Introduction to gretl

Quantitative Microeconomics

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Outline

1. What is gretl?
2. gretl Basics
3. Importing Data
4. Saving as gretl File
5. Running a Script
6. Basic Commands

What is gretl?

- gretl is an acronym for Gnu Regression Econometrics and Time-series Library
- it is free econometrics software
- it has an easy Graphical User Interface (GUI)
- it runs least-squares, maximum-likelihood, systems estimators...
- it outputs results to several formats
- very important for us in this course: it admits scripts (sequence of commands saved in a file)

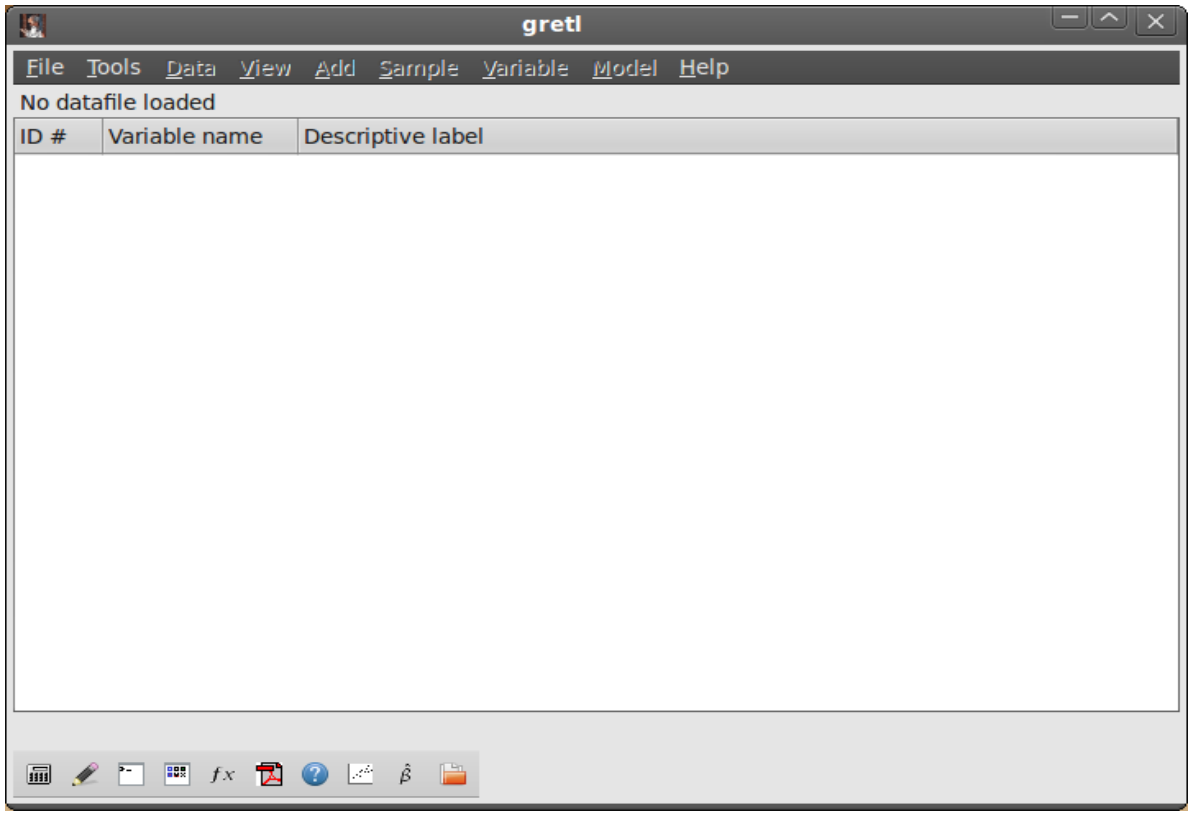
How do I get gretl?

- already installed in many computer rooms at Carlos III
- can be downloaded from **http://gretl.sourceforge.net** and installed on your personal computer
- it runs on Windows, Mac, Linux

How do I work with gretl?

- the easiest way for beginners is by using its graphical user interface
- you can also use the "console" button of the toolbar: from the prompt (?) you can execute gretl commands one line at a time.
- the most efficient way is by using *scripts:*
  1. create a script file, write gretl commands– one every line–, and save it
  2. run the script using the GUI
  3. inspect output
  4. if needed, change script file, save it, and go back to step 2

Main Window (1/2)

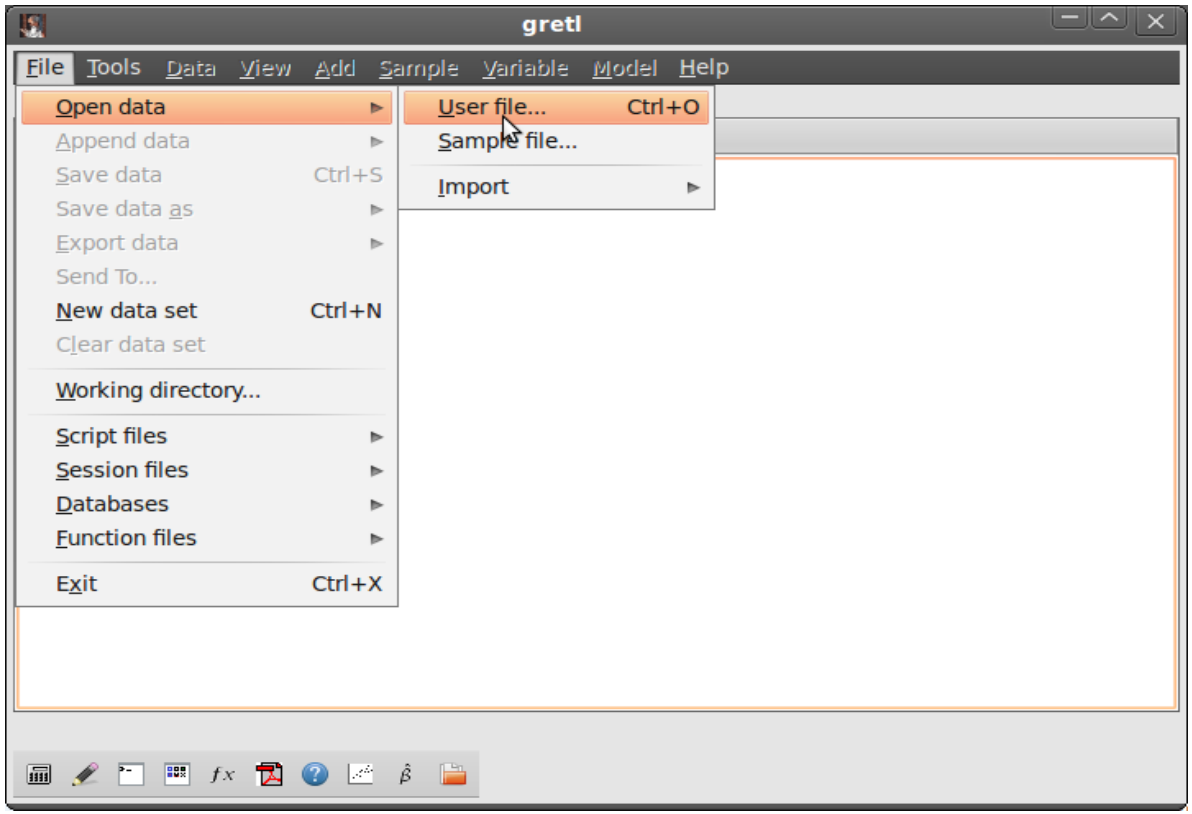


Main Window (2/2)

- across the top of the window you find the menu bar. From here you import and manipulate data, analyze data, and manage output.
- at the bottom of the window is the gretl toolbar. Among others:
  - access to the gretl web site from here
  - open the pdf version of the manual
  - open the operating system default calculator.

