Efficiency and Productivity Analysis
Doctorate in Economics, Management and Organizations (DEMO) (UAB, UPNA, UIB)

Spring Term 2007

Instructors
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Course Description
This course provides a theoretical and empirical overview of the efficiency and productivity analysis topic, with special focus on the most recent advances and the main areas of research in the field. Based on the fundamentals of the economic theory of production, the lectures introduce and apply alternative approaches to performance measurement. The practical potential of these methods will be illustrated with a number of empirical applications drawn from a variety of firms and sectors. Performance measurement is applied to a macro and a micro level. At a micro level to a variety of organizations, such as private firms or units within the firm or non-profit organisations, e.g. schools or hospitals. The course also introduces the student to the use of software packages specifically designed to compute efficiency and productivity analysis.

Course Objectives
1. Provide the students a general understanding of production and cost functions as well as efficiency and productivity concepts grounding on the economic theory of production.
2. Provide the students with useful research tools based on different approaches to measure performance: mathematical programming models (Data Envelopment Analysis), index numbers and Stochastic Frontiers Approach.
3. Develop students’ abilities to link theory with applied work. Given a problem of performance analysis, students will be able to identify an appropriate theoretical framework, a suitable analytical method, and undertake an informed empirical
Methods of teaching and course activities

The course combines theoretical lectures and practical sessions that require the dynamic participation of students. Learning activities include: following lectures on main topics, making of problems and computer exercises, reading and critical reviewing of papers and student presentations. This is an interactive course. Case preparations and in-class discussions will form the important benchmarks of progress. In-class discussions give students an opportunity to apply material from the class to real-world managerial problems. Other class sessions will be primarily dedicated to lecture material and shorter discussions. The course also schedules three invited researchers on specific topics in the field.

Course outline

1. Review of Production Economics.
   - Distance functions. Input based efficiency measurement. Output based efficiency measurement. Graph efficiency measurement.
   - Technical, allocative and economic efficiency.

2. Efficiency Measurement.
   - Overview of empirical methods: econometrics vs mathematical programming approach.

3. Productivity Measurement and Decomposition.
   - The Malmquist productivity index. Decompositions of the Malmquist productivity index.

4. Index Numbers Theory.
   - Price and quantity index numbers. TFP measurement using index numbers. Laspeyres, Paasche, Fisher and Tornqvist indexes. Empirical applications.

5. Cost analysis.
Course schedule

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>#1</td>
<td>March, 15</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
<td>Motivation and Overview of the Course</td>
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<tr>
<td>#2</td>
<td>March, 15</td>
<td>12:00 – 13:30</td>
<td>B1/1068</td>
<td>Review of Production Economics</td>
</tr>
<tr>
<td>#3</td>
<td>March, 21</td>
<td>15:00 – 16:30</td>
<td>B1/1068</td>
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<td>#4</td>
<td>March, 21</td>
<td>17:00 – 18:30</td>
<td>B1/1068</td>
<td>Efficiency Measurement</td>
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<td>#5</td>
<td>March, 22</td>
<td>09:00 – 11:00</td>
<td>B1/1068</td>
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<tr>
<td>#6</td>
<td>March, 27</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
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<td>#7</td>
<td>March, 27</td>
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<td>B1/1068</td>
<td>Efficiency Measurement</td>
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<td>#8</td>
<td>March, 27</td>
<td>15:00 – 16:30</td>
<td>B1/1068</td>
<td>Productivity Measurement</td>
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<td>#9</td>
<td>March, 27</td>
<td>17:00 – 18:30</td>
<td>B1/1068</td>
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<td>#10</td>
<td>April, 5</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
<td>David Saal (Aston University, UK)</td>
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<td>#11</td>
<td>April, 5</td>
<td>12:00 – 13:30</td>
<td>B1/1068</td>
<td>David Saal (Aston University, UK)</td>
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<tr>
<td>#12</td>
<td>April, 26</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
<td>Finn Førsund (University of Oslo)</td>
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<tr>
<td>#13</td>
<td>April, 26</td>
<td>12:00 – 13:30</td>
<td>B1/1068</td>
<td>Finn Førsund (University of Oslo)</td>
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<td>#14</td>
<td>April, 27</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
<td>Productivity Measurement</td>
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<tr>
<td>#15</td>
<td>April, 27</td>
<td>12:00 – 13:30</td>
<td>B1/1068</td>
<td>Productivity Measurement</td>
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<tr>
<td>#16</td>
<td>May, 4</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
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<td>#17</td>
<td>May, 4</td>
<td>12:00 – 13:30</td>
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<td>#18</td>
<td>May, 10</td>
<td>10:00 – 11:30</td>
<td>B1/1068</td>
<td>Sverre Kittelsen (Frisch Centre for Economic Research, Oslo)</td>
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<td>#19</td>
<td>May, 10</td>
<td>12:00 – 13:30</td>
<td>B1/1068</td>
<td>Sverre Kittelsen (Frisch Centre for Economic Research, Oslo)</td>
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Midterm Test  April 18  16:00
#12 April, 26 10:00 – 11:30 B1/1068 Finn Førsund (University of Oslo)
#13 April, 26 12:00 – 13:30 B1/1068 Finn Førsund (University of Oslo)
#14 April, 27 10:00 – 11:30 B1/1068 Productivity Measurement
#15 April, 27 12:00 – 13:30 B1/1068 Productivity Measurement
#16 May, 4 10:00 – 11:30 B1/1068 Index numbers
#17 May, 4 12:00 – 13:30 B1/1068 Index numbers
#18 May, 10 10:00 – 11:30 B1/1068 Sverre Kittelsen (Frisch Centre for Economic Research, Oslo)
#19 May, 10 12:00 – 13:30 B1/1068 Sverre Kittelsen (Frisch Centre for Economic Research, Oslo)

