Real Estate Finance and Investments

Seventeenth Edition

William B. Brueggeman, PhD

Professor Emeritus Edwin L. Cox School of Business Southern Methodist University

Jeffrey D. Fisher, PhD

Professor Emeritus of Real Estate Kelley School of Business Indiana University President, Homer Hoyt Institute Visiting Professor, Johns Hopkins University



Brief Contents

PART ONE

Overview of Real Estate Finance and Investments

- 1 Real Estate Investment: Basic Legal Concepts 1
- 2 Real Estate Financing: Notes and Mortgages 16

PART TWO

Mortgage Loans

- **3** Mortgage Loan Foundations: The Time Value of Money 42
- 4 Fixed Interest Rate Mortgage Loans 78
- 5 Adjustable and Floating Rate Mortgage Loans 122
- 6 Mortgages: Additional Concepts, Analysis, and Applications 147

PART THREE

Residential Housing

- 7 Single-Family Housing: Pricing, Investment, and Tax Considerations 182
- 8 Underwriting and Financing Residential Properties 219

PART FOUR

Income-Producing Properties

- **9** Income-Producing Properties: Leases, Rents, and the Market for Space 249
- **10** Valuation of Income Properties: Appraisal and the Market for Capital 291
- 11 Investment Analysis and Taxation of Income Properties 341
- **12** Financial Leverage and Financing Alternatives 391

- **13** Risk Analysis 426
- **14** Disposition and Renovation of Income Properties 460
- **15** Financing Corporate Real Estate 496

PART FIVE

Financing Real Estate Development

- **16** Financing Project Development 521
- 17 Financing Land Development Projects 556

PART SIX

Alternative Real Estate Financing and Investment Vehicles

- 18 Structuring Real Estate Investments: Organizational Forms and Joint Ventures 585
- **19** The Secondary Mortgage Market: Pass-Through Securities 624
- **20** The Secondary Mortgage Market: CMOs, CDOs, CLOs, and Derivative Securities 651
- **21** Real Estate Investment Trusts (REITs) 693

PART SEVEN

Portfolio Analysis and Real Estate Funds

- **22** Real Estate Investment Performance and Portfolio Considerations 727
- **23** Real Estate Funds: Structure, Performance, Benchmarking, Risk and Attribution Analysis 753

INDEX 797



Table of Contents

PART ONE OVERVIEW OF REAL ESTATE FINANCE AND INVESTMENTS

Chapter 1 Real Estate Investment: Basic Legal Concepts 1

Property Rights and Estates 2
Definition of Estate 4
Two General Classifications of Estates 4
Examples of Freehold Estates 4
Estates Not Yet in Possession (Future Estates) 5
Examples of Leasehold Estates 5
Interests, Encumbrances, and Easements 6
Assurance of Title 7
The Meaning of Title 7
Deeds 9
Methods of Title Assurance 9
Abstract and Opinion Method 11
The Title Insurance Method 11
Recording Acts 12
Limitations on Property Rights 13

Chapter 2 Real Estate Financing: Notes and Mortgages 16

Notes 16 The Mortgage Instrument 18 Definition of a Mortgage 18 Relationship of Note to Mortgage 18 Interests That Can Be Mortgaged 19 Minimum Mortgage Requirements 19 Important Mortgage Covenants 20 Assumption of Mortgage 22 Acquiring Title "Subject to" a Mortgage 23 Property Covered by a Mortgage 23 Junior Mortgages 24 Recording of Mortgages 24 Other Financing Sources 25 Seller Financing 25 Land Contracts 25 Default 26 What Constitutes Default? 26 Alternatives to Foreclosure: Workouts 27 Restructuring the Mortgage Loan 27

Transfer of Mortgage to a New Owner 29 Voluntary Conveyance 29 Friendly Foreclosure 30 Prepackaged Bankruptcy 30 Short Sale 31 Foreclosure 31 Judicial Foreclosure 31 Redemption 32 Sales of Property 32 Effect of Foreclosure on Junior Lienors 35 Deficiency Judgment 35 Taxes in Default 36 Bankruptcy 37 Chapter 7 Liquidation 37 Chapter 11 38 Chapter 13 39

PART TWO MORTGAGE LOANS

Chapter 3 Mortgage Loan Foundations: The Time Value of Money 42

Compound Interest 42 Compound or Future Value 43 Calculating Compound Interest Factors 47 Using Financial Functions: Calculators and Spreadsheets 49 Present Value 52 A Graphic Illustration of Present Value 52 Expanding the Use of Calculators for Finding Present Values 54 Compound or Future Value of an Annuity 56 Use of Compound Interest Factors for Annuities 58 Present Value of an Annuity 60 Use of the Present Value of an Annuity Factors 61 Accumulation of a Future Sum 64 Determining Yields, or Internal Rates of Return, on Investments 65 Investments with Single Receipts 65 Yields on Investment Annuities 68 Equivalent Nominal Annual Rate (ENAR): Extensions 70 Solving for Annual Yields with Partial Periods: An Extension 72

Chapter 4 Fixed Interest Rate Mortgage Loans 78

Determinants of Mortgage Interest Rates: A Brief Overview 78 The Real Rate of Interest: Underlying Considerations 79 Interest Rates and Inflation Expectations 79 Interest Rates and Risk 80 A Summary of Factors Important in Mortgage Loan Pricing 82 Understanding Fixed Interest Rate Mortgage (FRM) Loan Terms 82 Calculating Payments and Loan Balances-Fixed Interest Rate Loans 84 The Importance of Accrued Interest and Loan Payments 84 Loan Amortization Patterns 84 Fully Amortizing, Constant Payment Mortgage (CPM) Loans 85 Partially Amortizing, Constant Payment Mortgage (CPM) Loans 89 Zero Amortizing, or Interest-Only-Constant Payment Mortgage (CPM) Loans 90 Negative Amortizing, Constant Payment Mortgage (CPM) Loans 91 Summary and Comparisons: Fixed Interest Rate, Constant Payment Mortgage (CPM) Loans with Various Amortization Patterns 92 Determining Loan Balances 94 Finding Loan Balances-Other Amortization Patterns 95 Loan Closing Costs and Effective Borrowing Costs 96 Loan Fees and Early Repayment: Fully Amortizing Loans 99 Charging Fees to Achieve Yield, or When "Pricing" FRMs 103 Financing Loan Fees and Other Closing Costs 104 Other FRM Loan Patterns—Declining Payments and Constant Amortization Rates 104 Amortization Schedules and Callable Loans 105 "Reverse Mortgages" 106 Appendix 113 Inflation, Mortgage Pricing, and Payment Structuring 113

Chapter 5 Adjustable and Floating Rate Mortgage Loans 122

The Price Level Adjusted Mortgage (PLAM) 124 PLAM: Payment Mechanics 124 ARMs and Floating Rate Loans: An Overview126Variations: ARM and Floating Rate Loans129Risk Premiums, Interest Rate Risk, and Default Risk133Expected Yield Relationships and Interest Rate Risk135More Complex Features136ARM Payment Mechanics138

Chapter 6

Mortgages: Additional Concepts, Analysis, and Applications 147

Incremental Borrowing Cost 147 Early Repayment 149 Origination Fees 150 Incremental Borrowing Cost versus a Second Mortgage 151 Relationship between the Incremental Cost and the Loanto-Value Ratio 151 Differences in Maturities 154 Loan Refinancing 155 Early Repayment: Loan Refinancing 156 Effective Cost of Refinancing 158 Borrowing the Refinancing Costs 158 Other Considerations 159 Early Loan Repayment: Lender Inducements 161 Market Value of a Loan 162 Effective Cost of Two or More Loans 163 Second Mortgages and Shorter Maturities 165 Effect of Below-Market Financing on Property Prices 166 Assuming a Lower Loan Balance 169 Cash Equivalency 169 Cash Equivalency: Smaller Loan Balance 170 Cash Equivalency: Concluding Comments 171 Wraparound Loans 171 Buydown Loans 174 Appendix 178 After-Tax Effective Interest Rate 178

PART THREE RESIDENTIAL HOUSING

Chapter 7

Single-Family Housing: Pricing, Investment, and Tax Considerations 182

Overview 182 House Prices 182 Income and Employment 183 Renting versus Owning 184 Analyzing Expected House Prices 190 Economic Base Analysis—Location Quotients 194 Housing Supply: An Overview 195 Submarkets: Neighborhoods/Municipalities 196 Capitalization Effects: Price Premiums 196 Pricing Property in Specific Submarkets/ Locations 198

Investing in "Distressed Properties" 206 Financial Framework for Analyzing Distressed Properties 207 Acquisition Phase 207 Holding Period Phase 211 Disposition Phase—Exit Strategies 215

Chapter 8 Underwriting and Financing Residential Properties 219

Underwriting Default Risk 219 Classification of Mortgage Loans 220 Conventional Mortgage Loans 220 Insured Conventional Mortgage Loans 221 FHA-Insured Mortgage Loans 223 VA-Guaranteed Mortgage Loans 223 The Underwriting Process 224 Borrower Income 224 Verification of Borrower Assets 226 Assessment of Credit History 226 Estimated Housing Expense 227 Other Obligations 227 Compensating Factors 227 The Underwriting Process Illustrated 229 Underwriting Standards—Conventional and Insured Conventional Mortgages 230 Underwriting Standards—FHA-Insured Mortgages 231 Underwriting Standards—VA-Guaranteed Mortgages 232 Underwriting and Loan Amounts—A Summary 234 The Closing Process 236 Fees and Expenses 236 Prorations, Escrow Costs, and Payments to Third Parties 237 Statutory Costs 239 Requirements under the Real Estate Settlement and Procedures Act (RESPA) 239 Settlement Costs Illustrated 241 Federal Truth-in-Lending (FTL) Requirements 243 Truth-in-Lending Sample Disclosure 244 Establishing the APR under Federal Truth-in-Lending Requirements 244 ARMs and Truth-in-Lending Disclosure 244

PART FOUR INCOME-PRODUCING PROPERTIES

Chapter 9

Income-Producing Properties: Leases, Rents, and the Market for Space 249

Property Types 249 Supply and Demand Analysis 251 Local Market Studies of Supply and Demand 254 Location and User-Tenants 255 The Business of Real Estate 257 The "Market" for Income-Producing Real Estate 258 Income Potential—Real Estate Assets 259 Vacancy 260 Underwriting Tenants 261 General Contents of Leases 261 Leases and Rental Income 265 Leases and Responsibility for Expenses (Recoveries) 265 Comparing Leases: Effective Rent 268 Other Financial Considerations 270 Developing Statements of Operating Cash Flow 272 Case Example: Office Properties 273 Rent Premiums and Discounts for Office Space 273 Pro Forma Statement of Cash Flow-Office Properties 276 Case Example: Industrial and Warehouse Properties 277 Pro Forma Statement of Cash Flow-Industrial/ Warehouse Properties 278 Case Example: Retail Properties 279 The Retail Leasing Environment 279 CAM Charges—Recoveries 281 Pro Forma Statement of Cash Flow-Retail Properties 282 Case Example: Apartment Properties 284

Chapter 10 Valuation of Income Properties: Appraisal and the Market for Capital 291

Introduction 291 Valuation Fundamentals 291 Appraisal Process and Approaches to Valuation 292 Sales Comparison Approach 293 Income Approach 295 *Capitalization Rate 297 Capitalization Rates—A Note of Caution 300 Discounted Cash Flow Techniques 301* Land Values: Highest and Best Use Analysis 308 Volatility in Land Prices 309 "Highest and Best Use" Analysis—Vacant Site 309 "Highest and Best Use" Analysis-Improved Property 310 Mortgage-Equity Capitalization 311 Reconciliation: Sales Comparison and Income Capitalization Approaches 313 Exploring the Relationships between Changing Market Conditions, Cap Rates, and Property Values 313 A Closing Note on Cap Rates and Market Conditions 318 A Word of Caution-Simultaneous Effects of Real Market Forces and Interest Rates on Property Values 318 Leases: Valuation of a Leased Fee Estate 318 Cost Approach 319 Valuation Case Study—Oakwood Apartments 323 RealNex Solution 325 Appendix 334 RealNex Inputs and Output for Apartment Analysis 334

Chapter 11 Investment Analysis and Taxation of Income Properties 341

Motivations for Investing 341 Real Estate Market Characteristics and Investment Strategies 342 The Real Estate Cycle 342 Investment Strategies 344 Market Analysis 347 Supply of Space 349 Market Rents 351 Forecasting Supply, Demand, Market Rents, and Occupancy 352 Making Investments: Projecting Cash Flows 354 Office Building Example 354 Base Rent 355 Market Rent 355 Expense Stops 356 Net Operating Income 357 Expected Outlays for Replacements and Capital Improvements 358 Estimated Sale Price 358 Introduction to Investment Analysis 360 Internal Rate of Return (IRR) 360 Present Value 361 Introduction to Debt Financing 361 Measures of Investment Performance Using Ratios 362

Before-Tax Cash Flow from Sale 362 Summary of Investment Analysis Calculations 364 Taxation of Income-Producing Real Estate 364 Taxable Income from Operation of Real Estate 365 Depreciation Allowances 366 Loan Points 367 Tax Liability and After-Tax Cash Flow 367 Taxable Income from Disposal of Depreciable Real Property 368 After-Tax Investment Analysis 368 After-Tax Cash Flow from Operations 368 After-Tax Cash Flow from Sale 370 After-Tax IRR 371 Effective Tax Rate 371 A Note about Passive Losses 372 Special Exceptions to PAL Rules 373 Appendix A 377 Approaches to Metro Area Market Forecasting: 377 Appendix B 383 RealNex Office Example 383

Chapter 12 Financial Leverage and Financing Alternatives 391

Introduction to Financial Leverage 391 Conditions for Positive Leverage—Before Tax 392 Conditions for Positive Leverage—After Tax 396 Break-Even Interest Rate 398 Risk and Leverage 400 Underwriting Loans on Income Properties 402 Market Study and Appraisal 402 Borrower Financials 402 The Loan-to-Value Ratio 403 The Debt Coverage Ratio 403 Other Loan Terms and Mortgage Covenants 404 Alternatives to Fixed Rate Loan Structures 406 Participation Loans 407 Lender Motivations 407 Investor Motivations 408 Participation Example 408 Sale-Leaseback of the Land 412 Effective Cost of the Sale-Leaseback 414 Interest-Only Loans 414 Accrual Loans 416 Structuring the Payment for a Target Debt Coverage Ratio 416 Convertible Mortgages 418 Lender's Yield on Convertible Mortgages 418 Comparison of Financing Alternatives 420 Other Financing Alternatives 422

Chapter 13 Risk Analysis 426

Introduction 426 Comparing Investment Returns 426 Types of Risk 427 Due Diligence in Real Estate Investment Risk Analysis 429 Sensitivity Analysis 429 Partitioning the IRR 433 Variation in Returns and Risk 434 Retail Case Study—Westgate Shopping Center 438 Westgate Shopping Center Scenario Analysis 441 Lease Rollover Risk 441 Market Leasing Assumptions with Renewal Probabilities 443 Market Rent 443 Months Vacant 443 Leasing Commissions 444 Tenant Improvements 444 Industrial Case Study—Worthington Distribution Center 444 Risk and Leverage 446 Monte Carlo Simulation 449 Example 451 Extensions of Monte Carlo Simulation 452 Participation Example 452 A "Real Options" Approach to Investment Decisions 454

 A Real Options Approach to Land Valuation 455

 Real Option Approach to Land Valuation 455

 Real Options Extensions and Strategy 456

Chapter 14 Disposition and Renovation of Income Properties 460

Disposition Decisions 460 A Decision Rule for Property Disposition 461 *IRR* for Holding versus Sale of the Property 462 Return to a New Investor 465 Marginal Rate of Return 465 Refinancing as an Alternative to Disposition 469 Incremental Cost of Refinancing 470 Leveraged Return from Refinancing and Holding an Additional Five Years 470 Refinancing at a Lower Interest Rate 472 Other Disposition Considerations-Portfolio Balancing 473 Tax-Deferral Strategies upon Disposition 473 Installment Sales 474 Tax-Deferred Exchanges 479 Renovation as an Alternative to Disposition 486

Renovation and Refinancing 489 Rehabilitation Investment Tax Credits 489 *Low-Income Housing 491*

Chapter 15 Financing Corporate Real Estate 496

Lease-versus-Own Analysis 497 Leasing versus Owning—An Example 497 Cash Flow from Leasing 498 Cash Flow from Owning 498 Cash Flow from Owning versus Leasing 500 Return from Owning versus Leasing 500 Importance of the Residual Value of Real Estate 501 The Investor's Perspective 503 A Note on Project Financing 504 Factors Affecting Own-versus-Lease Decisions 505 Impact on Lessee Financial Reporting 509 Impact of Lease on Income Statement and Balance Sheet 509 The Role of Real Estate in Corporate Restructuring 513 Sale–Leaseback 513 Refinancing 516 Investing in Real Estate for Diversification 516 Appendix 519 Real Estate Asset Pricing and Capital Budgeting Analysis: A Synthesis 519

PART FIVE FINANCING REAL ESTATE DEVELOPMENT

Chapter 16 Financing Project Development 521

Introduction 521 Overview: The Planning and Permitting Process 521 The Development of Income-Producing Property 525 Market Risks and Project Feasibility 526 Project Risks 527 Project Development Financing—An Overview 529 Lender Requirements in Financing Project Development 530 Interest Rates and Fees 536 Project Development Illustrated 536 Project Description and Project Costs 536 Market Data and Tenant Mix 541 Pro Forma Construction Costs and Cash Flow Projections 542 Feasibility, Profitability, and Risk—Additional Issues 546 Profitability Before and After Taxes 546 Sensitivity Analysis, Risk, and Feasibility Analysis 550

Chapter 17 Financing Land Development Projects 556

Characterization of the Land Development Business 556 The Land Development Process—An Overview 558 Acquisition of Land–Use of the Option Contract 558 Financing and Development 560 Lender Requirements in Financing Land Development 563 Detailed Cost Breakdowns 565 General Contracts and Subcontracts 565 Residential Land Development Illustrated 566 Market Conditions and Site Plan 567 Estimating Development Cost and Interest Carry 569 Estimating Release Prices per Parcel Sold 577 Loan Request and Repayment Schedule 577 Project Feasibility and Profitability 578 Project IRR and Net Present Value 581 Entrepreneurial Profits 581 Sensitivity Analysis 582

PART SIX ALTERNATIVE REAL ESTATE FINANCING AND INVESTMENT VEHICLES

Chapter 18 Structuring Real Estate Investments: Organizational Forms and Joint Ventures 585

Introduction 585 Sole Proprietorships 585 Partnerships 586 Limited Liability Companies 588 Corporations 589 Joint Ventures 590 Organizational Forms 591 Profit Sharing 591 Initial Capital Contributions 592 Sharing Cash Flow from Operations 592 Sharing of Cash Flow from Sale 593 Summary of Cash Flows Distributed in Each Operating Year 594 Cash Flow from Sale 596 *IRR* to Each Joint Venture Party 596 Variation on the Preferred IRR—"The Lookback IRR" 597 Syndications 598

Use of the Limited Partnership in Private and Public Syndicates 599 Private Syndication Problem Illustrated 600 Financial Considerations—Partnership Agreement 601 **Operating Projections** 602 Statement of Before-Tax Cash Flow (BTCF) 603 Calculation of Net Income or Loss 603 Calculation of Capital Gain from Sale 604 Capital Accounts 604 Distribution of Cash from Sale of Asset 605 Calculation of After-Tax Cash Flow and ATIRR on Equity 606 Partnership Allocations and Substantial Economic Effect 608 Capital Accounts and Gain Charge-Backs 609 Use of the Limited Partnership in Private and Public Syndicates 611 Use of Corporate General Partners 612 Private versus Public Syndicates 612 Accredited Investors—Regulation D 613 Regulation of Syndicates 617 Investment Objectives and Policies 618 Promoters' and Managers' Compensation 618 Investor Suitability Standards 619 Federal and State Securities Authorities 619

Chapter 19 The Secondary Mortgage Market: Pass-Through Securities 624

Introduction 624 Evolution of the Secondary Mortgage Market 624 Early Buyers of Mortgage Loans 625 The Secondary Market 625 FNMA's Changing Role 626 The Government National Mortgage Association 627 Mortgage-Backed Securities and the GNMA Payment Guarantee 627 The Federal Home Loan Mortgage Corporation 628 Operation of the Secondary Mortgage Market 629 Direct Sale Programs 629 The Development of Mortgage-Related Security Pools 629 Mortgage-Backed Bonds 630 Pricing Mortgage-Backed Bonds 631 Subsequent Prices 633 Mortgage Pass-Through Securities 634 Important Characteristics of Mortgage Pools 635 Mortgage Pass-Through Securities: A General Approach to Pricing 639

Mortgage Pass-Through Payment Mechanics Illustrated 641 Prepayment Patterns and Security Prices 643 Prepayment Assumptions 644 The Effects of Prepayment Illustrated 646 Security Prices and Expected Yields 647 Market Interest Rates and Price Behavior on Mortgage Pass-Throughs 648 A Note on MBBs and MPTs 649