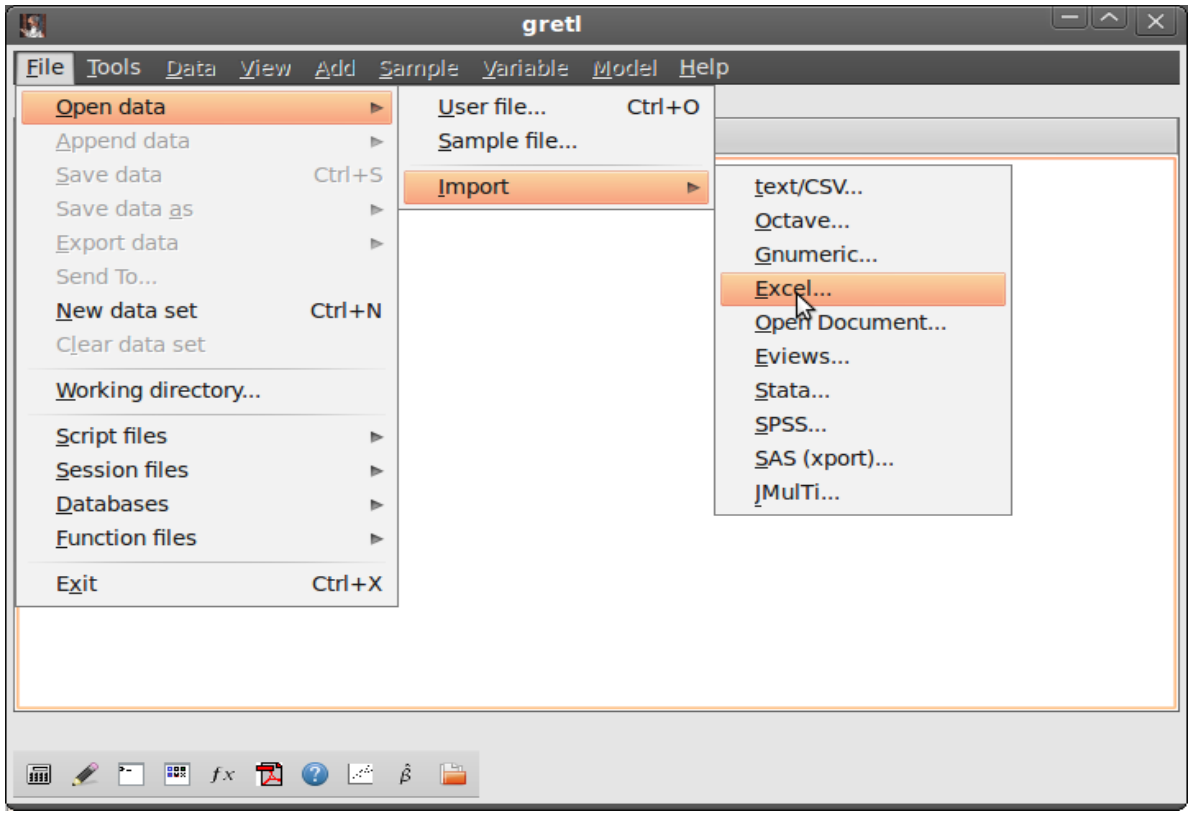
Opening a gretl (.gdt) dataset

File/Open data/Sample file, File/Open data/User file



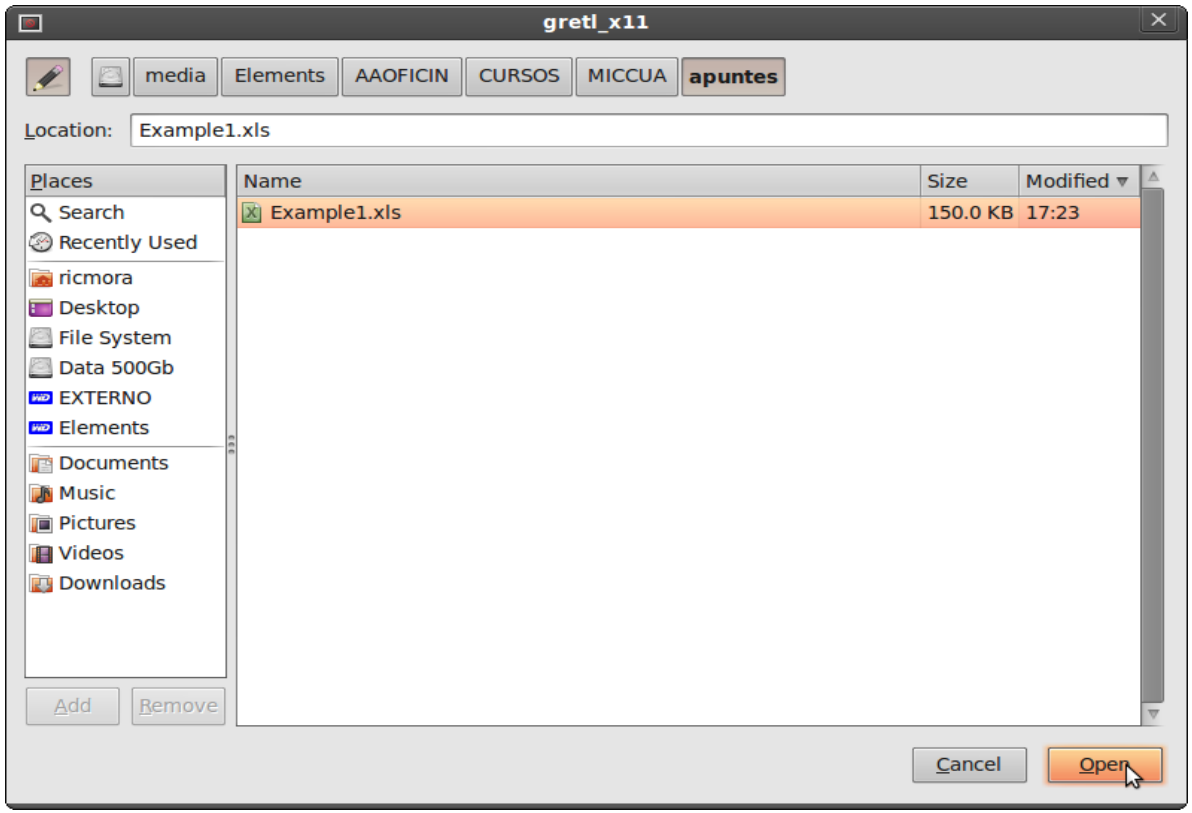
Importing an Excel file

File/Open data/Import/Excel



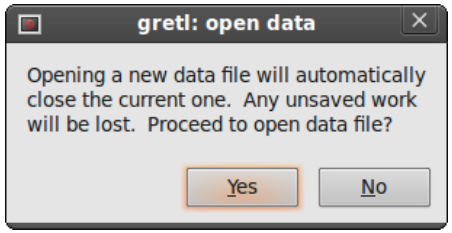
Importing Example1.xls

browse your PC and choose the file



