## Bonds and Bond Derivatives

Second Edition

Miles Livingston

HOCHSCHULE LIECHTENSTEIN Biblibthek



# -CONTENTS-

Pr	Preface	
Ac	knowledgements	xiii
	Introduction	1
	Growth of Debt	1
	Increased Variability of Interest Rates	2
	New Varieties of Debt	5
	Plan of the Book	6
1	Determinants of the Level of Interest Rates	7
	Federal Reserve •	7
	Foreign Central Banks	9
	Loanable Funds Approach	9
	Inflation and Interest Rates	13
	Summary	16
	Questions and Problems	16
2	Issuers	17
	The US Treasury	17
	Index-Linked Bonds	24
	Government-Sponsored Enterprises	26
	Municipal Securities	27
	Mortgages •	32

	Corporations	34
	Summary	35
	Questions and Problems	35
3	Financial Intermediaries	37
	Initial Sale of Securities (Primary Market)	37
	Dealers and Brokers (Secondary Market)	41
	Mutual Funds	47
	Insurance Companies	50
	Pension Funds	52
	Commercial Banks and Thrifts	53
	Comparing Types of Debt Financing	55
	Summary	56
	Questions and Problems	56
4	Time Values	58
	A Time Line	58
	' Future Value	59
	Present Value	59
	Finding Future Value from Present Value "	62
	Price of a Bond	62
	Bond Yield to Maturity	63
	Other Yield Measures	65
	Perpetual Bonds	66
	Holding Period Returns	67
	Semiannual Interest	70
	Accrued Interest	71
	Newspaper and Internet Quotes	73
	Summary	73
	Notes	. 73
	Questions and Problems ,	73
	Appendix	. 76
5	Money Market Instruments and Rates	80
	Money Market Instruments	81
	Money Market Rates	88
	Summary	94
	Questions and Problems	94
6	The Risk of Changing Interest Rates	96
	Duration ~	96
	Immunization at a Horizon Date	102

Immunizing Assets and Liabilities	106
Summary	106
Note	107
Questions and Problems	107
Appendix	108
Time Value with Nonflat Term Structure	113
Spot Interest Rates	113
Present Values or Spot Prices	114
Treasury Strips	1.16
Forward Interest Rates	117
Shape of the Term Structure	122
Annuities	124
Prices of Coupon-Bearing Bonds	125
Yield to Maturity and Spot Rates	126
Methods for Estimating the Term Structure of	
Interest Rates	127
Summary	129
Questions and Problems •	130
Appendix '	132
Arbitrage	133
Shortselling '	133
Conditions for Arbitrage "	135
Arbitrage and Present Values	136
Arbitrage and Bond Coupons	137
An Example Where Cumulative Cash Flows Matter	139
An Example of a Replicating Portfolio	139
Creating Forward Contracts from Spot Securities	141
Arbitrage and Forward Interest Rates	143
Arbitrage Proof of Linear Relationship between	
Bond Price and Coupon	145
Finding Arbitrage Opportunities	147
Summary	148
Note	148
Questions and Problems	148
<b>Term Structure of Interest Rates</b>	150
Historical Patterns in Yield Curves	150
Segmented Markets Theory	152
Increasing Liquidity Premiums	153
Preferred Habitat ~	154
Money Substitute	155

viii CONTENTS

	Expectations Hypothesis	155
,l~	Combined Theory	159
	Humpbacked Curves	161
	Holding Period Returns	161
	Modern Term Structure Models	163
	Summary	164
	Notes	165
	Questions and Problems	165
10	Default Risk	167
	Default on Municipal Bonds	167
	Default on Mortgages	167
	Corporate Bonds	168
	Bond Ratings	172
	High-Yield (Junk) Bonds	176
	Summary	178
	Questions and Problems	178
11	Put and Call Options	179
	Call Options	179
	Put Options	186
	Put-Call Parity	188
	Determinants of the Value of a Call Option	191
	Employee Stock Options	194
	Summary '	195
	Notes	196
	Questions and Problems	196
12	Call Features on Bonds	199
	Reasons for Calling a Bond	200
	Embedded Options	201
	Yield to Call .	201
	Refunding	. 202
	The Timing of Refunding	203
	The Existence of Call Provisions	204
	Callable Debt versus Short-Term Debt	206
	Advance Refundings	206
	Refunding Discounted Debt	207
	Sinking Funds	208
	Refunding Municipal Bonds	208
	Summary"	209
	Ouestions and Problems	209

13	Mortgages	211
	Mortgage'Mathematics	212
	Variable-Rate Mortgages	215
	Assumable Mortgages	216
	The Prepayment Option	217
	Marketable Mortgages	220
	Default and Mortgage Guarantees	222
	Derivative Mortgage Products	224
	Summary	229
	Questions and Problems	229
14	<b>Futures Contracts</b>	232
	Open Interest	234
	Margin and Marking-to-Market	235
	Forward versus Futures Contracts	237
	Determinants of Futures Prices	238
	Speculative Futures Positions	245
	Hedging with Futures Contracts	246
	Summary	250
	Notes	250
	Questions and Problems	251
15	Bond Futures •	253
	Treasury Bond Futures	253
	Comparison with Other Futures Contracts	258
	Hedging with Financial Futures	258
	Cheapest Deliverable Bond	260
	Invoice price	261
	Other Aspects of the Delivery Process	263
	Summary	264
	Notes •	264
	Questions and Problems	265
16	Other Derivatives	267
	Floating-Rate Notes	267
	Interest Rate Swaps	- 269
	Convertible Bonds	272
	Preferred Stock	275
	Summary	276
	Notes -	276
	Questions and Problems	276

17	Exchange Rates and International Investments.	277
	International Investment .	277
	Exchange Rates	278
	Impact of Changing Exchange Rates on Imports and Exports	279
	Exchange Rates and Investment Returns	279
	Inflation, Interest Rates, and Exchange Rates	282
	Spot and Forward Exchange Rates	282
	Covered Interest Arbitrage ,	283
	Time Series Properties of Exchange Rates	285
	International Bond Markets	285
	Summary	286
	Questions and Problems	286
Sele	ected References	288
Ind	ex	291