

A spreadsheet Approach to Business Quantitative Methods

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A Spreadsheet Approach to Business Quantitative Methods

This textbook represents a major revision of the previous textbook "Quantitative Methods in Property" by the same authors.

Several new chapters have been added and much of the existing material has been refined and improved upon. A significant improvement with the new edition is the explicit use of the Excel spreadsheet throughout.

Some of the new chapters added include:

- Selected Features and Functions in Microsoft Excel

The key Excel features used throughout the text and presented in this chapter to focus attention of a number of some of the more recent enhancements to the spreadsheet. A brief introduction to the VBA programming language is included to suggest ways of further harnessing the power of the spreadsheet.

- Simulation

The use of simulation as a decision and planning tool is becoming more prevalent. Spreadsheets are ideal to introduce many simulation concepts and to demonstrate their usefulness in a wide variety of areas. When more specialised simulation tools are required users can move to Excel plug-ins such as @RISK (not discussed in the text).

- Geographic Information Systems

GIS is now a widely used tool in the property profession and in the wider business community. Applications to department

store location are discussed in the text.

Supplementary resources

- Solutions manual for all exercises
- Web site containing examples and applications using Excel

Part I Building the Foundations

1. Mathematical Preliminaries
2. Selected Features and Functions in Microsoft Excel
3. Matrix Algebra
4. Introduction to Statistics

Part II Basic Statistical Concepts

5. Probability and Mathematical Expectation
6. Probability Distributions
7. Elements of Hypotheses Testing
8. Nonparametric Statistics
9. Analysis of Variance

Part III Regression and Time Series Models

10. Introduction to Regression Analysis
11. Multiple Regression
12. Data Problems and Residual Analysis in Regression
13. Time Series Forecasting
14. Advanced Time Series Models

PART IV Multivariate Analysis

15. Principal Component Analysis
16. Factor Analysis

Part V Heuristics and Optimisation

17. Simulation

18. Linear Programming

19. Transportation, Assignment, and Transshipment Problems

20. Network Analysis / Project Management

21. Dynamic Programming

22. Decision Theory and Expected Utility

23. Markov Chains and Input Output Analysis

24. Inventory Models

25. Queuing Theory

26. Artificial Neural Networks

27. Geographic Information Systems

Appendix - Answers to Selected Problems

- Statistical Tables

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A Spreadsheet Approach to Business Quantitative Methods

PART I Building the Foundations

Mathematical Preliminaries

1.1 Review of Basic Algebra

1.2 Functions

1.3 Exponents and Logarithms

1.4 The Mathematics of Finance

1.5 Introduction to Calculus

1.6 Maximization and Minimization of Functions

1.7 Summation Notation

References

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2. Selected Features and Functions in Microsoft Excel

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2.2 Using Excel to Chart Data

2.3 The Analysis ToolPak

2.4 Lookup and Reference Functions

2.5 Hyperlinks

2.6 Offset Function

2.7 Data Tables and Array Formulae

2.8 Using the Trend Function

2.9 Introduction to Solver

2.10 GoalSeek

2.11 Recording a Macro

2.12 Creating Your Own Functions

2.12 Some Common Limitations in Excel

References

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3.2 Matrix Operations

3.3 Matrix Algebra Using Excel

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3.5 Matrix Inversion

3.6 Rank, Trace and Orthogonality

3.7 Eigenvalues and Eigenvectors

3.8 Examples of Matrix Algebra Using Excel

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4.2 Descriptive Statistics

4.3 Measures of Central Tendency

4.4 Dispersion of the Data Around the Mean

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4.6 Skewness and Kurtosis

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5.2 Basic Counting Methods

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5.6 The Expected Value of a Random Variable

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6.3. Discrete Distribution - Binomial & Poission.

6.4. The Normal Distribution

6.5 The Exponential Distribution

6.6 The Erlang Distribution

6.7 The Chi-square Distribution

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20.5 Activity Time Statistics and Project Completion Times

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23.3 The Use of Markov Chains for Optimal Decision Making

23.4 The Application of Markov Chains to Input Output Analysis

23.5 Using Excel and Minitab

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24.2 Derivation of the EOQ Formula

24.3 Quantity Discounts

24.4 When to Place an Order and Safety Stock

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26. Artificial Neural Networks and Genetic Algorithms

(McCloskey/Borst)

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26.2 Main Elements of a Neural Network System

26.3 Case Study

2 7 Geographic Information Systems (Lloyd & Hugh Williams)

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