Chapter 20 The Secondary Mortgage Market: CMOs, CDOs, CLOs, and Derivative Securities 651

Introduction 651 Mortgage Pay-Through Bonds (MPTBs) 651 Collateralized Mortgage Obligations 652 CMOs Illustrated 653 CMO Mechanics 655 CMOs: Pricing and Expected Maturities 661 CMO Price Behavior and Prepayment Rates 663 CMO Tranche Variations 665 Subprime Mortgage-Backed Securities 666 Derivatives Illustrated 667 Yield Enhancement 670 IO and PO Strips 670 Convexity 673 Residential Mortgage-Related Securities: A Summary 673 Residential Mortgage-Related Securities: Some Closing Observations 675 Commercial Mortgage-Backed Securities (CMBSs) 676 Rating Commercial Mortgage-Backed Securities 679 Collateralized Debt Obligations (CDOs) 681 Collateralized Loan Obligations (CLOs) 684 Mortgage-Related Securities and REMICs 685 REMICs: Other Considerations 687

Appendix 690

Duration—An Additional Consideration in Yield Measurement 690

Chapter 21 Real Estate Investment Trusts (REITs) 693

Introduction 693 Legal Requirements 693 Tax Treatment 696 Violation Penalties and Status Termination 697 Taxable REIT Subsidiaries 697 TYPES of REITs 698 Equity REITs 698 The Investment Appeal of Equity REITs 699

Public Nonlisted REITs 701 Importance of FFO (Funds from Operations) 704 REIT Expansion and Growth 706 Important Issues in Accounting and Financial Disclosure: Equity REITs 710 Tenant Improvements and Free Rents: Effects on FFO 711 Leasing Commissions and Related Costs 711 Use of Straight-Line Rents 712 FFO and Income from Managing Other Properties 712 Types of Mortgage Debt and Other Obligations 713 Existence of Ground Leases 713 Lease Renewal Options and REIT Rent Growth 713 Occupancy Numbers: Leased Space or Occupied Space? 714 Retail REITs and Sales per Square Foot 714 Additional Costs of Being a Public Company 715 The Investment Appeal of Mortgage REITs 715 Financial Analysis of an Equity REIT Illustrated 717 Valuing REITs as Investments 720 Valuation of Midwestern America Property Trust 720

PART SEVEN PORTFOLIO ANALYSIS AND REAL ESTATE FUNDS

Chapter 22 Real Estate Investment Performance and Portfolio Considerations 727

Introduction 727 The Four Quadrants of Real Estate Investment 727 Sources of Data Used for Real Estate Performance Measurement 728 REIT Data: Security Prices 730 Hybrid and Mortgage REITs 730 NCREIF Property and Fund Indices 730 Data Sources for Other Investments 731 731 Computing Holding Period Return Comparing Investment Returns 733 Risk-Adjusted Returns: Basic Elements 733 Elements of Portfolio Theory 735 Calculating Portfolio Returns 736 Portfolio Risk 737 Risk and Return for Portfolios with Different Weights 741 Importance of Correlation 742 Three Asset Class Portfolios 743 Multi-Asset Portfolios 745 Systematic versus Unsystematic Risk 745 Adding REITs to the Portfolio 746

Global Diversification 747 Use of Derivatives to Hedge Portfolio Risk 748 Beta and the Capital Asset Pricing Model (CAPM) 748

Chapter 23

Real Estate Funds: Structure, Performance, Benchmarking, Risk and Attribution Analysis 753

Investor Goals and Objectives 754 General Explanation of Possible Provisions in Fund Offerings 755 Reporting Fund Performance 765 Measuring and Reporting Investment Returns 765 Summary of Major Activity during Quarter: 766 Calculating Returns 768 Calculating Returns at the Property Level 770

Returns: Before and After Fees 771 Comparing Returns: Fund Level versus Property Level 772 Calculating Historical Returns 772 Time-Weighted Returns 773 Investor's Return versus Fund Return 776 Choosing IRR versus TWR for Performance Measurement 778 Target Returns and Benchmarks 779 Investment Multiple 780 Attribution Analysis 780 Attribution Analysis Mathematics 783 Interpreting Sector Allocation 784 Evaluating Risk Differences 786 Jensen's Alpha 790 Risk-Adjusted Attribution Analysis 791

INDEX 797