Using Eviews

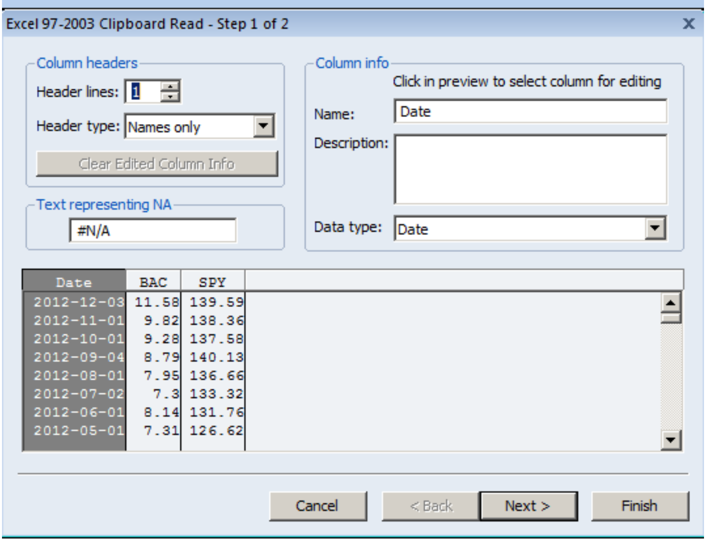
Rob Hayward

January 14, 2014

Outline

1. Import data
2. R^2
3. Confidence intervals on coefficients
4. Durbin-Watson
5. Residuals
6. Further Reading

Import Data

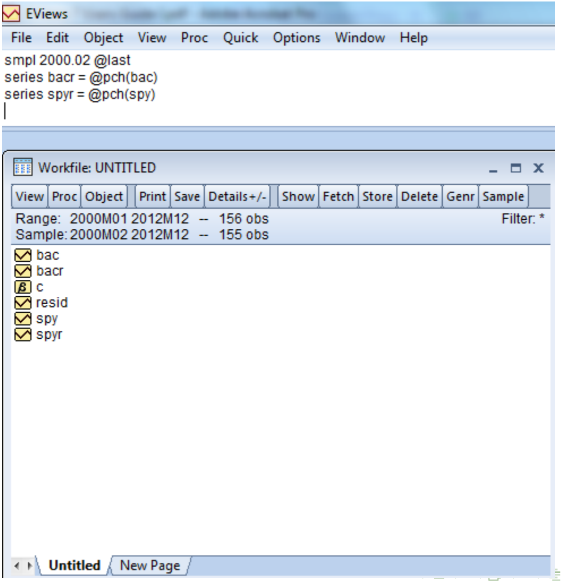

Excel 97-2003 Clipboard Read - Step 1 of 2
Column headers
Header lines: 1
Header type: Names only
Clear Edited Column Info
Text representing NA
#N/A
Column info
Click in preview to select column for editing
Name: Date
Description:
Data type: Date
Date BAC SPY
2012-12-03 11.58 139.59
2012-11-01 9.82 138.36
2012-10-01 9.28 137.58
2012-09-04 8.79 140.13
2012-08-01 7.95 136.66
2012-07-02 7.3 133.32
2012-06-01 8.14 131.76
2012-05-01 7.31 126.62
Cancel
< Back
Next >
Finish

Return Code

"Quick", "Generate Series" or,

```
smpl 2000.02 @last
series bacr = @pch(bac)
series spyr = @pch(spy)
```

Return Series

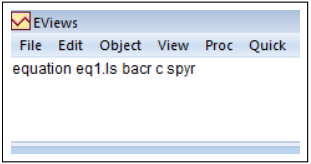


Samples

You can sample from a smaller range of data. This can be used to test the stabilty of the parameters or is necessary to compute lags.

```
smpl 2000.01 2012.12
@first @last
@all
```

Equations



C is the constant
(-1) will lag the variable
No need to specify the error

R Squared (p. 13)

The total variance of the dependent variable is called the total sum of squares (TSS). This can be split into

- Explained sum of squares or sum of squares of the regression (ESS)

R Squared (p. 13)

The total variance of the dependent variable is called the total sum of squares (TSS). This can be split into

- Explained sum of squares or sum of squares of the regression (ESS)
- Residual sum of squares (RSS)