Final Exam  May 24  11:00
Research project deadline  June, 16

Invited Lectures


“Scale properties in DEA” by Prof. Finn Førsund. Department of Economics, University of Oslo, Norway.

"Bootstrapping in DEA" by Prof Sverre Kittelsen. Frisch Centre for Economic Research Oslo, Norway.

Important dates

Spring Break from April 10 to April 23, 2006.
Midterm Test April 18, 2006
Final Exam May 24, 2006.

Assessment

Final grades are based on performance on
Problem sets 10%
Class presentation and participation 25%
Midterm test 20%
Research project 25%
Final exam 20%

Guidelines

Problem Sets
A series of problems that will help you learn the course material will be available on-line. The course includes various assignments that you are to turn in for credit. Students are encouraged to work in study groups while preparing problem sets.

Presentation ofAssigned Papers
Students will be required to make presentations and lead the discussion of papers that will be assigned in class. You should determine: 1) what was the central question addressed by the paper?; 2) how is economic theory used to answer the question, to formulate general hypothesis and main propositions?; 3) which and how is the methodology employed?; 4) which are the main results and conclusions, their policy and/or managerial implications as well as their limitations?

Class Participation
Each student's participation will be evaluated with respect to the contribution that student makes towards the entire class' learning experience, in particular during case discussions; in other words, quality of contribution matters more than frequency of speech. Attendance is a necessary but not sufficient condition for earning an acceptable class participation score; those not attending are by definition not participating.

Research Paper
The research paper is thought to be an exercise of formulating the analysis of a relevant issue related to performance measurement. The paper must investigate a single topic in depth. It may be: i) a theoretical development; ii) an empirical study; iii) a comprehensive survey on the literature. As a rule, the research paper should contain the following elements:

1. Problem statement. Define the problem that your paper is examining and why it is important that the problem be answered. It should include a clear statement of the questions you will address or the hypotheses to be tested in the study.
2. Literature review: A review of alternative approaches and conclusions of previous studies on the issue.
3. Research design and Methodology. Describe the design and approach of your analysis, including model specification and assumptions.
4. Data collection. You should discuss the data collection procedures you will use and provide some justification of your choice of those procedures over alternatives. State
under what conditions the information will be collected and analysed.

5. Results and conclusions. Including: Major findings, managerial/policy implications, suggestions for future research.


**Reading List**

There is no text required for this course. However, the following book provides an adequate coverage of many topics at an introductory level:


Other references will be used as needed and are listed below. Every student will be given on the first day class a copy of all papers in a CD.


