Computer Handout 4: In-sample Forecast

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Econ 3342

This Computed Handout 4 will provide an example of the following concepts:

1) Simple and multiple regression.
2) In-sample forecast.
3) In-sample forecast errors

We will be using the data set Handout04 from the class website. The data set is already formatted for EViews (or gretl) and contains for key components of U.S. real GDP: Manufacturing, retail, services, and agriculture. The series correspond to annual data from 1960 to 2001 measured in millions of dollars.

We want to estimate the following model to see how the agricultural GDP has been changing over the years:

$$agriculture_t = \beta_0 + \beta_1 year_t + \varepsilon_t \qquad (1)$$

The variable "year" is just takes the value of the corresponding year: 1960, 1961, ..., 2001.

To generate the variable year you have to type the following command: genr year = @year

Now, to estimate the model in equation (1), you have to type the command: "LS agriculture c year" to obtain the following regression output:

Dependent Variable: AGRICULTURE
Method: Least Squares
Date: 09/24/10 Time: 00:03
Sample: 1960 2001
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6119.273	165.4182	-36.99275	0.0000
YEAR	3.126007	0.083522	37.42740	0.0000

R-squared	0.972238	Mean dependent var	71.78352
Adjusted R-squared	0.971544	S.D. dependent var	38.89304
S.E. of regression	6.560855	Akaike info criterion	6.646567
Sum squared resid	1721.793	Schwarz criterion	6.729313
Log likelihood	-137.5779	F-statistic	1400.810
Durbin-Watson stat	1.298698	Prob(F-statistic)	0.000000

Notice that the interpretation of the slope coefficient β_1 is the same as before: If year increases by one unit, then the agricultural GDP (aGDP) will increase by 3.12 million dollars. This means that in a given year the aGDP is 3.12 million dollars greater than the aGDP the year before. The p-value indicates that

the variable "year" is highly significant and the R^2 shows that time (year) explains 97% of the variation in aGDP.

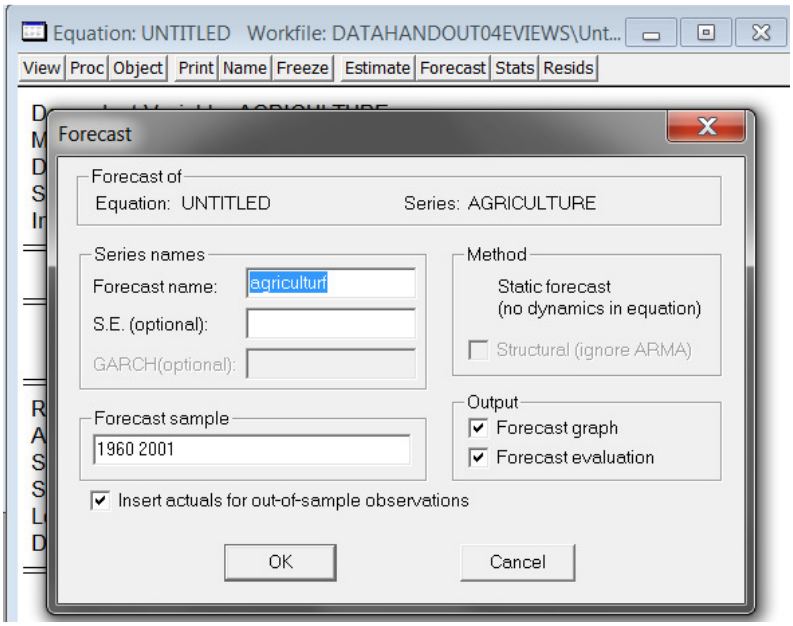
What happened in the year zero? The aGDP is estimated to be negative 6119 million dollars. Does that make sense? No! That's why you have to be very careful in using these type of models to predict out-of-sample values.

Let's obtain the in-sample forecasted values for aGDP (agriculture):

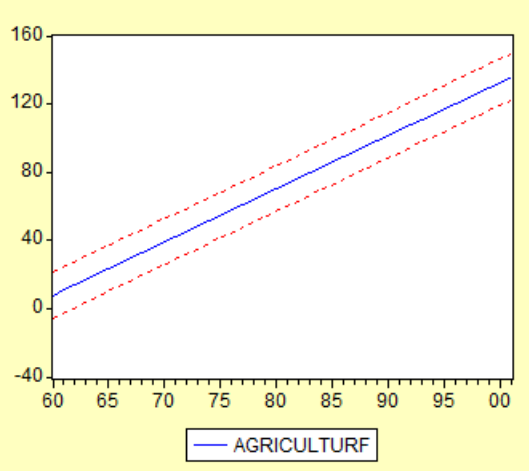
$$\widehat{agriculture}_t = \hat{\beta}_0 + \hat{\beta}_1 year_t$$

$$\widehat{agriculture}_t = -6119.273 + 3.126\ year_t$$

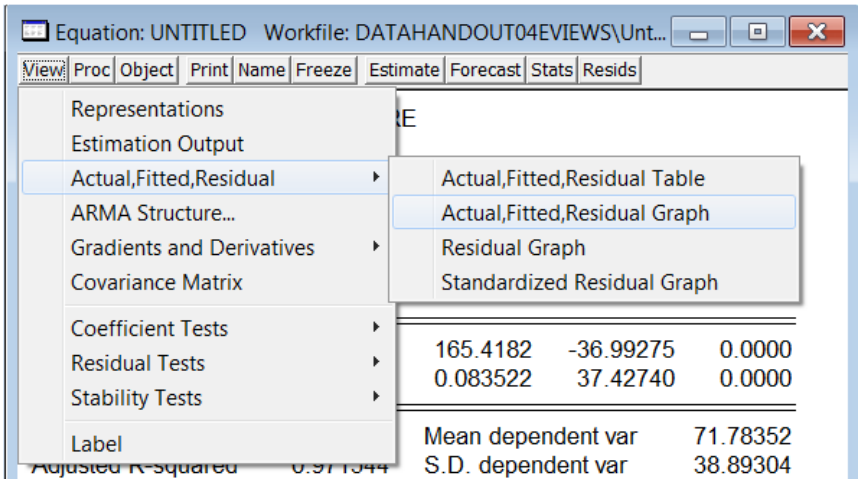
This can be done by simply selecting the "Forecast" icon:



To obtain:



and most importantly, Eviews generated the variable "agricurturf" that contains the in-sample forecasted values. The difference between "agriculture" and "agriculturf" corresponds to the forecasting errors and this variable is automatically stored in "resid." You can obtain a graph of all these three components (actual value = agriculture, fitted value = agriculturf, forecasting error = resid) by selecting the following option:



To obtain: