

BNM825 ADVANCED PERFORMANCE MEASUREMENT

Academic Year 2011/12

Number of Aston Credits: 15

Number of ECTS Credits: 7.5

Staff Member Responsible for the Module:

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Availability: see office hours on door
Or contact the Operations and Information Management Group Administrator
John Morley, ABS266, Ext: 3236

Pre-requisites for the module:

BNM820 Operational Research Methods and BNM826 Performance Measurement in Practice (as co-requisite) or equivalent, subject to the approval of the course director.

Mode of Attendance:

On Campus

Module Objectives and Learning Outcomes:

- > To introduce students to advanced DEA models for dealing with exogenously fixed variables and for assessments of performance under layered data and for setting performance targets.
- > To introduce students to the specification and estimation of econometric models for performance measurement using production functions, cost functions and distance functions to measure efficiency, as well as productivity growth and its decomposition into technical change and efficiency change.
- > To introduce the comparative advantages and drawbacks of Data Envelopment Analysis (DEA) and econometric methods in comparative performance measurement.



- > To enable the student to critically assess results about a given set of units derived using parametric and non-parametric methods of comparative performance measurement.
- > To enable the student to carry out more robust comparative efficiency assessments, using and reconciling results from a variety of methods of comparative performance measurement.

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, BNM825 is in fact delivered in full day blocks with each block covering two weeks material. See mode of attendance and the teaching method section below.

Week 1: Review of Data Envelopment Analysis as a non parametric method for comparative efficiency assessment.

Week 2: Review of OLS as a parametric method for comparative efficiency assessments. Introduction to Corrected OLS and MOLS as methods for comparative efficiency assessment.

Week 3: Advanced DEA models for dealing with exogenously fixed variables, target setting and efficiency decomposition in layered data.

Week 4: Introduction to Stochastic frontier Analysis (SFA) for efficiency including cross sectional and panel based models.

Week 5: Case study assessment by means of DEA, COLS, MOLS and SFA: Cross-sectional case. Discussion of the similarities and differences between the results.

Week 6: Case study assessment by means of DEA, COLS, MOLS and SFA: Panel data case. Discussion of the similarities and differences between the results.

Week 7-8: Case study assessment of cross-sectional and panel data using parametric and non parametric methods. Discussion of the similarities and differences between the results.

Week 9: Revision

Week 10: Examination

Corporate Connections:

The module is delivered in block form over 4-5 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.

International Dimensions:

The course material is a mix of methodologies and applications some of which will be drawn internationally. Additionally some of those taking this module as a training course could be 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, LIMDEP, FRONT41 and PIM DEA are used in the hands-on sessions. Handouts are provided through the Blackboard learning environment 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 40% by individual assignment and 60% by examination. Feedback on the assessment is provided in the form of a separate document prepared by the markers for each student. Non individual feedback is available also 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.



Learning Hours:

Contact hours	90
Assessment (case study)	20
Directed learning	10
Private study/group work	90
Total	150

The following essential and recommended readings are subject to change. Students should not therefore purchase textbooks prior to commencing their course. If students wish to undertake background reading before starting the course, many of the chapters/readings are available in electronic form via on-line library catalogues and other resources.

Essential Reading

Greene, W.H. (2007) *The Econometric Approach to Efficiency Analysis*. In: Fried, H.O., Lovell, C.A.K. and Schmidt, S.S. (eds.) *The Measurement of Productive Efficiency and Productivity Growth*. Oxford University Press

Thanassoulis, E. (2001) *Introduction to the Theory and Application of Data Envelopment Analysis: A foundation text with integrated software*, Springer

Wooldridge, J.M. (2000) *Introductory Econometrics: A Modern Approach*, South Western College Publishing

Coelli, T., Prasada Rao, D.S. and Battese, G.E. (1998) *An Introduction to Efficiency and Productivity Analysis*, Springer (Chapters 2, 3, 8 and 9)

Indicative Bibliography:

Kumbhakar, S.C., Lovell, C.A.K (2000) *Stochastic Frontier Analysis*, Cambridge University Press

Hackman, S.T. (2008) *Production Economics: Integrating the Microeconomic and Engineering Perspectives*, Springer

Kenneth S.G. (2004) *Introduction to Applied Econometrics*, Duxbury Applied Series, South Western College Publishing

Cameron, A.C. and Trivedi, P.K. (2005) *Microeconometrics: Methods and Application*, Cambridge University Press.

Beattie, B.R. and C.R. Taylor (1985) *The Economics of Production*, New York: Wiley





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Robert, C.G. (1988) *Applied Production Analysis: A Dual Approach*. Cambridge University Press.

Silberberg, E. (2000) *The Structure of Economics: A Mathematical Analysis*, Irwin McGraw-Hill.



For further information on any of the opportunities that Aston Business School offers, please contact:

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