"Econometric analysis using GRETL"

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Outline

1. GRETL
   - What is GRETL?
   - Obtaining Data Yahoo Finance

Outline

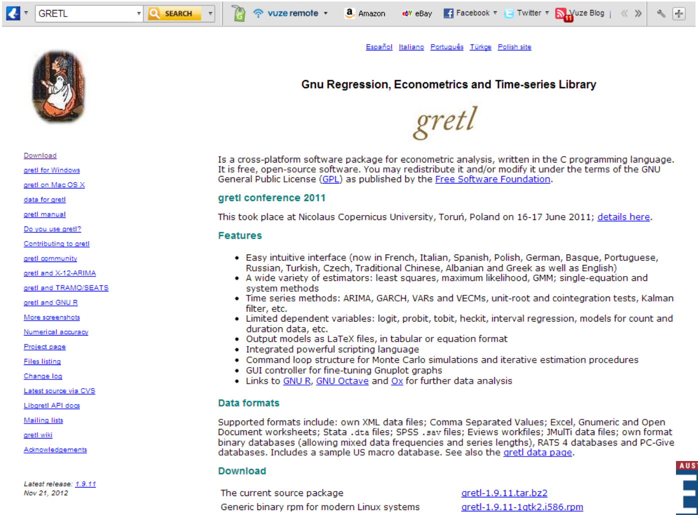
Obtaining GRETL

Go to http://gretl.sourceforge.net/

Figure : GRETL Home page

GRETL Download

Figure : GRETL Download page



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Download
gretl for Windows
gretl on Mac OS X
data for gretl
gretl manual
Do you use gretl?
Contributing to gretl
gretl community
gretl and X-12-ARIMA
gretl and TRAMO/SEATS
gretl and GNU R
More screenshots
Numerical accuracy
Project page
Files listing
Change log
Latest source via CVS
Libgretl API docs
Mailing lists
gretl wiki
Acknowledgements

Latest release: 1.9.11
Nov 21, 2012

Gnu Regression, Econometrics and Time-series Library

gretl

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.

gretl conference 2011

This took place at Nicolaus Copernicus University, Toruń, Poland on 16-17 June 2011; details here.

Features

- Easy intuitive interface (now in French, Italian, Spanish, Polish, German, Basque, Portuguese, Russian, Turkish, Czech, Traditional Chinese, Albanian and Greek as well as English)
- A wide variety of estimators: least squares, maximum likelihood, GMM; single-equation and system methods
- Time series methods: ARIMA, GARCH, VARs and VECMs, unit-root and cointegration tests, Kalman filter, etc.
- Limited dependent variables: logit, probit, tobit, heckit, interval regression, models for count and duration data, etc.
- Output models as LaTeX files, in tabular or equation format
- Integrated powerful scripting language
- Command loop structure for Monte Carlo simulations and iterative estimation procedures
- GUI controller for fine-tuning Gnuplot graphs
- Links to GNU R, GNU Octave and Ox for further data analysis

Data formats

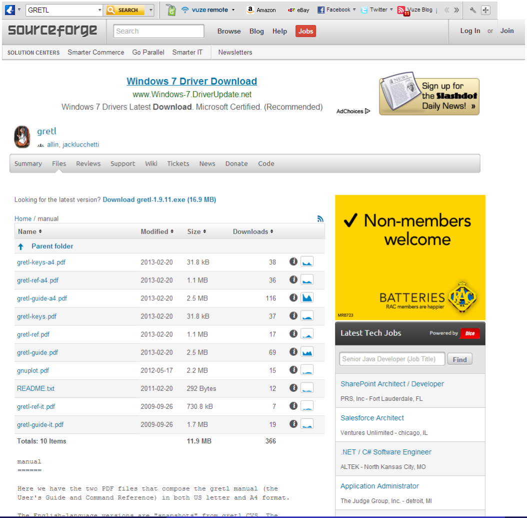
Supported formats include: own XML data files; Comma Separated Values; Excel, Gnumeric and Open Document worksheets; Stata .dta files; SPSS .sav files; Eviews workfiles; JMulTi data files; own format binary databases (allowing mixed data frequencies and series lengths), RATS 4 databases and PC-Give databases. Includes a sample US macro database. See also the gretl data page.

