Seminar to Advanced Macroeconomics

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Introduction

Aim of the seminar:

- Overview over empirical methods used in macro to make your horizons wider.
- Easy applications of econometrics to macroeconomic topics discussed in the lectures
- Using econometric software
- Talking about your Project Tasks and discussion about Problem Sets

Why Empirical Seminar?
The Role of Empirical Work in Macro

- Correspondence between the theory and real data
- Forecasting and economic policy
- Finding empirical evidence to build new theories
- Fundamental ucertainty in econometrics: choice of variables => Robustness over different datasets, over different additional variables... => We should always keep in mind this uncertainty and ask: Are my results good because of the datasets?

Methods

- Descriptive statistics, tests...
- Some nonparametric methods: tests, density estimates
- Linear Regression
- Panel data regression
- Principal Components method
- Time series: seasonal adjustment, trends...
- Dynamic models (very brief introduction)
- ...

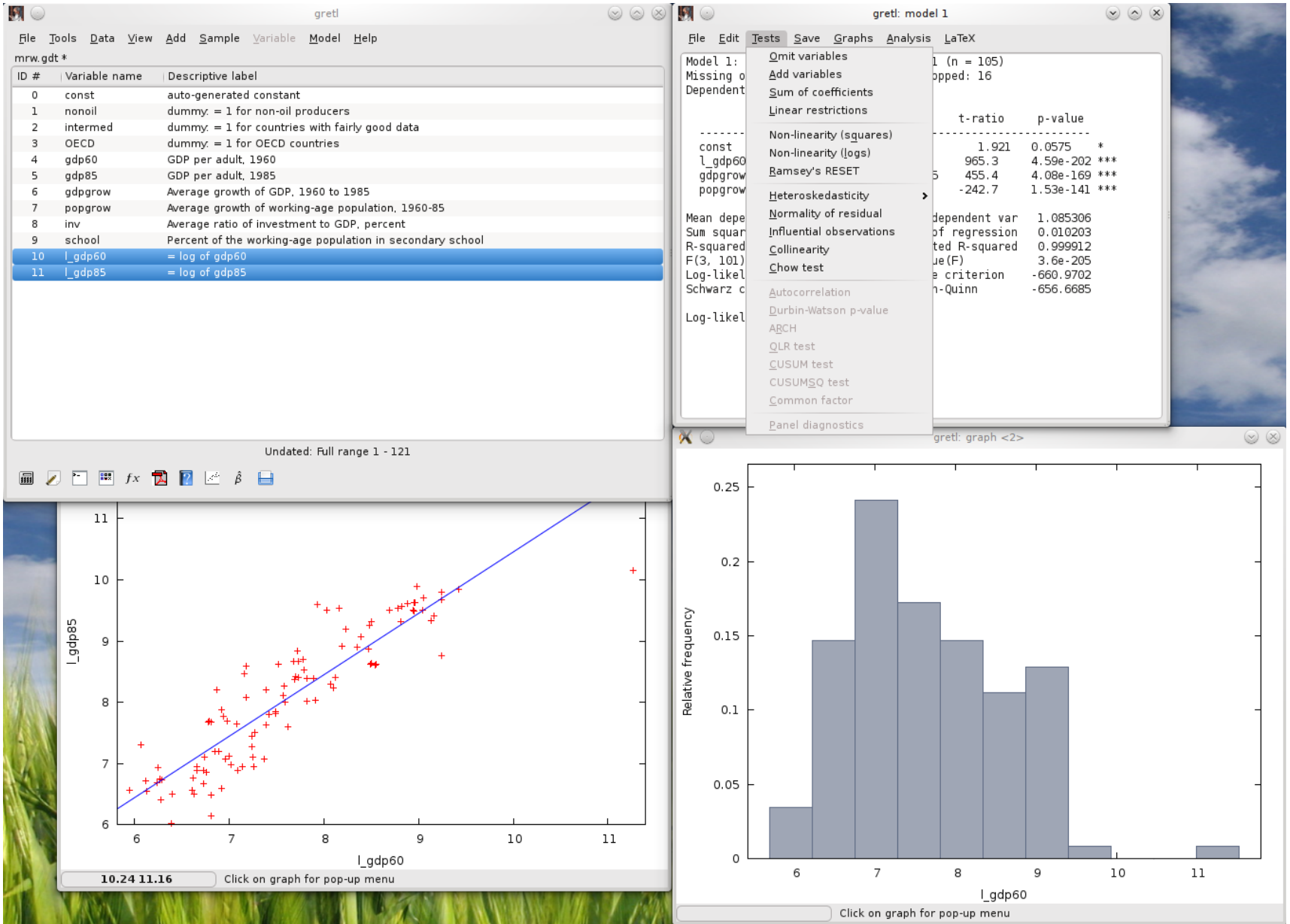
Software

- You can't do empirical work without it.
- There are many software packages for econometrics:
  - Commercial: TSP, SAS, Stata, E-views, PC-Give, Gauss, S-Plus and many others
  - Freeware/Open Source/Shareware without limitations: Gretl, R-Project, Ox
  - See http://freestatistics.altervista.org/stat.php for comprehensive list.
- Use whatever you want to
- And bring your laptop with (if you can)