R Squared (p. 13)

The total variance of the dependent variable is called the total sum of squares (TSS). This can be split into

- Explained sum of squares or sum of squares of the regression (ESS)
- Residual sum of squares (RSS)

R Squared (p. 13)

The total variance of the dependent variable is called the total sum of squares (TSS). This can be split into

- Explained sum of squares or sum of squares of the regression (ESS)
- Residual sum of squares (RSS)

$$R^2 = 1 - \frac{RSS}{TSS} = 1 - \frac{RSS}{RSS + ESS}$$

$$R^2 = 1 - \frac{\hat{\varepsilon}'\hat{\varepsilon}}{(y - \bar{y})'(y - \bar{y})}$$

$$u = \hat{\varepsilon} \tag{1}$$

Adjusted R Squared (p. 13)

The R^2 can be considered a measure of *goodness of fit*. However, the more variables that you add the smaller the R^2. The *Adjusted R Squared* ($\bar{R}^2$) will make a penalty for adding variables.

$$\bar{R}^2 = 1 - \frac{RSS}{TSS} \times \frac{(T-1)}{(T-K)} \tag{2}$$

where T is the total number of observations and K is the number of variables.

Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate

Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate
- We want to know how reliable the estimates will be under different samples

Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate
- We want to know how reliable the estimates will be under different samples
- β is a random variable. If OLS (*Gauss-Markov* assumptions hold)

Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate
- We want to know how reliable the estimates will be under different samples
- β is a random variable. If OLS (*Gauss-Markov* assumptions hold)
    - $\hat{\beta}_1 \sim N(\beta_1, \sigma^2_{\beta_1})$

Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate
- We want to know how reliable the estimates will be under different samples
- β is a random variable. If OLS (*Gauss-Markov* assumptions hold)
  - $\hat{\beta}_1 \sim N(\beta_1, \sigma^2_{\beta_1})$

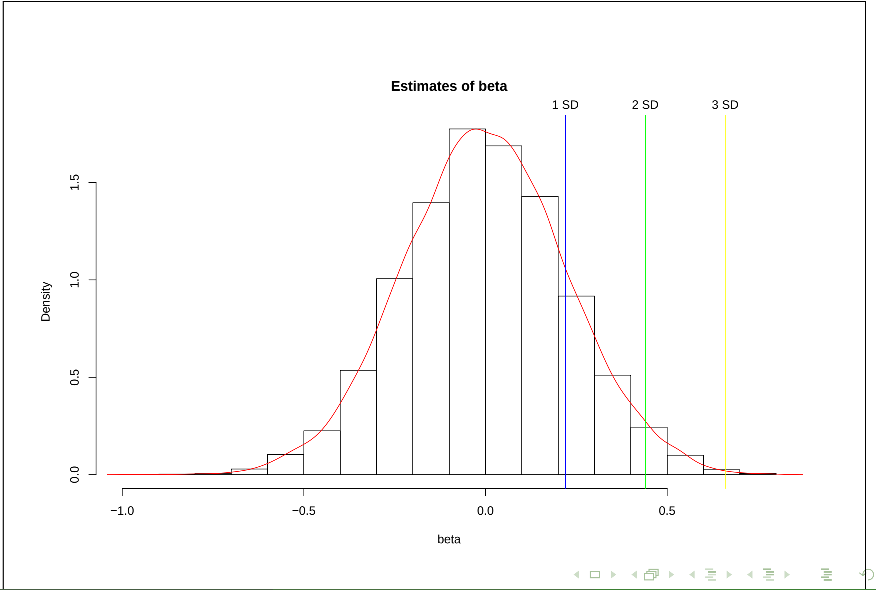
Coefficient Estimates

Remember that the estimates of the coefficients will depend on the sample

- A different sample will give a different estimate
- We want to know how reliable the estimates will be under different samples
- β is a random variable. If OLS (*Gauss-Markov* assumptions hold)
    - $\hat{\beta}_1 \sim N(\beta_1, \sigma^2_{\beta_1})$

  If we assume a normal distribution we can carry out hypothese tests about coefficients like β_1