Download

The current source package	gretl-1.9.11.tar.bz2
Generic binary rpm for modern Linux systems	gretl-1.9.11-1gtk2.i586.rpm

GRETL Manuals

Figure : GRETL Manuals



GRETL

Gretl is an econometrics package, including a shared library, a command-line client program and a graphical user interface. User-friendly Gretl offers an intuitive user interface; it is very easy to get up and running with econometric analysis. Thanks to its association with the econometrics textbooks by Ramu Ramanathan, Jeffrey Wooldridge, and James Stock and Mark Watson, the package offers many practice data files and command scripts. These are well annotated and accessible. Two other useful resources for gretl users are the available documentation and the gretl-users mailing list. Flexible You can choose your preferred point on the spectrum from interactive point-and-click to batch processing, and can easily combine these approaches. Cross-platform Gretl's "home" platform is Linux but it is also available for MS Windows and Mac OS X, and should work on any unix-like system that has the appropriate basic libraries (see Appendix C). Open source The full source code for gretl is available to anyone who wants to critique it, patch it, or extend it.

GRETL

Sophisticated Gretl offers a full range of least-squares based estimators, either for single equations and for systems, including vector autoregressions and vector error correction models. Several specific maximum likelihood estimators (e.g. probit, ARIMA, GARCH) are also provided natively; more advanced estimation methods can be implemented by the user via generic maximum likelihood or nonlinear GMM. Extensible Users can enhance gretl by writing their own functions and procedures in gretl's scripting language, which includes a wide range of matrix functions. Accurate Gretl has been thoroughly tested on several benchmarks, among which the NIST reference datasets. See Appendix D. Internet ready Gretl can access and fetch databases from a server at Wake Forest University. The MS Windows version comes with an updater program.

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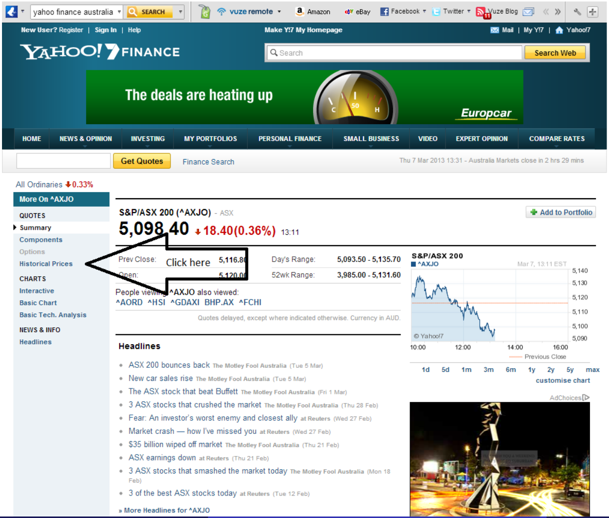
Obtaining data

Figure : Yahoo Finance Australia home page

ASX200 Index Yahoo Finance

Figure : ASX200 Index Yahoo Finance

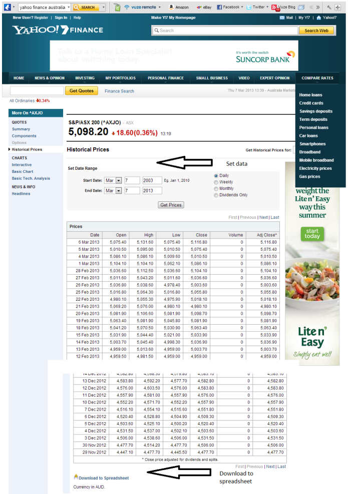


Historical price data

Click on historical price link
Set data request to daily
Set date range
I have requested 10 years of data.
Bottom of page - click down load to spreadsheet.