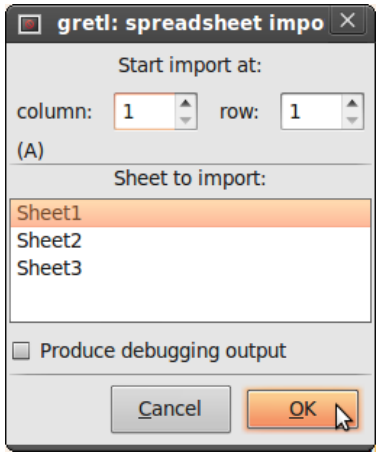
Importing Example1.xls

this warning only takes place with the gui



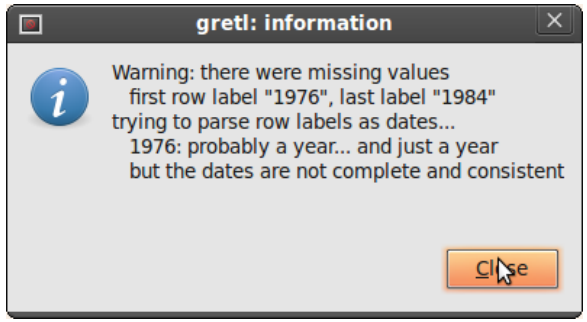
Importing Example1.xls

You can import from any of the sheets



Importing Example1.xls

gretl gives you some info

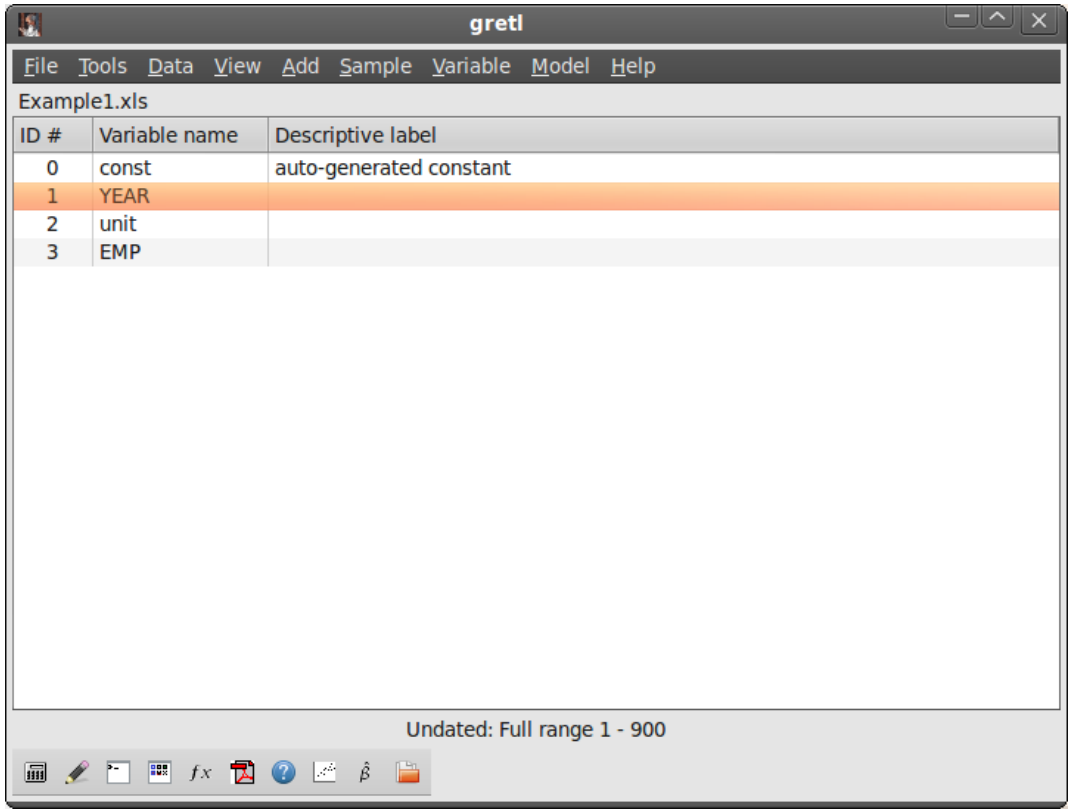


