

An Introduction to *gretl*

Dr. Jia-Ping Huang

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Description

Gretl (Gnu Regression, Econometrics and Time-series Library) is a cross-platform software package for econometric analysis, written in the C programming language. It is free, open-source software. You may redistribute it and/or modify it under the terms of the GNU General Public License (GPL) as published by the Free Software Foundation.¹

- Official website: <http://gretl.sourceforge.net/>

Installation

Go to the website and find the *latest release* (version 2019c by Sep, 2019) for your operating system. Download the installer program and following its instruction.

- Download link for Windows: <http://gretl.sourceforge.net/win32/>
- Download link for Mac: <http://gretl.sourceforge.net/osx.html>

Documentations

All the following documents can be found from the help menu of *gretl*, as well as from the website.

- Gretl Command Reference: <http://gretl.sourceforge.net/gretl-help/cmdref.html>
- Gretl Function Reference: <http://gretl.sourceforge.net/gretl-help/funcref.html>
- hansl primer: <http://sourceforge.net/projects/gretl/files/manual/hansl-primer.pdf>
(hansl is the programming language used in *gretl* scripts)

A walkthrough for absolute beginners

In this section I will show the readers how to use *gretl* using a simple example of linear regression analysis.² There are some videos on YouTube providing similar contents, which can be used as a supplement.

The main window

When you open *gretl* for the first time, you will see the main window with the title 'gretl'. Most of the functions of *gretl* can be found from the menu bar (Fig 1). Some of the functions are colored gray, meaning they are not available at the current stage. In what follows we conduct a simple linear regression analysis.

¹ Gretl website: <http://gretl.sourceforge.net/>

² Mac version of *gretl* is used.

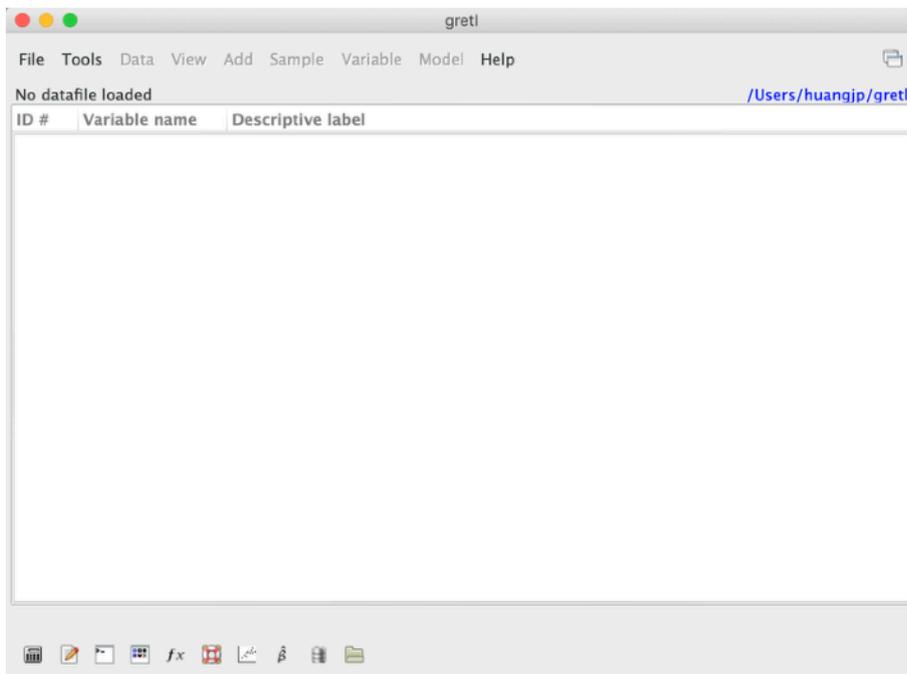


Fig 1. The main window of gretl

Data Import

The first thing of econometric analysis with any software is to import data. Gretl has some built-in data sets for learning purposes. They can be imported by clicking *File > Open data > Sample file...* (Fig 2). Then you will see a new window with the title 'gretl: data files' showing all available data sets. Let us select *data3-1 (House prices and sqft)* under tab *Ramanathan* by double clicking it (Fig 3). Now the data is loaded into the main window (Fig 4).