Downloading historical price data

Figure : Historical price data Yahoo Finance

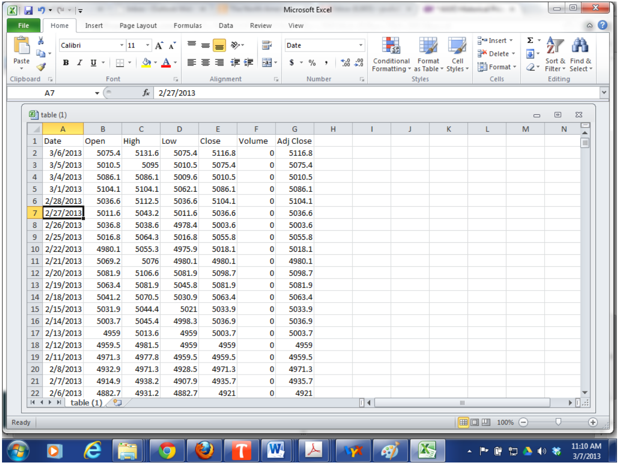


Date	Open	High	Low	Close	Volume	Adj Close*
6 Mar 2013	5,075.40	5,131.60	5,075.40	5,116.80	0	5,116.80
5 Mar 2013	5,010.50	5,095.00	5,010.50	5,075.40	0	5,075.40
4 Mar 2013	5,086.10	5,086.10	5,009.60	5,010.50	0	5,010.50
1 Mar 2013	5,104.10	5,104.10	5,062.10	5,086.10	0	5,086.10
28 Feb 2013	5,036.60	5,112.50	5,036.60	5,104.10	0	5,104.10
27 Feb 2013	5,011.60	5,043.20	5,011.60	5,036.60	0	5,036.60
26 Feb 2013	5,036.80	5,038.60	4,978.40	5,003.60	0	5,003.60
25 Feb 2013	5,016.80	5,064.30	5,016.80	5,055.80	0	5,055.80
22 Feb 2013	4,980.10	5,055.30	4,975.90	5,018.10	0	5,018.10
21 Feb 2013	5,069.20	5,076.00	4,980.10	4,980.10	0	4,980.10
20 Feb 2013	5,081.90	5,106.60	5,081.90	5,098.70	0	5,098.70
19 Feb 2013	5,063.40	5,081.90	5,045.80	5,081.90	0	5,081.90
18 Feb 2013	5,041.20	5,070.50	5,030.90	5,063.40	0	5,063.40
15 Feb 2013	5,031.90	5,044.40	5,021.00	5,033.90	0	5,033.90
14 Feb 2013	5,003.70	5,045.40	4,998.30	5,036.90	0	5,036.90
13 Feb 2013	4,959.00	5,013.60	4,959.00	5,003.70	0	5,003.70
12 Feb 2013	4,959.50	4,981.50	4,959.00	4,959.00	0	4,959.00
13 Dec 2012	4,583.80	4,592.20	4,577.70	4,582.80	0	4,582.80
12 Dec 2012	4,576.00	4,603.50	4,576.00	4,583.80	0	4,583.80
11 Dec 2012	4,557.90	4,581.00	4,557.90	4,576.00	0	4,576.00
10 Dec 2012	4,552.20	4,571.70	4,552.20	4,557.90	0	4,557.90
7 Dec 2012	4,516.10	4,554.10	4,515.60	4,551.80	0	4,551.80
6 Dec 2012	4,520.40	4,528.80	4,504.90	4,509.30	0	4,509.30
5 Dec 2012	4,503.60	4,525.10	4,500.20	4,520.40	0	4,520.40
4 Dec 2012	4,531.50	4,537.00	4,502.10	4,503.60	0	4,503.60
3 Dec 2012	4,506.00	4,538.60	4,506.00	4,531.50	0	4,531.50
30 Nov 2012	4,477.70	4,514.20	4,477.70	4,506.00	0	4,506.00
29 Nov 2012	4,447.10	4,477.70	4,445.50	4,477.70	0	4,477.70

* Close price adjusted for dividends and splits.