Importing Example1.xls

you can import cross-sections, time-series, or panel data

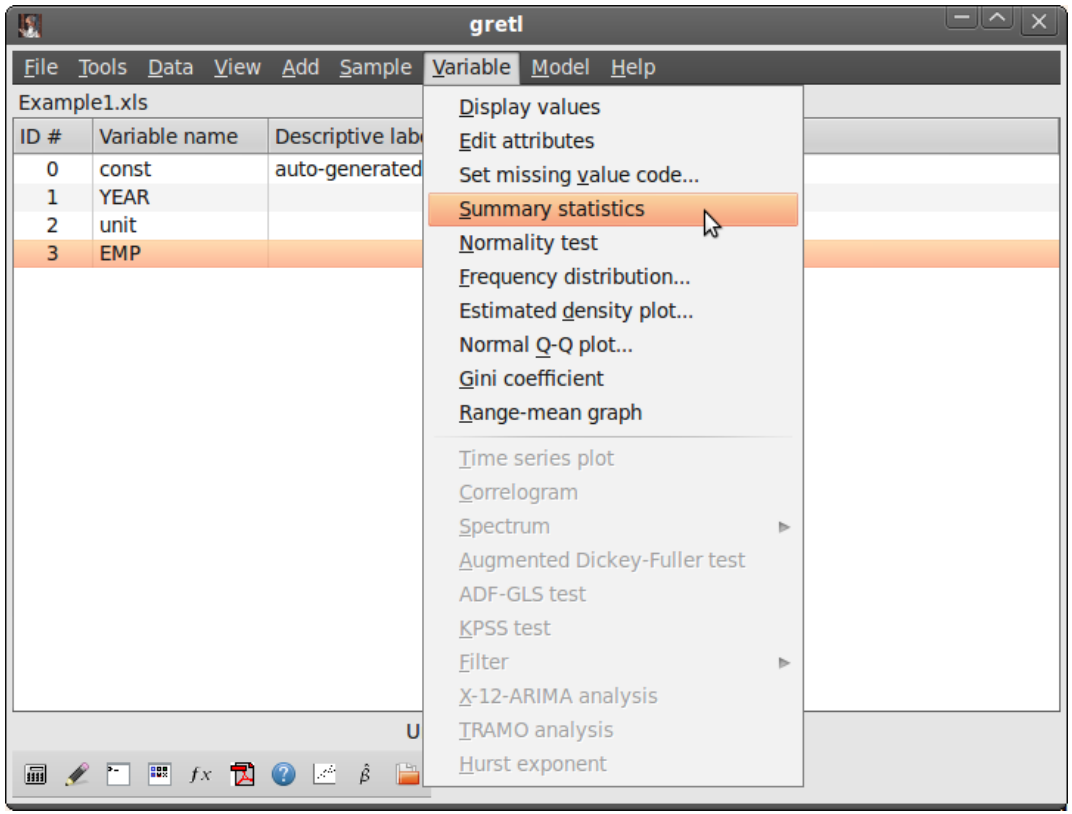
Importing Example1.xls

now the data is available in gretl



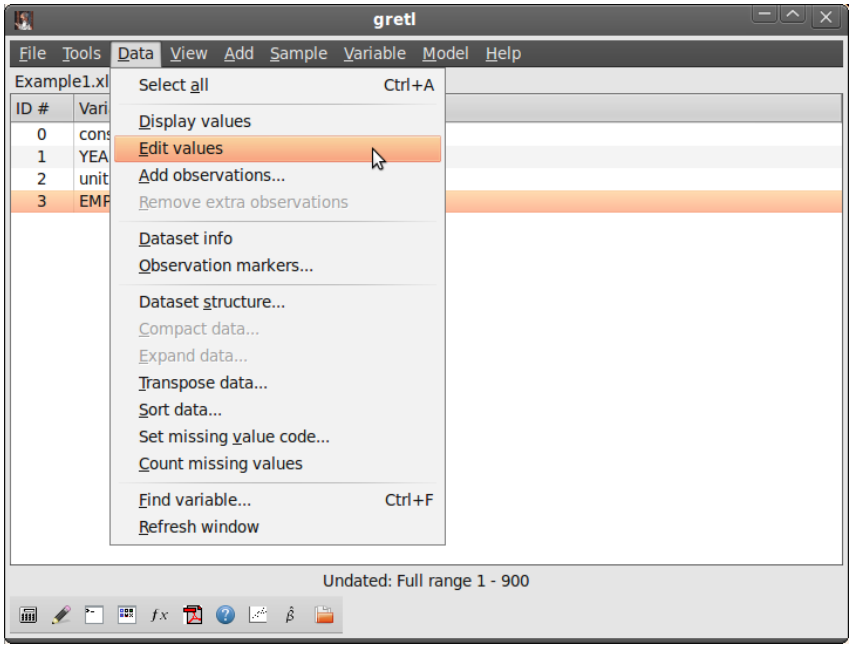
Describing a variable in a dataset

After selecting one variable, Variable/Summary statistics



