	6.8	Durable Goods	199
	6.9	Solutions and Further Problems	201
7	Produ	ction-Based Asset Pricing	207
	7.1	Physical Investment with Adjustment Costs	207
		7.1.1 A ^-Theory Model of Investment	208
		7.1.2 Investment Returns	212
		7.1.3 Explaining Firms'Betas	214
	7.2	General Equilibrium with Production	215
		7.2.1 Long-Run Consumption Risk in General Equilibrium	215
		7.2.2 Variable Labor Supply	220
		7.2.3 Habit Formation in General Equilibrium	222
	7.3	Marginal Rate of Transformation and the SDF	222
	7.4	Solution and Further Problem	226
8	Fixed	-Income Securities	229
	8.1	Basic Concepts	230
		8.1.1 Yields and Holding-Period Returns	230
		8.1.2 Forward Rates	234
		8.1.3 Coupon Bonds	236
	8.2	The Expectations Hypothesis of the Term Structure	237
		8.2.1 Restrictions on Interest Rate Dynamics	238
		8.2.2 Empirical Evidence	239
	8.3	Affine Term Structure Models	241
		8.3.1 Completely Affine Homoskedastic Single-Factor Model	242
		8.3.2 Completely Affine Heteroskedastic Single-Factor Model	245
		8.3.3 Essentially Affine Models	246
		8.3.4 Strong Restrictions and Hidden Factors	249
	8.4	Bond Pricing and the Dynamics of Consumption Growth and Inflation .	. 250
		8.4.1 Real Bonds and Consumption Dynamics	250
		8.4.2 Permanent and Transitory Shocks to Marginal Utility	252
		8.4.3 Real Bonds, Nominal Bonds, and Inflation	254
	8.5	Interest Rates and Exchange Rates	257
		8.5.1 Interest Parity and the Carry Trade	258
	0.6	8.5.2 The Domestic and Foreign SDF	260
	8.6	Solution and Further Problems	264
9	Intert	emporal Risk	269
	9.1	Myopic Portfolio Choice	270
	9.2	Intertemporal Hedging	272
		9.2.1 A Simple Example	272
		9.2.2 Hedging Interest Rates	273
		9.2.3 Hedging Risk Premia	277
	0.2	9.2.4 Alternative Approaches	283
	9.3	I ne Intertemporal CAPM	283
		9.5.1 A IWO-Beta Model	283
	0.4	9.5.2 Hedging volatility: A Infee-Beta Model	28/
	9.4	I ne Term Structure of Kisky Assets	290
		9.4.1 Stylized Facts	290
		7.4.2 Asset Friding Theory and the Kisky Term Structure	291

х

Contents

	9.5	Learning	295
	9.6	Solutions and Further Problems	299
Pa	rt III	Heterogeneous Investors	
10	Hous	ehold Finance	307
	10.1	Labor Income and Portfolio Choice	308
		10.1.1 Static Portfolio Choice Models	308
		10.1.2 Multiperiod Portfolio Choice Models	312
		10.1.3 Labor Income and Asset Pricing	316
	10.2	Limited Participation	318
		10.2.1 Wealth, Participation, and Risktaking	318
		10.2.2 Asset Pricing Implications of Limited Participation	322
	10.3	Underdiversification	323
		10.3.1 Empirical Evidence	324
		10.3.2 Effects on the Wealth Distribution	327
		10.3.3 Asset Pricing Implications of Underdiversification	329
	10.4	Responses to Changing Market Conditions	331
	10.5	Policy Responses	334
	10.6	Solutions and Further Problems	335
11	Risks	haring and Speculation	341
	11.1	Incomplete Markets	342
		11.1.1 Asset Pricing with Uninsurable Income Risk	342
		11.1.2 Market Design with Incomplete Markets	345
		11.1.3 General Equilibrium with Imperfect Risksharing	346
	11.2	Private Information	347
	11.3	Default	349
		11.3.1 Punishment by Exclusion	349
		11.3.2 Punishment by Seizure of Collateral	353
	11.4	Heterogeneous Beliefs	354
		11.4.1 Noise Traders	354
		11.4.2 The Harrison-Kreps Model	356
	115	11.4.5 Endogenou Margin Requirements	339
	11.5	Solution and Further Problems	303
12	Asym	metric Information and Liquidity	371
	12.1	Rational Expectations Equilibrium	372
		12.1.1 Fully Revealing Equilibrium	372
		12.1.2 Partially Revealing Equilibrium	375
		12.1.3 News, Trading Volume, and Returns	378
		12.1.4 Equilibrium with Costly Information	380
	10.0	12.1.5 Higher-Order Expectations	383
	12.2	Market Microstructure	384
		12.2.1 Information and the Bid-Ask Spread	385
		12.2.2 Information and Market Impact	389
	122	Liquidity and Asset Pricing	392
	12.3	12.3.1 Constant Trading Costs and Asset Prices	392
		12.3.1 Constant Trading Costs and Assat Prices	393 205
		12.5.2 Kanuonii Haunig Cosis and Asset Flices	595

	12.3.3 Margins and Asset Prices	396
	12.3.4 Margins and Trading Costs	397
12.4	Solution and Further Problems	400
Refer	405	
Index		435