Download to spreadsheet

Figure : Spreadsheet download



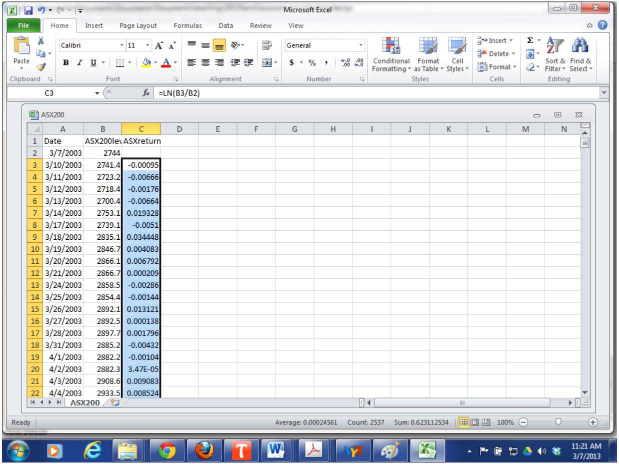
Date	Open	High	Low	Close	Volume	Adj Close
3/6/2013	5075.4	5131.6	5075.4	5116.8	0	5116.8
3/5/2013	5010.5	5095	5010.5	5075.4	0	5075.4
3/4/2013	5086.1	5086.1	5009.6	5010.5	0	5010.5
3/1/2013	5104.1	5104.1	5062.1	5086.1	0	5086.1
2/28/2013	5036.6	5112.5	5036.6	5104.1	0	5104.1
2/27/2013	5011.6	5043.2	5011.6	5036.6	0	5036.6
2/26/2013	5036.8	5038.6	4978.4	5003.6	0	5003.6
2/25/2013	5016.8	5064.3	5016.8	5055.8	0	5055.8
2/22/2013	4980.1	5055.3	4975.9	5018.1	0	5018.1
2/21/2013	5069.2	5076	4980.1	4980.1	0	4980.1
2/20/2013	5081.9	5106.6	5081.9	5098.7	0	5098.7
2/19/2013	5063.4	5081.9	5045.8	5081.9	0	5081.9
2/18/2013	5041.2	5070.5	5030.9	5063.4	0	5063.4
2/15/2013	5031.9	5044.4	5021	5033.9	0	5033.9
2/14/2013	5003.7	5045.4	4998.3	5036.9	0	5036.9
2/13/2013	4959	5013.6	4959	5003.7	0	5003.7
2/12/2013	4959.5	4981.5	4959	4959	0	4959
2/11/2013	4971.3	4977.8	4959.5	4959.5	0	4959.5
2/8/2013	4932.9	4971.3	4928.5	4971.3	0	4971.3
2/7/2013	4914.9	4938.2	4907.9	4935.7	0	4935.7
2/6/2013	4882.7	4931.2	4882.7	4921	0	4921

Modifications to spreadsheet

We really only require the adjusted closing price.
The data is stacked from most recent to last.
We need to sort on the dates and re-order the data.
Use the sort function to do this.
We need to calulate a rate of return series.
We can do this using the natural logarithm of price changes to get a continuously compounded return series.
$return = ln(price_t / price_{t-1})$

Calculating returns

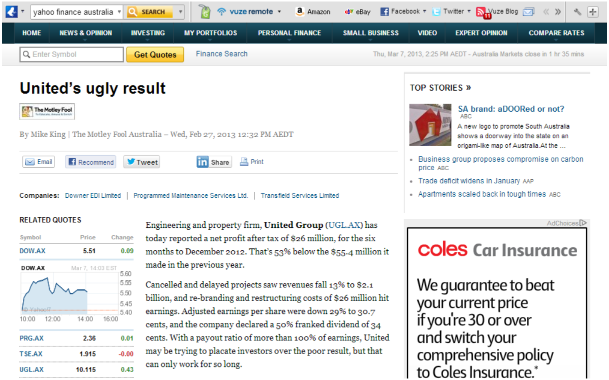
Figure : ASX200 return calculation



	A	B	C
1	Date	ASX200lev	ASXreturn
2	3/7/2003	2744	
3	3/10/2003	2741.4	-0.00095
4	3/11/2003	2723.2	-0.00666
5	3/12/2003	2718.4	-0.00176
6	3/13/2003	2700.4	-0.00664
7	3/14/2003	2753.1	0.019328
8	3/17/2003	2739.1	-0.0051
9	3/18/2003	2835.1	0.034448
10	3/19/2003	2846.7	0.004083
11	3/20/2003	2866.1	0.006792
12	3/21/2003	2866.7	0.000209
13	3/24/2003	2858.5	-0.00286
14	3/25/2003	2854.4	-0.00144
15	3/26/2003	2892.1	0.013121
16	3/27/2003	2892.5	0.000138
17	3/28/2003	2897.7	0.001796
18	3/31/2003	2885.2	-0.00432
19	4/1/2003	2882.2	-0.00104
20	4/2/2003	2882.3	3.47E-05
21	4/3/2003	2908.6	0.009083
22	4/4/2003	2933.5	0.008524