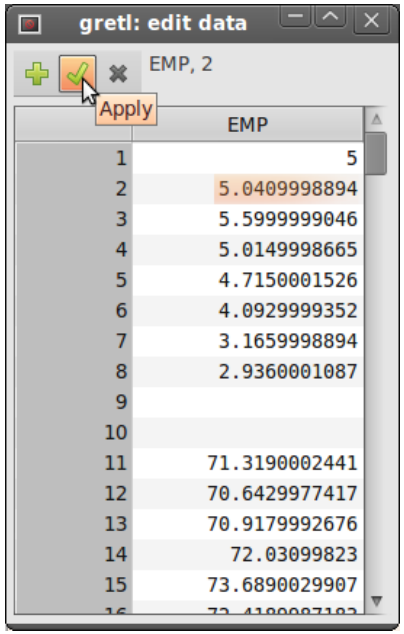
Editing a variable in a dataset

After selecting variable, Data/Edit Values



Editing a variable in a dataset

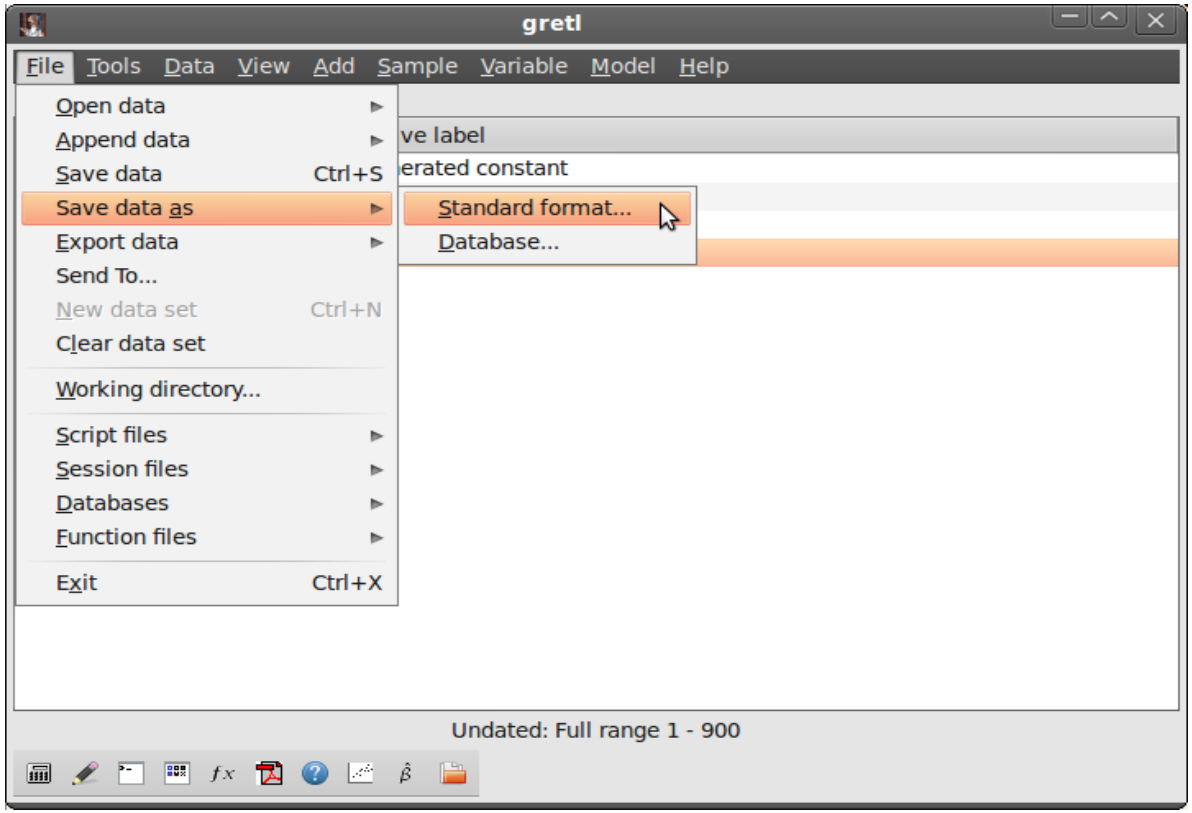
we add 5 in the first observation



(to display EMP and check editing has been succesful, double-click on EMP in main Window)