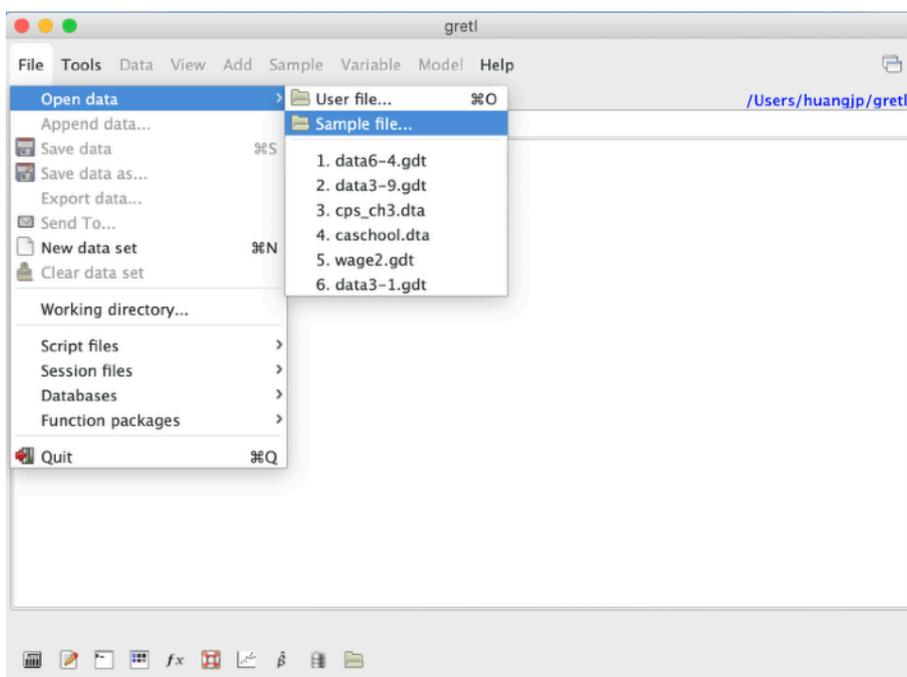


Fig 2. Built-in data sets.

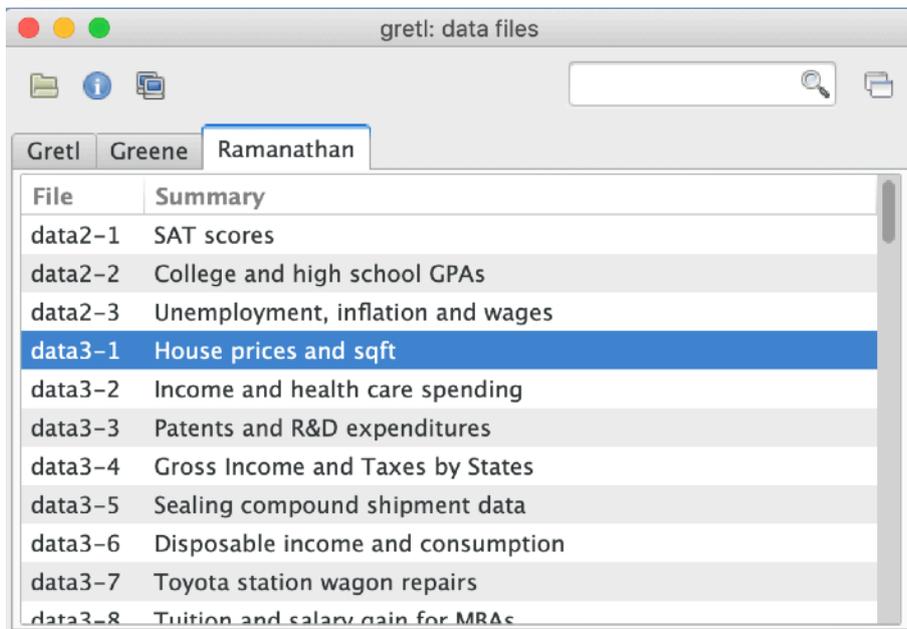


Fig 3. Data selection window.