Variance of Coefficient estimates



Hypothesis tests of Coefficients p.14

Hypothese tests are conducted using the t-statistic

t-stat $= \frac{\text{estimator}-\text{hypothesised value}}{\text{standard error of the estimator}}$

$$t = \frac{\hat{\beta}_1 - \beta_{1,0}}{SE(\hat{\beta}_1)}$$

Need to estimate the standard deviation of the coefficient estimate

Estimating the distribution of the parameter estimate

Covariance matrix of estimated coefficiencts is
$Var(b) = s^2(X'X)^{-1}$
$s^2 = \frac{\hat{\varepsilon}'\hat{\varepsilon}}{(T-k)}$
$\hat{\varepsilon} = y - Xb$
$SE(\hat{\beta}_1) = \sqrt{Var(b)^2}$

Standard Errors

Equation: EQ1 Workfile: UNTITLED::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: BACR
Method: Least Squares
Date: 01/12/14 Time: 18:32
Sample (adjusted): 2000M02 2012M12
Included observations: 155 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002538	0.008828	0.287470	0.7741
SPYR	1.565524	0.192469	8.133894	0.0000

R-squared	0.301881	Mean dependent var	0.006798
Adjusted R-squared	0.297318	S.D. dependent var	0.130876
S.E. of regression	0.109709	Akaike info criterion	-1.569157
Sum squared resid	1.841508	Schwarz criterion	-1.529887
Log likelihood	123.6097	Hannan-Quinn criter.	-1.553206
F-statistic	66.16023	Durbin-Watson stat	1.847680
Prob(F-statistic)	0.000000		

Standard Errors

Equation: EQ1 Workfile: UNTITLED::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: BACR
Method: Least Squares
Date: 01/12/14 Time: 18:32
Sample (adjusted): 2000M02 2012M12
Included observations: 155 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002538	0.008828	0.287470	0.7741
SPYR	1.565524	0.192469	8.133894	0.0000

R-squared	0.301881	Mean dependent var	0.006798
Adjusted R-squared	0.297318	S.D. dependent var	0.130876
S.E. of regression	0.109709	Akaike info criterion	-1.569157
Sum squared resid	1.841508	Schwarz criterion	-1.529887
Log likelihood	123.6097	Hannan-Quinn criter.	-1.553206
F-statistic	66.16023	Durbin-Watson stat	1.847680
Prob(F-statistic)	0.000000		

Standard Errors

Equation: EQ1 Workfile: UNTITLED::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: BACR
Method: Least Squares
Date: 01/12/14 Time: 18:32
Sample (adjusted): 2000M02 2012M12
Included observations: 155 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002538	0.008828	0.287470	0.7741
SPYR	1.565524	0.192469	8.133894	0.0000

R-squared	0.301881	Mean dependent var	0.006798
Adjusted R-squared	0.297318	S.D. dependent var	0.130876
S.E. of regression	0.109709	Akaike info criterion	-1.569157
Sum squared resid	1.841508	Schwarz criterion	-1.529887
Log likelihood	123.6097	Hannan-Quinn criter.	-1.553206
F-statistic	66.16023	Durbin-Watson stat	1.847680
Prob(F-statistic)	0.000000		

Durbin Watson

This is a test of *first order autocorrelation*
If $Y_t = a + bX_t + u_t$
and
$u_t = \rho u_{t-1} + v_t$
DW tests