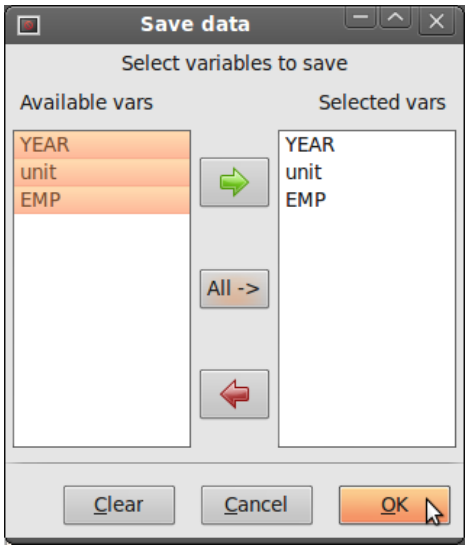
Saving as a new gretl File

File > Save Data as > Standard format



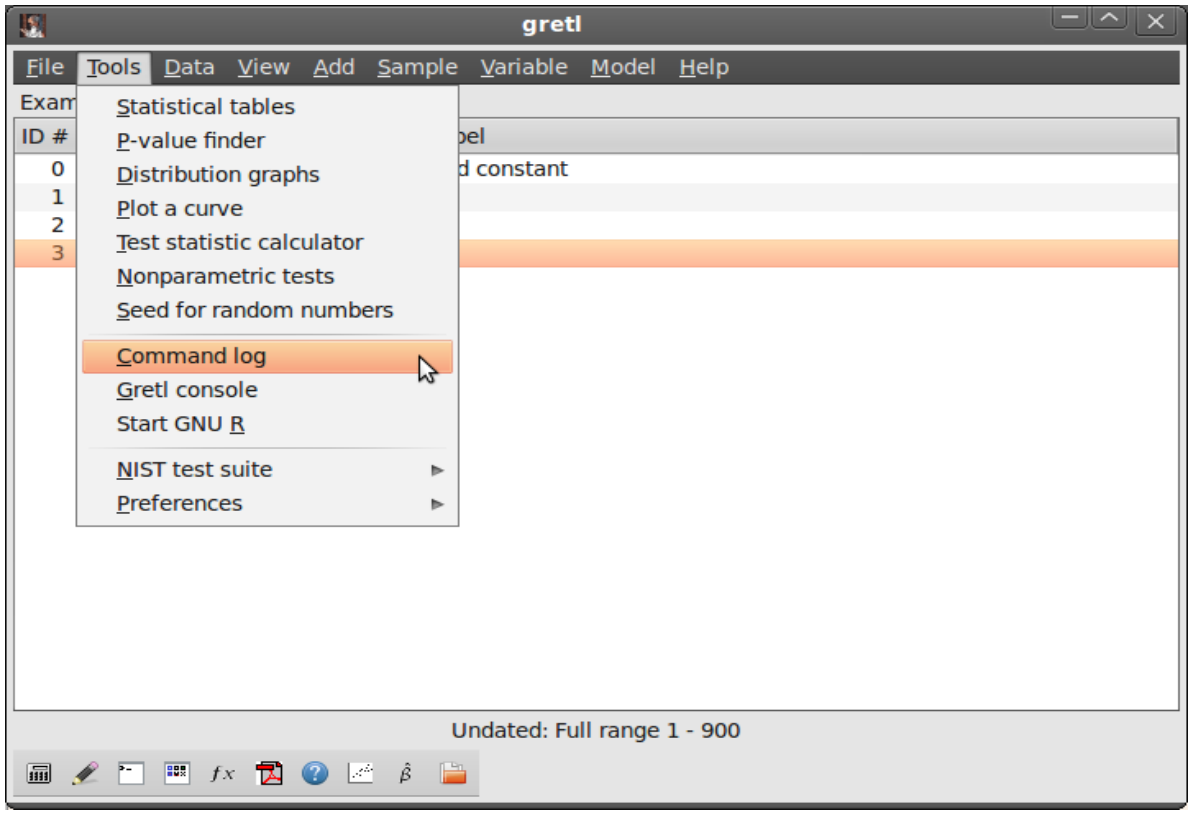
Saving as a new gretl File

you can select a subset of the variables



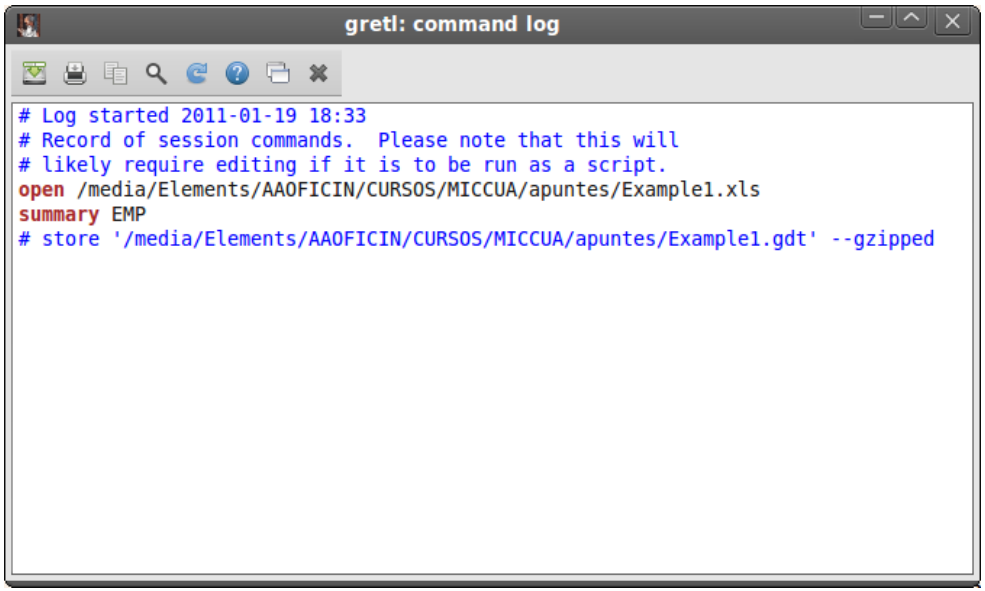
Looking at the Session Script

Tools > Command log



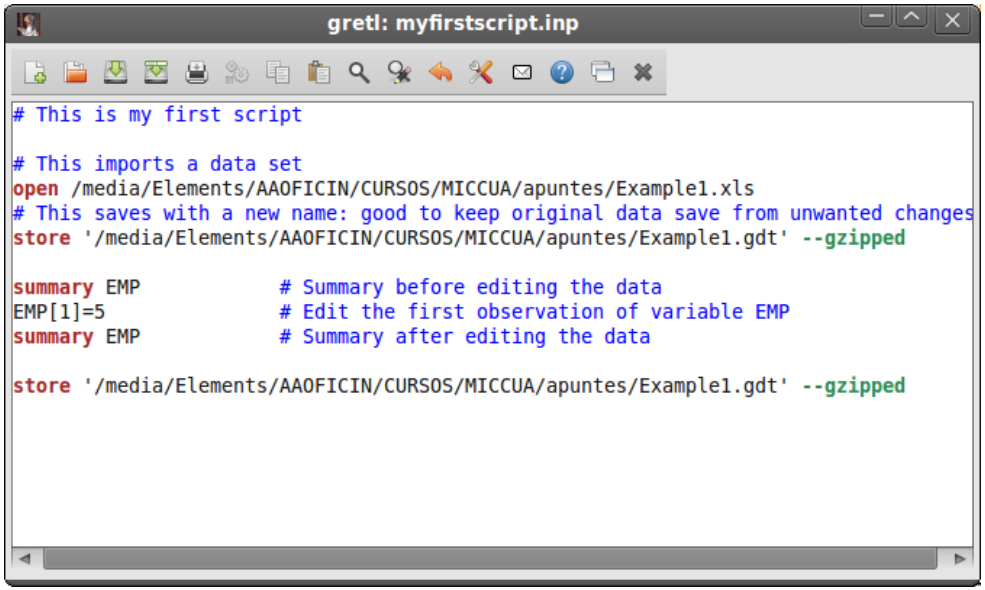
Looking at the session script

note that editing is not recorded and storage is commented out



Changing the script

- type the commands you want to execute in the box using one line for each command
- to save the file, use the “save" button at the top of the box.
- to run the program, click your mouse on the “gear" button.



More on scripts

- using File/Script files/New script you open the command script editor
- If you have a very long command that exceeds one line, use the backslash (\) as a continuation command
- using scripts (and the console) requires you to use the correct language syntax
- `gretl`'s language is case sensitive: `gretl` considers `x` to be different from `X`
- you can find all the commands in the `gretl` command reference (the fourth botton from the right hand side of the toolbar
- at the console window, you can type `help`

Basic commands for data management (1/2)

Commands on the entire data

- `open`: opens a data file replacing any data file already open
- `append`: appends the content of a data to the current dataset
- `dataset`: sorts/clears/transposes/compacts/expands the data...
- `setobs`: declares the structure of the data (cross-section, time-series, panel)
- `smpl`: resets the sample range
- `store`: saves the data into a file

Basic commands for data management (2/2)

Basic commands on variables

- `genr`: creates a new variable
- `delete`: removes variables
- `setinfo`: sets attributes of a variable
- `rename`: renames a variable
- `summary`: shows summary statistics for variables
- `print`: lists the values of variables

Basic commands and functions for regression

- `ols`: computes ordinary least squares
- $coeff: returns a column vector containing the estimated coefficients for the last model
- `$yhat`: a function which computes predicted values in running sample
