FEB22009(X)(S)
Introductory Seminar Case Studies
Econometrics and Operations Research

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Introductory Seminar Case Studies E&OR

- So much theory, so little practice!
- That is about to change today!
- Apply your knowledge of econometrics and operations research to relevant economic decision problems

- Get a taste of the major tracks:
    - Quantitative Logistics / Operations Research
    - Quantitative Marketing
    - Quantitative Finance
    - Econometrics

Aims

Aims of the seminar include:

1. Learn how to approach a practical economic decision problem
2. Translate a problem into a mathematical or statistical model
3. Analyze the model using suitable methods
4. Interpret the results and translate these into practical implications
5. Present research findings in writing
6. Work in teams

Set-up

1. Academic writing skills
2. Econometrics (Pick and van den Hauwe)
3. Quantitative Marketing (Paap)
4. Quantitative Logistics / Operations Research (Huisman)

Each of the cases lasts for two weeks.

Schedule

Schedule per case:

1. Introduction
2. Lab sessions (multiple days; PC-labs are booked)
3. Research proposal
4. Team-wise compulsory meeting with case supervisors
5. Voluntary consultation
6. Final report

Detailed schedule on Blackboard (currently not fully working - may be on my home page: http://apick.eu)

Seminar = **Werk**college

In Dutch, seminar = **werk**college

- This term suggests that you need to work!
- Reward: 8 ECTS, in other words 224 hours

Working in teams

The cases are studied in teams

- Teams consist of four students
- The composition of the teams is the same for all three cases
- Should you have preferences for a team, send one email per team before Monday, 2 May 2016, 14.00 (if you don't have a team, also send email!).
- Cooperation and division of labor is the team's own responsibility
- Report "free-rider" behavior as soon as possible to the case supervisor and the course coordinator (by email)
- Compulsory attendance at (i) case introductions; (ii) team-wise meeting with supervisor.

Reports

Each team writes a report for each of the three cases

- For FEB22009 and FEB22009S reports in Dutch or English;
  For FEB22009X and FEB22009XS reports in English
- Pre-master: Only case that corresponds to the MSc they intend to take
- Maximum 4000 words (equivalent) – approx. 10 pages
- Read the course information document for further guidelines
- Strongly recommended to write report in LaTeX
- Make sure your report is 'readable'
  1. Make a story; avoid endless lists with, e.g., steps taken in the research
  2. Use your own words; do not copy-paste from the course description or the relevant literature
  3. Do not copy-paste output from computer programs
- Reports should be submitted in PDF format via Blackboard (see course info document for details).

Assessment

The course is assessed as follows:

- Grades on a 10-point scale will be given for each of the individual cases
- Final course grade is the equal-weighted average of the grades for the three cases

Note: The grades for the individual cases should be at least 4.0.

Questions

- Questions should be posted on the Blackboard discussion forum.
- 4 sub-fora: one for general questions about the course, one for each case.
- Note: The cases should (and can!) be studied independently!

Academic writing skills

- Learn and practice your writing skills
- Self-study using *Zelf leren schrijven* or *Academic Writing Skills* (see sin-online)
- Inside the book, you find a unique registration code
- On web site, use your ERNA identifier as your name!
- Teacher codes are on Blackboard.
- Deadline: Sunday, 17 June 2016, 23.59
- No grade; Pass/Fail
- Failure to pass implies failing the entire course!

Writing skills for the cases

Special attention will be given to different aspects in each case:

1. Case 1: Replicability
2. Case 2: Data description and literature
3. Case 3: Explaining tables/results

Case 1: Replicability

- Academic writing implies that the reader is able to replicate the results.
- Precision and detail of description
- Source and any transformation of the data.
- Description of model and estimation in precise mathematical terms. However, you can assume the reader knows econometrics to the extent you do. No need to define OLS as long as it's $(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{y}$.
- If you were to give your report and the data to a fellow student, she/he should be able to obtain exactly the same results that are in your report.

Writing tips

- Use LaTeX! A template is on Blackboard.
- Don't copy and paste computer output! Format it.
- Use mathematical equations properly. Don't:

$$houseprice = \beta_0 + \beta_1 housepricelagged + \beta_2 \ldots$$

  Do:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \ldots$$

  where y_t is the house price in period t (etc)

- Vectors are lower case in bold font, matrices are upper case in bold font.
- Put your group number, all names and ERNA numbers on the cover page!
- More in course description file on Blackboard.

Case 1: Predicting house prices in the UK

- Houses are a large part of private sector wealth and in terms of mortgage payments also a large part of household expenditure.
- Consumption will therefore be influenced by house prices.
- For this reason, fiscal and monetary policy makers will be interested in the development in the housing market.

Case 1: Predicting house prices in the UK
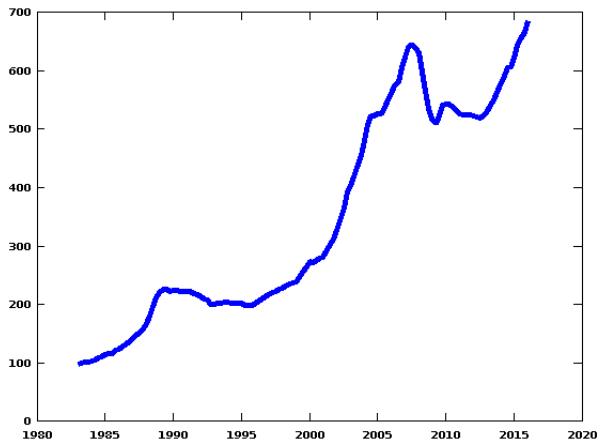
Case 1: Predicting house prices in the UK

You will forecast the house prices in one region of the UK using the following techniques:

- Univariate time series model
- Time series model with exogenous variables
- Factor augmented model
- Spatial model ("stretch goal")

Case 1: Predicting house prices in the UK

Steps to take

- Determine properties of the time series
- Determine best univariate time series model
- Determine best model that incorporates additional variables: inflation, GDP growth, and possibly others
- Add house prices in the remaining regions into the mix: estimate common factors in a factor model
- Add factors to models above
- Using all of these models, forecast house prices
- Stretch goal: In place of factors, consider spatial model and use for forecasting.
- Evaluate forecasts

More details on Blackboard.

Case 1: Things to watch out for

- When forecasting, be careful not to use future information.
- Forecast house prices. But that does not mean you have to model house prices.
- Common factors should not be based on the series you are forecasting.

Data

On Blackboard you will find files with the data.
Extract the data that you need given the information on Blackboard.

Software

- Matlab
- Octave
- R

Report your code as an appendix to the report.

Research proposal

- Outline the approaches to estimation and forecasting that you would like to take.
- Max. 2 pages! That means no more than two sheets of paper will be printed – what is not on these will not be read.
- Submit by Thursday at 15.00 on Blackboard.

- Compulsory group meetings on Friday. Time table will be announced on Blackboard once teams are established.
- Voluntary group meetings Tuesday next week. Time table will be announced on Blackboard.

Final report

- Max. 4000 words for the text body – this includes tables and figures.
- Using the LaTeX layout of the file on Blackboard, this yields 8 pages of text, tables, and figures. Add a cover page and references and the report should not exceed 10 pages.
- Excessive length leads to lower grades.
- Don't waste space on a table of contents, literature review.
- Submit on Blackboard
- Further details are in the course information document on Blackboard.

Research is fun

- Strict rules are necessary due to large number of groups.
- Two weeks is very short period for research.
- Still, we hope you will a taste of research.
- If you like the idea of research, have a look at the TI MPhil programme. `www.tinbergen.nl`

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