United Group

Figure : United Group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United's ugly result

The Motley Fool

By Mike King | The Motley Fool Australia – Wed, Feb 27, 2013 12:32 PM AEDT

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Companies: Downer EDI Limited | Programmed Maintenance Services Ltd. | Transfield Services Limited

RELATED QUOTES

Symbol	Price	Change
DOW.AX	5.51	0.09
PRG.AX	2.36	0.01
TSE.AX	1.915	-0.00
UGL.AX	10.115	0.43

Engineering and property firm, **United Group** (UGL.AX) has today reported a net profit after tax of $26 million, for the six months to December 2012. That's 53% below the $55.4 million it made in the previous year.

Cancelled and delayed projects saw revenues fall 13% to $2.1 billion, and re-branding and restructuring costs of $26 million hit earnings. Adjusted earnings per share were down 29% to 30.7 cents, and the company declared a 50% franked dividend of 34 cents. With a payout ratio of more than 100% of earnings, United may be trying to placate investors over the poor result, but that can only work for so long.

TOP STORIES »

SA brand: aDOORed or not? ABC

A new logo to promote South Australia shows a doorway into the state on an origami-like map of Australia.At the ...

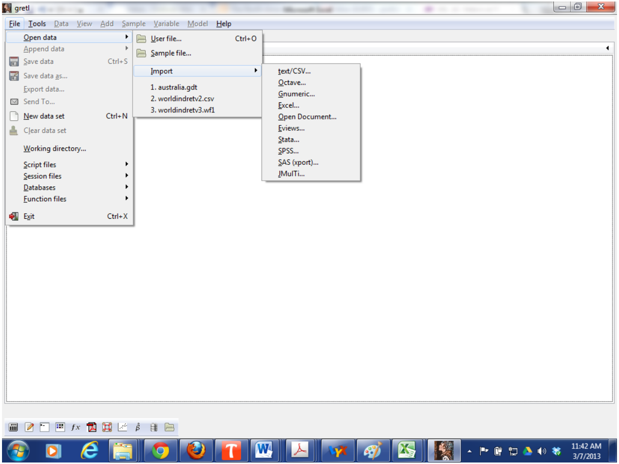
- Business group proposes compromise on carbon price ABC
- Trade deficit widens in January AAP
- Apartments scaled back in tough times ABC

United Group

We need another return series to run a regression.
I noticed that United Group was one of the day's biggest movers so I downloaded 10 years of its data
Calculated returns
Pasted them into the other spreadsheet.
One anomaly was that there were about 10 more observations for United over the period than the 2539 I had for the
ASX 200.
As this is just an example I deleted the last 10 - for serious research this would need to be checked out.
We now need to load our data file into GRETL
The download from Yahoo finance was in CSV format. We can stick with this.