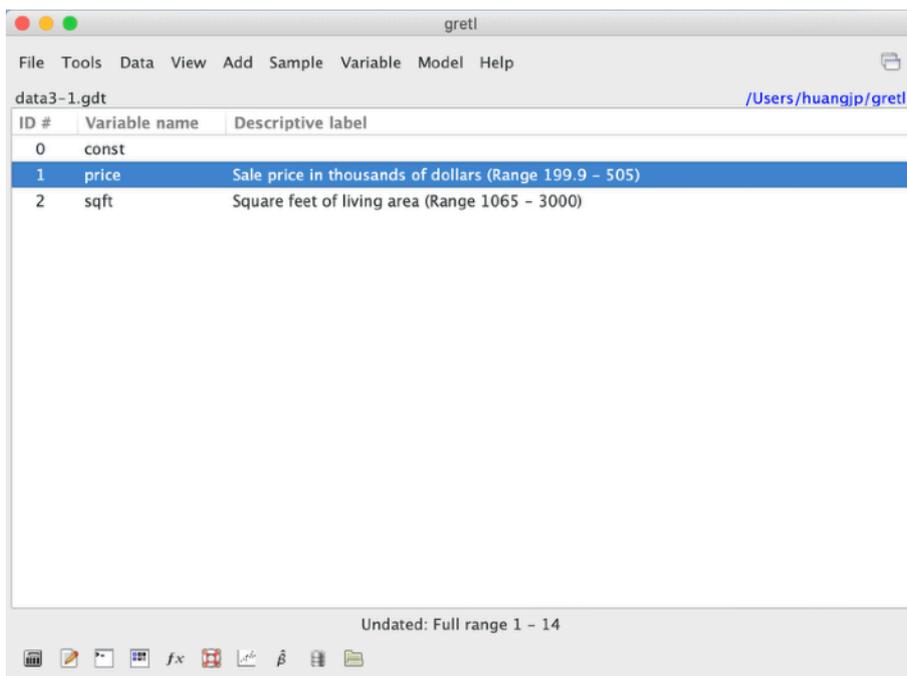


Fig 4. Data loaded.

Data description

There are three variables in Fig 4 numbered from 0 to 2. All variables contain 14 observations (see the bottom of the window). Each variable has a name. The first variable is always named 'const' which means the constant 1. This corresponds to the intercept in linear regression models. The other two variables here are 'price' and 'sqft'. By double clicking on a variable (or anywhere on that row) one can see the values of observations of it.

Summary statistics of variables can be generated from *View > Summary statistics*. Then a window entitled 'gret: summary statistics' enables us to select the variables whose summary statistics we want to have (Fig 5). Select the variables (you can select multiple variables at the same time), click the right pointing arrow to move the them into the box on the right, and click OK. You will be asked whether to show main statistics or full statistics. Here let us choose full statistics. The statistics will be shown in another window (Fig 6).

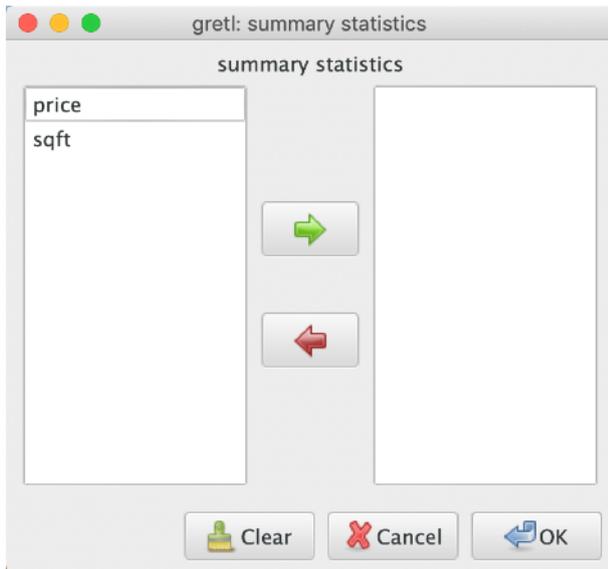


Fig 5. Choose variables for summary statistics.

