

# CONTENTS

PREFACE	III
CONTENTS	VII
LIST OF FIGURES	XI
<b>I Major U.S. Asset Classes</b>	<b>1</b>
1 MARKETS AND DATA	3
1.1 <i>Description of Databases</i> . . . . .	3
1.2 <i>Description of Data Sets</i> . . . . .	5
1.3 <i>Summary</i> . . . . .	6
<b>II Asset Statistics</b>	<b>11</b>
2 INTRODUCTION	13
3 WEALTH INDICES	15
3.1 <i>Nominal Wealth Index Charts</i> . . . . .	18
3.2 <i>Nominal Wealth Index Tables</i> . . . . .	22
3.3 <i>Real Wealth Index Charts</i> . . . . .	24
3.4 <i>Real Wealth Index Tables</i> . . . . .	28
3.5 <i>Nominal vs. Real Indices</i> . . . . .	30
4 TOTAL RETURNS	33
4.1 <i>Nominal Monthly Total Returns Series</i> . . . . .	34
4.2 <i>Nominal Monthly Total Returns Statistics</i> . . . . .	35
4.3 <i>Real Monthly Total Returns</i> . . . . .	36
4.4 <i>Real Monthly Total Returns Statistics</i> . . . . .	37
4.5 <i>Density of Monthly Total Returns</i> . . . . .	38
4.6 <i>Extreme and Outlying Returns</i> . . . . .	40

5	RISK PREMIUMS	43
5.1	<i>Equity Risk Premium</i> . . . . .	46
5.2	<i>Small Stock Premium</i> . . . . .	48
5.3	<i>Bond Default Premium</i> . . . . .	50
5.4	<i>Bond Horizon Premium</i> . . . . .	52
6	HOLDING PERIODS	55
7	DRAWDOWNS AND RECOVERY	97
7.1	<i>Monthly Drawdown Series</i> . . . . .	100
7.2	<i>Monthly Drawdown Statistics</i> . . . . .	102
7.3	<i>Drawdown Depths and Lengths</i> . . . . .	104
7.4	<i>Rolling Maximum Drawdowns</i> . . . . .	112
8	MARKET TIMING	129
8.1	<i>Missed Trades</i> . . . . .	132
8.2	<i>Month of Year Effect</i> . . . . .	148
<b>III Multivariate Analysis</b>		<b>165</b>
9	INTRODUCTION	167
10	CORRELATION STRUCTURES	169
10.1	<i>Pearson's Correlogram Plots</i> . . . . .	172
10.2	<i>Kendall's Rank Correlogram Plots</i> . . . . .	176
10.3	<i>Pearson's Correlation Image Plots</i> . . . . .	180
10.4	<i>Kendall's Rank Correlation Image Plots</i> . . . . .	181
11	ORDERING OF ASSETS	183
11.1	<i>Pearson's Correlation</i> . . . . .	184
11.2	<i>Kendall's Rank Correlation</i> . . . . .	185
12	GROUPING OF ASSETS	187
12.1	<i>Hierarchical Grouping of Assets</i> . . . . .	188
12.2	<i>k-means Grouping of Assets</i> . . . . .	189
<b>IV Advanced Analytics</b>		<b>191</b>
13	INTRODUCTION	193
14	TURNING POINTS AND CYCLES	195
14.1	<i>Turning Points Frequency</i> . . . . .	198
14.2	<i>Turning Points in Assets Classes</i> . . . . .	199
14.3	<i>Turning Points in Stock/Bond Blends</i> . . . . .	207

15	GARCH VOLATILITY MODELLING	211
15.1	<i>Garch Modelling of Asset Classes</i> . . . . .	212
15.2	<i>Garch Modelling of Stock/Bond Blends</i> . . . . .	220
16	STRUCTURAL BREAKS	225
16.1	<i>Change Points in Assets Classes</i> . . . . .	228
16.2	<i>Change Points in Stock/Bond Blends</i> . . . . .	236
17	EXTREMES AND OUTLIERS	241
17.1	<i>Extremes and Outliers in Asset Classes</i> . . . . .	242
17.2	<i>Extremes and Outliers in Stock/Bond Blends</i> . . . . .	250
18	NON-STATIONARITY ANALYSIS	255
18.1	<i>Wavelet Analysis of Asset Classes</i> . . . . .	258
18.2	<i>Wavelet Analysis of Stock/Bond Blends</i> . . . . .	266
<b>V</b>	<b>Portfolio Benchmarking</b>	<b>269</b>
19	INTRODUCTION	271
20	BOND AND STOCK BLENDS	273
20.1	<i>Bond/Stock Portfolio Frontier</i> . . . . .	276
21	TERNARY PORTFOLIO DESIGN	293
21.1	<i>Portfolio Return</i> . . . . .	314
21.2	<i>Portfolio Covariance Risk</i> . . . . .	315
21.3	<i>Portfolio Value at Risk</i> . . . . .	316
21.4	<i>Portfolio Expected Shortfall Risk</i> . . . . .	317
21.5	<i>Portfolio Maximum Loss</i> . . . . .	318
22	MULTI ASSET PORTFOLIOS	321
22.1	<i>Multi Assets Class Portfolio</i> . . . . .	324
23	RISK SURFACES	341
23.1	<i>Weights Diversification</i> . . . . .	342
23.2	<i>Value at Risk Diversification</i> . . . . .	354
<b>VI</b>	<b>Appendix</b>	<b>359</b>
A	RMETRICS TERMS OF LEGAL USE	361

<b>References</b>	<b>363</b>
<b>About the Authors</b>	<b>365</b>