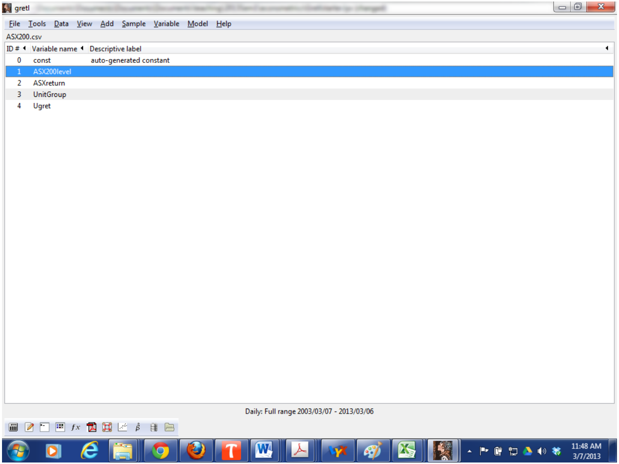
GRETL data import

Figure : GRETL Data Import



GRETL Data Read

Figure : GRETL Data Read

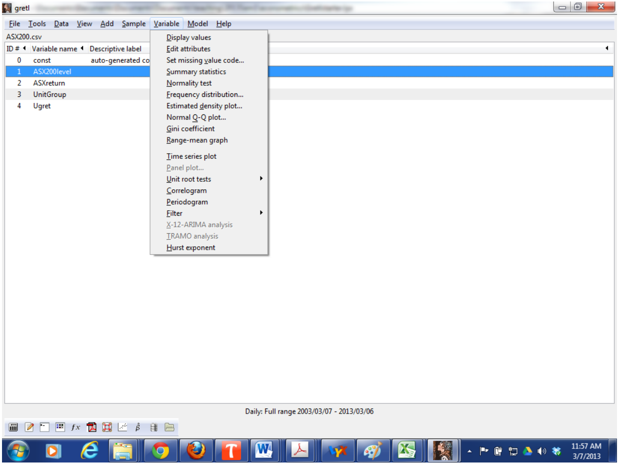


Preliminary data analysis

What does our data look like.
Is it normally distributed?
Lets obtain some descriptive statistics.

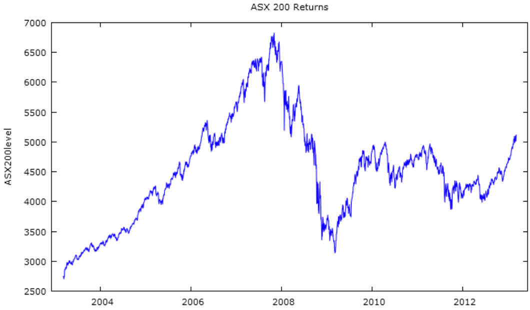
GRETL statistics and plots

Figure : GRETL Statistics and Plots

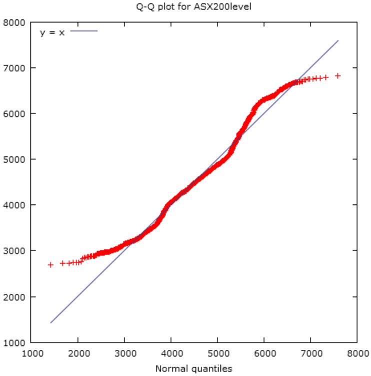


ASX200 return plot

Figure : ASX200 Return Plot



ASX200 QQPlot



ASX200 Descriptive statistics

Summary statistics, using the observations 2003/03/07 - 2013/03/06 for the variable 'ASX200level' (2538 valid observations)

Mean 4509.8

Median 4479.1

Minimum 2700.4

Maximum 6828.7

Standard deviation 870.46

C.V. 0.19302

Skewness 0.38717

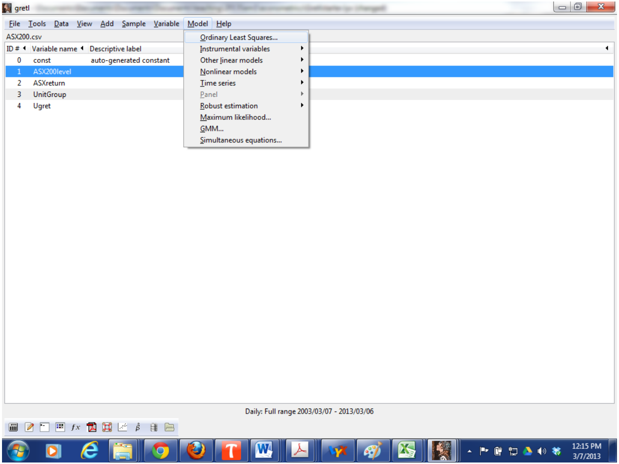
Ex. kurtosis -0.17387

ASX200 returns Normality test

Test for normality of ASX200level:
Doornik-Hansen test = 101.88, with p-value 7.53439e-023
Shapiro-Wilk W = 0.975225, with p-value 1.38052e-020
Lilliefors test = 0.0629944, with p-value ~= 0
Jarque-Bera test = 66.6041, with p-value 3.44427e-015