- `$uhat`: a function which computes residuals in running sample
- `$sample`: a function which identifies the observations used in estimation
- `omit/add`: tests joint significance
- `restrict`: tests restrictions using the Wald test

Basic commands and functions for IV Estimation

- `tsls`: computes two-stages least squares
- `omit/add`: tests joint significance

Example 1

This script imports the data from an excel file, obtains basic statistics for variable EMP, edits the first observation, and stores new dataset

```
open /media/Elements/Example1.xls       # This imports a data set
summary EMP                             # Summary before editing the data
EMP[1]=5                                # Edit the first observation of variable EMP
summary EMP                             # Summary after editing the data

store '/media/Elements/Example 1.gdt' --gzipped
```

Example 2

this script opens dataset in gretl format, restricts the sample in different ways and looks at descriptive statistics, and conducts ols estimation

```
open /home/ricmora/ps3.dta
smpl treat --restrict
summary headeduc mosques pop --simple
smpl treat==0 --restrict --replace
summary headeduc mosques pop --simple
smpl full
summary moneymissing headeduc mosques pop --simple --by=treat
ols moneymissing const treat headeduc mosques pop --robust
```

Example 3

$$D79 = \begin{cases} 1 & \text{if } YEAR = 1979 \\ 0 & \text{otherwise} \end{cases}$$

$$SIZE \begin{cases} 1 & \text{if } \#\text{ employees } < 5 \\ 2 & \text{if } \#\text{ employees } \in [5, 30) \\ 3 & \text{if } \#\text{ employees } \in [30, 75) \\ 4 & \text{if } \#\text{ employees } \in [75, \infty) \end{cases}$$

This script imports the data from an excel file, generates a time dummy, and discrete qualitative variable

```
open Example1.xls
freq YEAR                 # Tabulates values of discrete variable
genr D79 = YEAR==1979     # 1 if YEAR==1979, 0 otherwise
genr SIZE=1*(EMP<5)+2*(EMP>=5)*(EMP<30)+3*(EMP>=30)*(EMP<75)+4*(EMP>=75)
```

Summary

- gretl is free software for econometrics tools
- it has a simple and intuitive gui, but the most efficient way to work with gretl is by use of scripts