$$H0 : \rho = 0$$
$$H1 : \rho > 0$$

H0 - There is no first order autocorrelation

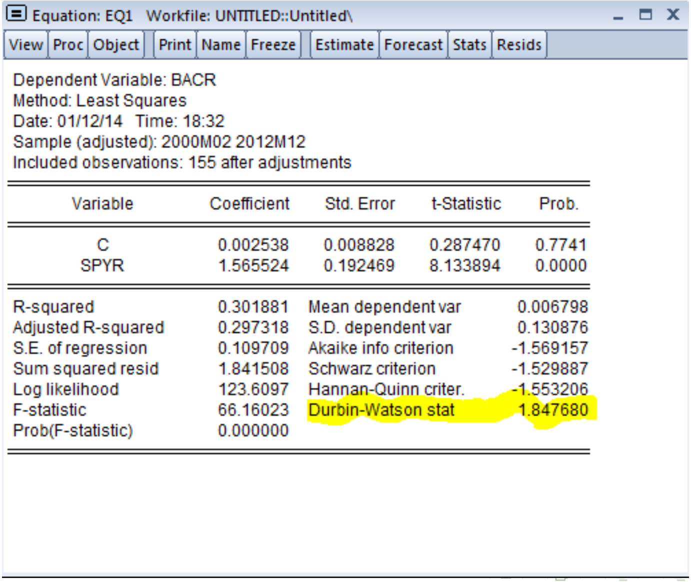
Durbin Watson test

The test is

$$\begin{aligned} DW &= 2 - 2\frac{\sum_{t=2}^{T} \hat{u}_t \hat{u}_{t-1}}{\sum_{t=1}^{T} \hat{u}_t^{\,2}} \\ DW &= 2(1 - \hat{\rho}) \end{aligned}$$

DW statistics close to two suggest no autocorrlation of the residuals.

Standard Errors



Equation: EQ1 Workfile: UNTITLED::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: BACR
Method: Least Squares
Date: 01/12/14 Time: 18:32
Sample (adjusted): 2000M02 2012M12
Included observations: 155 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002538	0.008828	0.287470	0.7741
SPYR	1.565524	0.192469	8.133894	0.0000

R-squared	0.301881	Mean dependent var	0.006798
Adjusted R-squared	0.297318	S.D. dependent var	0.130876
S.E. of regression	0.109709	Akaike info criterion	-1.569157
Sum squared resid	1.841508	Schwarz criterion	-1.529887
Log likelihood	123.6097	Hannan-Quinn criter.	-1.553206
F-statistic	66.16023	Durbin-Watson stat	1.847680
Prob(F-statistic)	0.000000		

Residual Tests

Inspection and tests of the residuals will allow us to assess whether there are problems with the model

- Residuals should be *White Noise*

Residual Tests

Inspection and tests of the residuals will allow us to assess whether there are problems with the model

- Residuals should be *White Noise*
- $u = \sim N(0, \sigma^2)$

Residual Tests

Inspection and tests of the residuals will allow us to assess whether there are problems with the model

- Residuals should be *White Noise*
- $u =\sim N(0, \sigma^2)$
- Tests for autocorrelation

Residual Tests

Inspection and tests of the residuals will allow us to assess whether there are problems with the model

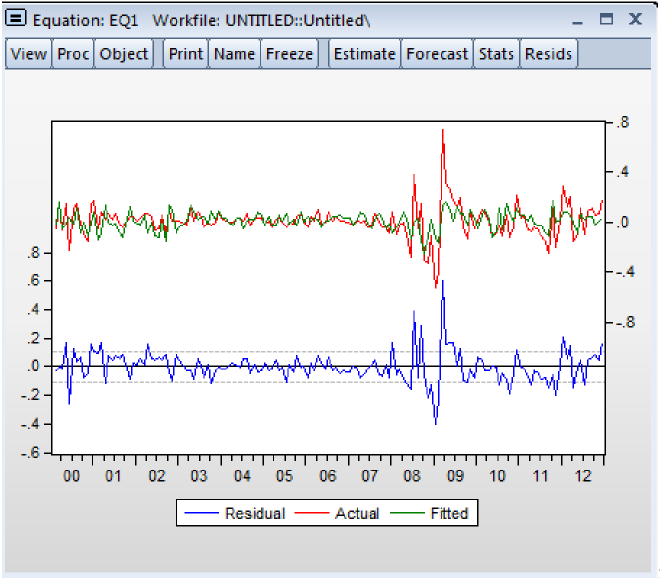
- Residuals should be *White Noise*
- $u = \sim N(0, \sigma^2)$
- Tests for autocorrelation
- Tests for hetroskedsasticity

Residual Tests

Inspection and tests of the residuals will allow us to assess whether there are problems with the model

- Residuals should be *White Noise*
- $u = \sim N(0, \sigma^2)$
- Tests for autocorrelation
- Tests for hetroskedsasticity
- Tests for normal distribution

Standard Errors



Eviews documentation

- Eviews Website

Eviews documentation

- Eviews Website
- Tutorials

Eviews documentation

- Eviews Website
- Tutorials
- User Guide 1 Chapter 11 (p. 315 to 321)

Eviews documentation

- Eviews Website
- Tutorials
- User Guide 1 Chapter 11 (p. 315 to 321)
- User Guide 2 Chapter 18 (p. 1 to 22)

Bibliography