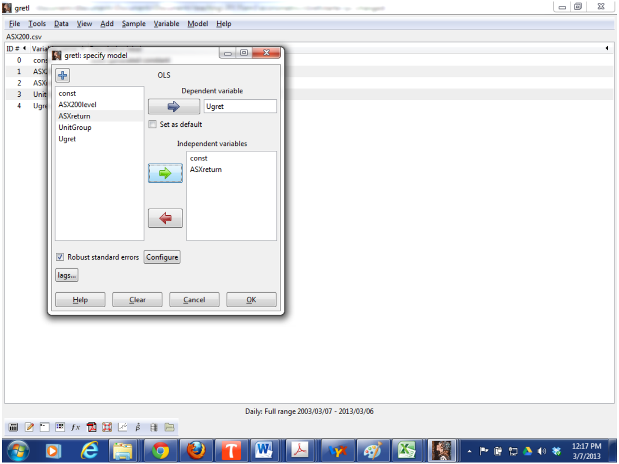
Regression of United Group return on ASX200 Return

Figure : Returns Regression GRETL



GRETL Regression

Figure : GRETL regression variable choice



Regression output

Model 1: OLS, using observations 2003/03/10-2013/03/06 (T = 2537)
Dependent variable: Ugret
HAC standard errors, bandwidth 10 (Bartlett kernel)

	coefficient	std. error	t-ratio	p-value
const	0.000606896	0.000391498	1.550	0.1212
ASXreturn	-0.0218864	0.0446121	-0.4906	0.6238

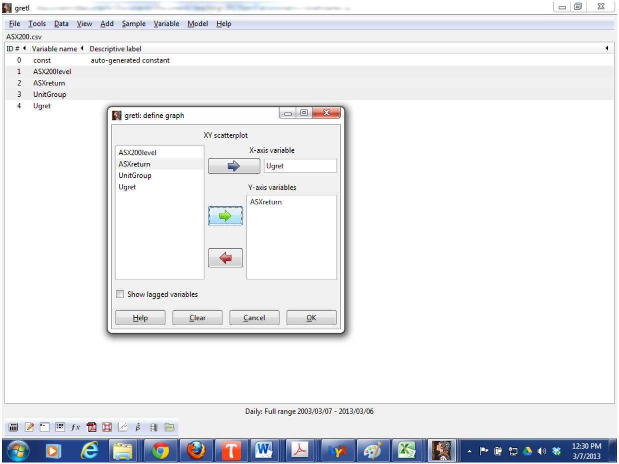
Mean dependent var 0.000602 S.D. dependent var 0.020966
Sum squared resid 1.114621 S.E. of regression 0.020969
R-squared 0.000133 Adjusted R-squared -0.000261
F(1, 2535) 0.240682 P-value(F) 0.623757
Log-likelihood 6205.941 Akaike criterion -12407.88
Schwarz criterion -12396.20 Hannan-Quinn -12403.65
rho -0.025522 Durbin-Watson 2.051023

An insignificant regression

T ratios below 2
Probabilities above 0.05
Very low Rsquare
Durbin-Watson looks ok.
Suppose we plot our two variables together?

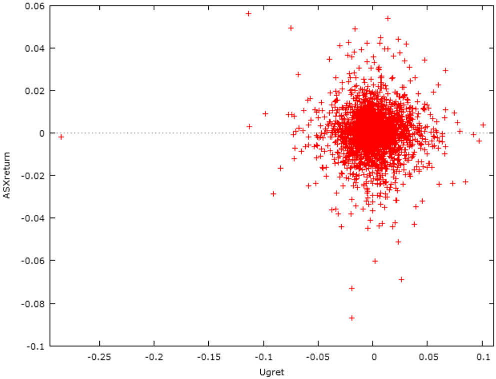
GRETL PLOT Series

Figure : PLOT in GRETL



Cross plot

Figure : Cross plot of the two return series



Summary

We have demonstrated loading data into GRETL
Obtaining some summary graphics and plots
Running a simple regression (albeit with poor results).