	Mean	Median	Minimum	Maximum
price	317.49	291.50	199.90	505.00
sqft	1910.9	1835.0	1065.0	3000.0
	Std. Dev.	C.V.	Skewness	Ex. kurtosis
price	88.498	0.27874	0.65346	-0.52983
sqft	577.76	0.30234	0.48526	-0.67212
	IQ range	Missing obs.		
price	154.50	0		
sqft	832.75	0		

Fig 6. Result of summary statistics.

We can also obtain correlation matrix, scatter plots, etc., from the *View* menu. Fig 7 depicts the scatter plot of price against sqft with a fitted line. This is done with *View > Graph specified vars > X-Y scatter....*

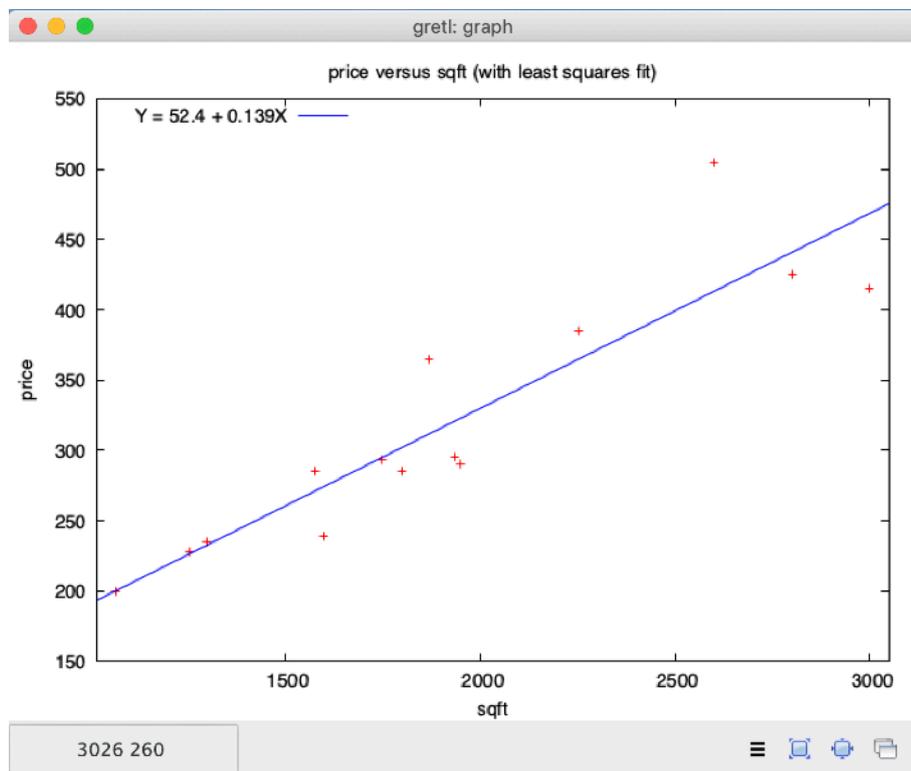


Fig 7. A scatter plot.

Regression analysis

Regression analysis can be found under *Model* menu. *Model > Ordinary Least Squares* provides us the OLS regression of a linear model. You can specify your model by choosing variables as a dependent variable or as a regressor, as shown in Fig 8. Do not remove the 'const' from the regressor list unless you know what it means.