Gretl

- Available in Room 016: TSP (GiweWin GUI), SPSS for Windows 10.0, R (with necessary libraries), Gretl, JMulti
- Gretl: http://gretl.sourceforge.net, GNU GPL licence, crossplatform. Have a look into documentation: manual as an textbook available.
- Don't forget to install seasonal adjustment methods, we will use them in a couple of weeks.

Gretl


gretl
File Tools Data View Add Sample Variable Model Help
mrw.gdt *
ID # | Variable name | Descriptive label
0 const auto-generated constant
1 nonoil dummy: = 1 for non-oil producers
2 intermed dummy: = 1 for countries with fairly good data
3 OECD dummy: = 1 for OECD countries
4 gdp60 GDP per adult, 1960
5 gdp85 GDP per adult, 1985
6 gdpgrow Average growth of GDP, 1960 to 1985
7 popgrow Average growth of working-age population, 1960-85
8 inv Average ratio of investment to GDP, percent
9 school Percent of the working-age population in secondary school
10 l_gdp60 = log of gdp60
11 l_gdp85 = log of gdp85
Undated: Full range 1 - 121
gretl: model 1
File Edit Tests Save Graphs Analysis LaTeX
Omit variables
Add variables
Sum of coefficients
Linear restrictions
Non-linearity (squares)
Non-linearity (logs)
Ramsey's RESET
Heteroskedasticity
Normality of residual
Influential observations
Collinearity
Chow test
Autocorrelation
Durbin-Watson p-value
ARCH
QLR test
CUSUM test
CUSUMSQ test
Common factor
Panel diagnostics
t-ratio p-value
const 1.921 0.0575 *
l_gdp60 965.3 4.59e-202 ***
gdpgrow 455.4 4.08e-169 ***
popgrow -242.7 1.53e-141 ***
l_gdp85
l_gdp60
10.24 11.16
Click on graph for pop-up menu
gretl: graph <2>
Relative frequency
l_gdp60
Click on graph for pop-up menu

Basic Growth Facts

- "mrw" data from gretl database (File => Open Data => Sample files)
- Distribution of GDP in 1960 and in 1985 (histograms, number of bars, estimated densities – in fact estimated empirical distribution from the data. Usually compared with normal dist. Gaussian kernel – if adj. parameter high – approximate normal distribution. Low: shape similar to histogram with infinite number of bars. Outliers: how to get rid of them in gretl: Sample =>Restrict sample according to some criterion => follow the instruction in Help)
- Comparing distributions (tests of same means, 2 sample t-test, assumption: same variance, normal distribution. Test for same variance: F-test. Test for normal distribution: Jarque-Berra, Kolmogorov-Smirnoff, NormalQQplot... If not, use nonparametric tests: Wilcoxon rank-sum test)
- Not many people know all tests statistics. But it is important to know the logic of hypothesis testing and to know what are the pitfalls: normality as an assumption of many parametric tests is one of them. Where to find information about statistical tests: Have a look here for a nice explanations: http://www.graphpad.com/articles/interpret/Analyzing_two_groups/choos_anal_comp_two.htm Basic principles http://www.graphpad.com/articles/interpret/principles/stat_principles.htm And finaly nice graphical and extensive explanation of Wilcoxon rank sum test available here: http://www.stat.auckland.ac.nz/~wild/ChanceEnc/Ch10.wilcoxon.pdf
- Transformation of variables Try to play with variables: make their logs and have a look how their distribution changes. Why?

Literature for Quick Reference

- Damodar Gujaratti: Basic Econometrics (2003)
- Gary Koop: Introduction to Econometrics (2008)
- Hill et al.: Principles of Econometrics (2007) – contains many examples with GretI
- Lecture notes at the LSE website or MIT OpenCourseWare:
  - http://ocw.mit.edu/OcwWeb/Economics/index.htm
  - http://econ.lse.ac.uk/courses/ec220/G/ieppt/series2/
  - http://econ.lse.ac.uk/courses/ec221/G/
- Wikipedia:
  - http://en.wikipedia.org