Contents

Commonly used symbols  

Introduction  

The changing property market  

Why is this book different?  

An approachable style • Use of notation that is common in finance • Use of empirical data • Use of examples and highlighted points • Summaries and summary tables • All proofs are shown in full • Property valuation models and financial theory • Advanced topics covered in appendices • Quantitative techniques • Instructor's workbook with worked examples and illustrations

General structure of the book

Part 1: The time value of money and the valuation of cash flows • Part 2: Risk and return in real estate • Part 3: Portfolio management

Proposed reading schedule

Acknowledgements

PART 1

The time value of money and the valuation of cash flows

1 Valuation and financial theory: bridging the gap

The importance of present value

3

4
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Valuing cash flows</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Single- and multiple-period investments</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Estimating future values</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Estimating present values</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Multiple-period cash flows</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Rent received in arrears and in advance</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Annuities</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Sinking funds</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Sinking fund example</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Another way of looking at sinking funds</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Valuing over periods of less than one year</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Annual percentage return (APR)</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>The effective rate of interest</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Real and nominal interest rates</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Simple freehold valuation models</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Non-growth models</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Annuities in perpetuity</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Example</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Income received in advance</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>The equivalent yield model</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Method 1: term and reversion • Method 2: the layer approach</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Constant growth models</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>The Gordon growth model</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Example</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>The periodic growth model</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Example</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>How valuers deal with periodic growth</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>The relationship between valuation models</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Important uses of growth explicit models</td>
<td>43</td>
</tr>
<tr>
<td>Appendix 3A:</td>
<td>Yields and rent review periods</td>
<td>46</td>
</tr>
<tr>
<td>Appendix 3B:</td>
<td>Estimating the growth rate from yields</td>
<td>49</td>
</tr>
<tr>
<td>Appendix 3C:</td>
<td>Estimating effective rents</td>
<td>54</td>
</tr>
</tbody>
</table>
4 Simple leasehold models
   The difference between two perpetuities
   Zero growth models
   Example
   Constant growth model
   Example
   Periodic growth model
   Example
Appendix 4A: Multiple growth models

5 Mortgages and amortisation
   The mortgage repayment table
   Example
   Endowment mortgages
   Changes in interest rates
   Changing the repayment period
   Payments over less than one year
   1. Annual payment method • 2. Annual interest method • 3. Effective interest method
   Reducing the payment period
Appendix 5A: Analysing alternative payment methods

6 The term structure of interest rates
   Spot rates, redemption yields and the yield curve
   Forward interest rates
   Valuation and the term structure
   Estimating the term structure
   Explaining the term structure
   The expectations hypothesis
   The liquidity preference hypothesis
   The preferred habitat hypothesis
   The market segmentation hypothesis

7 Valuations and prices
   The importance of valuations
   Valuations versus prices
   The slope coefficient
8 Investment decision techniques

The rationale for investment 138
The capital budgeting process 139
The residual analysis 139

Estimating the profit • Estimating the land value • Example

Some important questions 144
Common methods of investment appraisal 145

Pay-back 145
Shortcomings of the pay-back rule • Benefits of the pay-back rule

Discounted pay-back 147
Return on investment 148
Making decisions using cut-off rates 149
The internal rate of return 150
Net present value 154
The reinvestment rate 157

Requirements of decision-making techniques 157
The agency principle 158

Appendix 8A: Inflation, financing and taxation 165
Appendix 8B: Estimating relevant cash flows 172
Appendix 8C: Estimating relevant discount rates 174
Appendix 8D: Allowing for risk in the cash flows 184
Appendix 8E: The adjusted present value and residual equity income approach 191
Appendix 8F: Development finance: sources and techniques 200
Appendix 8G: Options to invest 203
PART 2

Risk and return in real estate

9 Distributional characteristics of real estate returns

Rates of return

Sample data

Comparison of sample with the IPD Index, 1987–92

Comparison of sample with the IPD Index, 1992–97

The distributional characteristics of real estate returns

Skewness

Kurtosis

Combining skewness and kurtosis

Return characteristics of individual properties

Return characteristics of portfolios

Comparison with the IPD Index

The correlation structure of returns

The correlation of real estate returns with other assets

Appendix 9A: Inter-asset comparisons

Appendix 9B: Statistical measures used to describe distributions

Appendix 9C: Arithmetic mean, geometric mean and continuous rates of return

10 Risk, return and diversification

Diversification and portfolio theory

Enter Harry Markowitz

Combining property returns

Risk indifference curves

Assumptions used in portfolio models

The standard portfolio problem

Ex-post versus ex-ante analysis

Enter William Sharpe

Portfolio expected return

Portfolio variance

Capital market theory

Example
The market portfolio 266
The separation theorem 266
How diversification affects value 266
Systematic and specific risk 267
Partitioning the variance 268
The security market line and the capital asset pricing model 269
Example 273
The two beta trap 273

Appendix 10A: Portfolio analysis 279
Appendix 10B: Portfolio analysis and index models 291
Appendix 10C: Portfolio analysis using alternative risk measures 299
Appendix 10D: The capital asset pricing model (CAPM) 307
Appendix 10E: The CAPM with non-marketable assets 310
Appendix 10F: Duration and risk 313