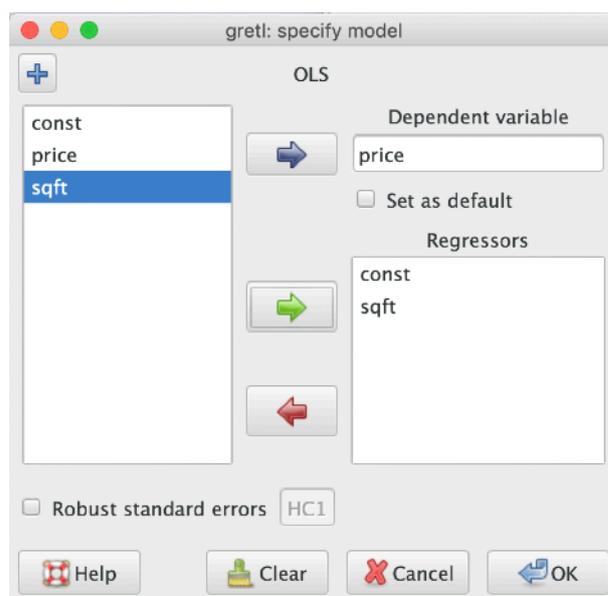
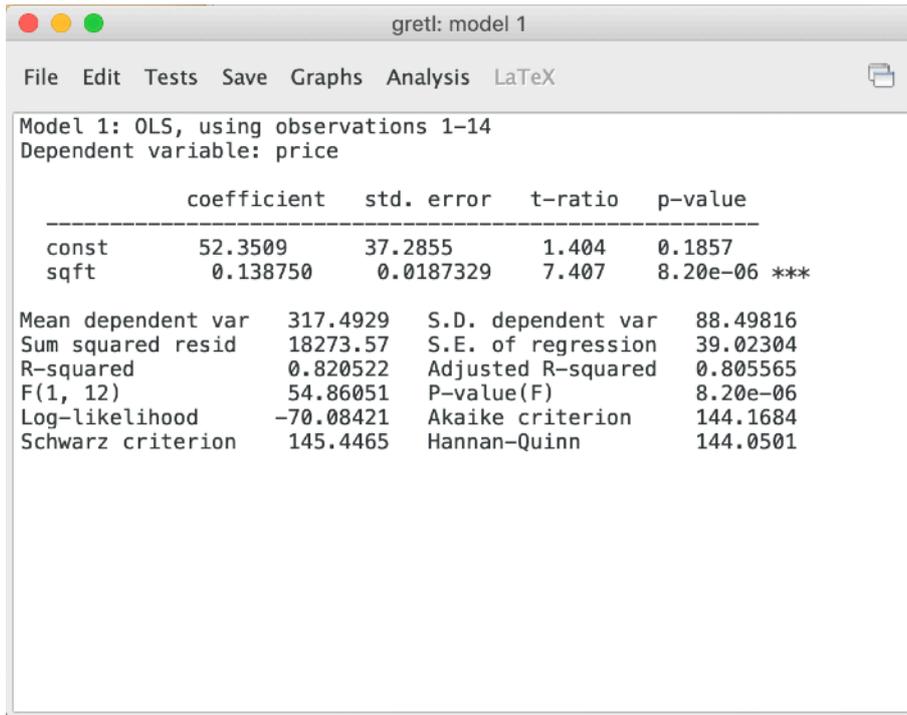


Fig 8. Specify a model.

Here we want to study how the price of a house depends on its floor area. The regression model is

$$\text{price}_i = \beta_0 + \beta_1 \text{sqft}_i + u_i .$$

The OLS regression result is shown in a separate window named 'gretl: model 1' (Fig 9). You can find the coefficients, standard errors, t statistics, and p values together with other information about the fitted model. You can also do diagnostic tests, save results, draw graphs, or analyze the fitted model by choosing the corresponding functions from the menu bar of this window.



The screenshot shows a window titled 'gretl: model 1' with a menu bar (File, Edit, Tests, Save, Graphs, Analysis, LaTeX) and a text area containing the following regression results:

	coefficient	std. error	t-ratio	p-value
const	52.3509	37.2855	1.404	0.1857
sqft	0.138750	0.0187329	7.407	8.20e-06 ***

Mean dependent var	317.4929	S.D. dependent var	88.49816
Sum squared resid	18273.57	S.E. of regression	39.02304
R-squared	0.820522	Adjusted R-squared	0.805565
F(1, 12)	54.86051	P-value(F)	8.20e-06
Log-likelihood	-70.08421	Akaike criterion	144.1684
Schwarz criterion	145.4465	Hannan-Quinn	144.0501

Fig 9. Regression results.

From a beginner to a specialist

So far we have seen the simplest way of working with *gretl*. In the study of and research with econometrics we need to use *gretl* more extensively. You will need to know how to work with real data rather than sample data sets, how to use the script mode to make your analysis more efficient, and how to correctly put theory into practice with *gretl*. All of these need your patience and efforts, and perhaps some guidance. It is always helpful to consult the documents under the *Help* menu.