E 4160: Econometrics–Modelling and Systems Estimation Computer Class

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Aims and purpose I

- Use computer to learn about
  - econometric theory and
  - applied econometrics
- The first aspect is complementary and supplementary to the lectures in E4160
- The second is integrated with the seminars
  - We will work together in the computer class
  - To each seminar, some of the exercises will be applied modelling tasks, and you will hold a computer presentation of your solution proposal at the seminar
  - The other type of seminar exercise will be more theoretical and algebraic

As noted by Greene, many powerful program packages and program languages are in use in econometric research and in applied projects:

- EViews
- Gauss
- LIMDEP
- MATLAB
- NLOGIT (LIMDEP)
- RATS
- SAS
- Shazam
- Stata
- TSP

- MicroFit
- OxMetrics which includes PcGive
- ForecastPro
- Troll

and many more (I am sure)
The above are licensed commercial products, though developed from research projects...
New development, free econometric software:

- *R*
- *Gret*
- *Scilabl*

What to look for I

- Ease and accuracy of data loading, data storage and result reporting
  - The data is often your most valuable asset, so:
  - Getting the data into the program is an essential step!
  - Basic reporting is very similar between programs, but not standard! Reporting for typesetting (e.g., LATEX) is still rare. PcGive has some, Stata is better
- Menus and batch language and programming capability
  - Menus are good for getting started, and for demonstrations
  - Batch language is important for efficient work (once you are "expert")
  - and for documentation
  - and communication (e.g., between supervisor and yourself)

What to look for II

- Econometric programs are like (specialized) tools: They are designed to do specific tasks effectively.
- So unless your are very specialized yourself, you will probably end up using more than one program


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OxMetrics™ is the name of a family of software packages providing an integrated solution for the econometric analysis of time series, forecasting, financial econometric modelling and for the statistical analysis of cross-section and panel data. Published by Timberlake Consultants
September 2011
2 day OxMetrics User Conference, Maastricht
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2 day OxMetrics User Conference, London: Programme
3 day Econometrics course Central Banks and Ministries, Oxford
2 day Time Series Course, Madrid
August 2010
New web site OxMetrics Publisher Timberlake.co.uk
July 2010
3 day course Modelling and Forecasting with OxMetrics, London, UK
May 2010
2 day course Econometric Modelling with PcGive and Autometrics, Washington, DC USA
April 2010
OxMetrics 6.1, Ox 6.1, PcGive 13.1, PcNaive 5, G@RCH 6.1, STAMP 8.3 shipping
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Topics for first computer class

- Loading data and exploring data properties in OxMetrics
  - *Note 1 to computer class: Use of the natural logarithm*
- Simple regression and mis-specification testing
  - *Note 2 to Computer class: Standard misspecification tests.*
- Regression and mis-specification testing with the use of the batch language
- Stability of regression models

Regression with experimental and non-experimental data I

Consider the modelling task with experimental/lab data:

$$\underset{\text{result}}{Y_i} = \underset{\text{input}}{g(X_i)} + \underset{\text{shock}}{v_i} \; . \tag{1}$$

and compare with the situation with non-experimental, real-world data:

$$\underset{\text{observed}}{Y_i} = \underset{\text{explained}}{f(X_i)} + \underset{\text{remainder}}{\varepsilon_i} \tag{2}$$

Clearly, we know much less about the match between $f(x_i)$ and Y_i in this case, so everything that we "do" with Y_i and $f(X_i)$ is reflected in the remainder ε_i:

$$\varepsilon_i = Y_i - f(X_i) \tag{3}$$

Regression with experimental and non-experimental data II

However we will follow custom and refer to ε_i as the *disturbance* and the estimated counterpart $\hat{\varepsilon}_i$ as the *residual*.

- We will then need to keep in mind that the assumptions that we make about the disturbances , e.g., the "classical assumptions" are only tentative, and that we need to test that they are valid after estimation
- This is called residual mis-specification testing

Residual mis-specification overview

X_i	Disturbances ε_i are: heteroscedastic		autocorrelated	
X_i	$\hat{\beta}_1$	$\widehat{Var}(\hat{\beta}_1)$	$\hat{\beta}_1$	$\widehat{Var}(\hat{\beta}_1)$
exogenous	unbiased consistent	wrong	unbiased consistent	wrong
predetermined	unbiased consistent	wrong	biased inconsistent	wrong