11 Constructing property portfolios 319
   Background 320
   Methodology 322
   Risk-reduction and portfolio size using monthly returns 324
   Risk-reduction and portfolio size using annual data 329
   Risk-reduction and value-weighted portfolios 332
   Investment in all sectors 334
   Portfolio diversification 337
   Example 343
   Combining risk-reduction and diversification 343
Appendix 11A: Risk-reduction and portfolio size based on equal investment 352
Appendix 11B: The relationship between systematic risk, diversification and the inter-asset coefficient of correlation 354
Appendix 11C: Estimating the number of properties required to achieve a given level of diversification 355
Appendix 11D: Estimating the portfolio-specific risk 356
Appendix 11E: Portfolio diversification and the naïve investor 358
Appendix 11F: Risk-reduction and portfolio size: empirical results 362

12 Valuation smoothing 371
   Competitive market imperfections 372
   Using comparable sales to estimate values 372
Estimating prices
The buyer's position • The seller's position
Estimating values
Estimating the smoothing parameter
Backining out the implied transaction prices
How to detect smoothing
Do valuers act in an optimal manner?
Appendix 12A: Sticky valuation processes and aggregation effects
Appendix 12B: Valuation smoothing without temporal aggregation
Appendix 12C: Estimating the volatility of terminal wealth
Appendix 12D: Random walk processes and aggregation effects
Appendix 12E: Removing smoothing with autoregressive models

PART 3
Portfolio management

13 The efficiency of the property market
The importance of information in assessing value
The efficiency of the property market
Why is efficiency important to the property market?
What would happen if property markets were inefficient?
The efficient markets hypothesis
Example
Capitalising on information
Why do you need property valuation models?
Different forms of market efficiency
Weak form efficiency • Semi-strong form efficiency • Strong form efficiency
General conclusions about market efficiency
Asset pricing and market efficiency
Appendix 13A: Fair game, martingale and random walk models
Appendix 13B: Tests of weak form market efficiency

14 Hedging against inflation
The development of inflation
Hedging against inflation
Inflation and asset performance – the record
Defining a hedge against inflation 468
A test of inflation hedging 472
Assessing expected inflation 474
The Fama and Schwert results 476
Appendix 14A: Empirical studies on inflation hedging 482

15 Developing a portfolio strategy 490

Some common misconceptions 491
The property market is grossly inefficient • Property offers stable returns • Property is a long-term investment • Property portfolios are well diversified • The objective of a strategy is to track an index • The capital asset pricing model (CAPM) does not work for property

Strategy and the investment process 495
Active-passive strategies 497
Portfolio strategy and forecasting ability 497
The active-passive strategy 497
Tracking an index with a property portfolio 499
Consistent and inconsistent strategies 501
Property selection 502
Processing information 505
Equivalent yields • Internal rate of return • Identifying abnormal returns • Example

Analysing large groups of properties 510
Sector and regional allocation 512
Strategy guidelines 516
Risk management 517

Appendix 15A: Estimating the risk premium 523
Appendix 15B: Using derivatives to control portfolio risk 535
Appendix 15C: Property performance indices 545

16 Performance measurement 560

Communication, accountability and research 561
Communication • Accountability • Research

Objectives of a performance measurement system 562
External • Internal • Timing • Selection

Measuring returns 564
Time-weighted and money-weighted rates of return 565
The time-weighted rate of return • The money-weighted rate of return
Case 1. Rising market • Case 2. Falling market
Calculating time-weighted rates of return 569
The exact method • The linked internal rate of return
The holding period return and the mean fund concept 574
Case 1 • Case 2
Choosing a benchmark 577
Introducing risk 578
Attribution analysis 580
The IPD standard comparative analysis 580
Appendix 16A: The IPD standard comparative analysis 586
Appendix 16B: Risk-adjusted measures of performance 590
Appendix 16C: Attribution analysis 597
Appendix 16D: Example portfolio analysis 608
Appendix 16E: Tracking errors 632
Appendix 16F: Some common questions concerning performance 634
Appendix 16G: The performance of property bonds 637
Appendix 16H: A time-varying analysis of property company performance 640

17 Quantitative techniques 652
Some basic definitions and notation 653
Variables • Coefficients • Suffixes • Integers
Using shorthand symbols 653
Summation • Products • Inequalities
Exponents 654
Exponential functions 655
Logarithms 656
Example 1 • Example 2
Linear and quadratic equations 659
Example
Graphical representation of functions 660
Example
Arithmetic and geometric progressions 661
Arithmetic progressions • Geometric progressions
Indices and geometric averages 663
Statistical issues 665
Descriptive statistics 665
The lower quartile range • The upper quartile range • The inter-quartile range
Frequency distributions and histograms 665
Probability concepts 666
Continuous random variables
The expectation operator
The expected value • The variance • The covariance • The skewness and kurtosis
Probability distributions
The normal distribution • The standard normal distribution
An introduction to confidence intervals and hypothesis testing
Confidence intervals • Hypothesis tests
An introduction to regression analysis
Example
Multiple regression
Appendix 17A: The explanatory power of the estimated regression equation
Appendix 17B: Property datasets

18 Some unanswered questions
1. What objectives do funds follow? 688
2. How do you measure risk? 688
3. Do property indices have to be smooth? 688
4. Can risk be controlled with derivative products? 689
5. Do investors make efficient use of information? 689
6. Do behavioural issues influence value? 690
7. Is depreciation important to investors? 690
8. Are property yields influenced by the term structure of interest rates? 691
9. What do we really know about international property investment? 691
10. Why do investors like property? 692
11. What is the relationship of property to the wider economy? 692

Bibliography 693
Index 703