Econometrics

Semadeni Claudio

<table>
<thead>
<tr>
<th>Cursus</th>
<th>Sem.</th>
<th>Type</th>
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<tbody>
<tr>
<td>Ing. finance</td>
<td>MA1, MA3</td>
<td>Obl.</td>
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<table>
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<tr>
<th>Language</th>
<th>English</th>
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<tbody>
<tr>
<td>Credits</td>
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<tr>
<td>Session</td>
<td>Winter</td>
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<td>Semester</td>
<td>Fall</td>
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<td>Exam</td>
<td>Written</td>
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<td>Workload</td>
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<tr>
<td>Weeks</td>
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<tr>
<td>Hours</td>
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<tr>
<td>Lecture</td>
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<tr>
<td>Exercises</td>
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Remarque
For sem. MA1

Summary
The course covers basic econometric models and methods that are routinely applied to obtain inference results in economic and financial applications.

Content
- Linear models;
- Least squares regression;
- Instrumental variables;
- Nonlinear models;
- Nonspherical errors;
- Large sample asymptotics: consistency, efficiency and limit distribution of estimators;
- Hypothesis testing.

Keywords
Linear regression models; least squares estimation; maximum likelihood inference.

Learning Prerequisites
Recommended courses
- Analysis;
- Linear algebra;
- Introduction to probability and statistics;
- Introduction to economics.

Important concepts to start the course
- Matrix algebra;
- Probability and distribution theory;
- Large-sample distribution theory;
- Familiarity with R and/or Matlab is recommended for simulations and empirical analyses.
Learning Outcomes

By the end of the course, the student must be able to:

• Describe the basic assumptions of the linear regression model.
• Test whether the basic assumptions of the linear regression model are met in the data using formal statistical procedures.
• Derive statistical estimators like least squares and instrumental variables estimators.
• Recall basic goodness-of-fit measures like R-squared.
• Construct linear regression models from actual data using statistical variable-selection techniques like t-statistics and F-tests.
• Describe the main advantages and disadvantages of likelihood-based and instrumental variable-based inference procedures.
• Carry out linear and nonlinear hypothesis testing procedures.
• Discuss asymptotic properties of linear and nonlinear estimators such as consistency and efficiency.
• Conduct team-work and write an econometric report about linear and nonlinear regression models.

Transversal skills

• Use a work methodology appropriate to the task.
• Continue to work through difficulties or initial failure to find optimal solutions.
• Write a scientific or technical report.
• Use both general and domain specific IT resources and tools

Teaching methods

Ex cathedra lectures and exercise sessions.

Expected student activities

Attending lectures, reading written material, completing exercises and group homework.

Assessment methods

• 20% Homework assignments;
• 30% Midterm examination (written, closed book);
• 50% Final examination (written, closed book).

Supervision

Office hours No
Assistants Yes
Forum No

Resources

Bibliography

Ressources en bibliothèque

- *Introduction to the Mathematical and Statistical Foundations of Econometrics* / Herman J. Bierens
- *Econometric analysis* / Greene
- *Econometrics* / Hayashi
- *Introduction to Econometrics* / Stock

Notes/Handbook
Lecture notes.

Prerequisite for

- Advanced topics in financial econometrics
- Credit risk
- Derivatives
- Financial econometrics
- Fixed income analysis
- Investments