

BNM4 DATA ENVELOPMENT ANALYSIS

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| Number of Aston Credits: | 10 |
| Number of ECTS Credits: | 5 |
| Target Students: | Masters level including MBA |

Staff Member Responsible for the Module:

Professor Emmanuel Thanassoulis Operations and Information Management Group
Room ABS264, Ext 3254
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Availability: see office hours on door
Or contact John Morley, ABS266, Extension 3239

Other Staff Contributing to the Module:

Dimitris Giraleas, PhD student, Operations and Information Management Group
Contact via John Morley, ABS266, Extension 3239

Pre-requisites for the Module:

Module BNM701.

Module Objectives and Learning Outcomes:

- > To introduce the student to Data Envelopment Analysis (DEA) as a method of comparative performance measurement;
- > To enable the student to identify the types of situations where DEA may be used;
- > To enable the student to use DEA to carry out comparative efficiency assessments;
- > To enable the student to interpret the information on comparative performance derived from DEA assessments.

Module Content:

(Please note that although the material is laid out below in weekly format to fit in with the style required by this form, M4 is in fact delivered over four full days. See mode of attendance and the teaching method section below.)

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| Week 1 | Introduction to comparative performance measurement. Unit of assessment. Measures of efficiency. |
| Week 2 | Data Envelopment Analysis under constant returns to scale: Basic principles. |
| Week 3 | Data Envelopment Analysis under constant returns to scale: General models. |
| Week 4 | Using Data Envelopment Analysis in Practice. |
| Week 5 | Data Envelopment Analysis under variable returns to scale. |
| Week 6 | Assessing policy effectiveness and productivity change using DEA |
| Week 7 | Incorporating Value Judgements in Data Envelopment Analysis |
| Week 8 | Some extensions to basic DEA models. |
| Week 9 | Revision |
| Week 10 | Examinations |

Corporate Connections:

The module is delivered in block form over 4 days to enable those with work or other commitments or from overseas to take it. This makes it possible to create a lively mix of students on the module consisting of those in full-time education and those in employment. Full time postgraduate students are typically joined on the module by employees of large public and private sector bodies such as OFWAT (the regulator of water utilities in England and Wales), United Utilities, Severn Trent Water Plc and consultancy companies.

International Dimensions:

The course material is virtually exclusively technical but where applications of the methods are concerned examples will be drawn internationally. Additionally some of those taking this module as a training course are employees of overseas organisations.



Contribution of Research:

The module draws heavily from extensive research at Aston Business School into Data Envelopment Analysis. The method is one of those used for performance measurement and management. There are several staff at Aston Business School, including those teaching this module, who have formed a Research Centre into Performance Measurement and Management researching and applying the methods covered in this module.

Method of Teaching:

- > Each 'week' in the outline above represents a block of three hours, divided as follows: 1.25 hour lecture per week, followed by 0.5 hour break, followed by 1.25 hour tutorial/consolidation/computer lab session as appropriate.
- > As noted above the module is delivered in block form over 4 days. Each day consists of lectures, followed by hands-on sessions implementing the material taught on sample data.
- > Appropriate software, notably LINDO, Excel and PIM DEA are used in the hands-on sessions.
- > Handouts are provided at lecture as well as the computer instructions where appropriate to create a dynamic learning environment with student participation in lectures and in the application of the concepts covered.

Method of Assessment and Feedback:

The module is assessed 100% by examination. Feedback is available at the end of each hands-on session in the form of debriefing facilitated by the tutor and led by students. This is done in class. Additional feedback is provided either by email or Blackboard.

Mode of Attendance:

The module is available full and part-time on campus. It is block-delivered over 4 days. Normally one week separates consecutive days.

Learning Hours:

These should be roughly along the lines indicated below:

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| Contact hours | 27 |
| Directed Learning (within the contact hours) | 13 |
| Private study/Group Work | 57 |
| Assessment | 16 |
| Total | 100 |

Essential Reading:

- > Course handouts
- > E. Thanassoulis (2001) Introduction to the Theory and Application of Data Envelopment Analysis: A foundation text with integrated software. Kluwer Academic Publishers, Boston, Hardbound, ISBN 0-7923-7429-0, 312 pp

Indicative Bibliography:

Cooper W. W., Seiford L. W. and Zhu J. Editors Handbook on Data Envelopment Analysis ISBN 1 40207797 1 (Kluwer Academic Publishers.)

W. W. Cooper, L. M. Seiford and K. Tone, (2000) Data Envelopment Analysis: A comprehensive text with models, applications, references and DEA-solver software. (Kluwer Academic Publishers)

Tim Coelli, D S Prasada Rao and George Battese (1998) An Introduction to Efficiency and Productivity Analysis Kluwer Academic Publishers ISBN: 0792380622

Charnes, A., Cooper, W. W., Lewin, Y. A., and Seiford, M.L. (Eds) (1994), Data Envelopment Analysis: Theory, Methodology and Application, (Kluwer Academic Publishers).