Time Series Econometrics

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The EViews file gdp.wf1 contains the values of the quarterly series GDP, which is a measure of real GDP for the UK over 1955Q1 to 2013Q2, seasonally adjusted (seasonal patterns have been removed from the series by the Office for National Statistics). Use this data in the questions below. You are strongly advised to save all your results to a file; this can be done by copying and pasting from the relevant EViews output screen to a Word file (remember to save this file each time you add more output). Hint: When you copy non-graphical output, you will be asked whether you wish to copy numbers Formatted (default) or Unformatted. Choose the default here, as the formatted results are much easier to read. In addition to the hints given below, you can find useful information about EViews at: http://wiki.humanities.manchester.ac.uk/ECLR/index.php/EVIEWS

1. In this question, we will undertake some preliminary descriptive analysis of the UK GDP series.

   (a) Graph the series GDP. What are the principal features of the series?
   Hint: Double click the series name, then View/Graph (the default options are fine - just click OK).

   (b) Create the percentage quarterly growth rate of GDP, calling the new series GDPGR, by taking the first difference of the log of GDP and multiplying the result by 100. Also graph this series and note its principal characteristics. *Hint: In the Command Line (the white pane near the top of the window), type: series* $gdpgr = 100 * dlog(gdp) < ENTER >$. *Alternatively you can click on the button Genr and type the above formula (omit the word series, which is then redundant). [Note: dlog in an in-built EViews instruction to take the difference of the log values of the named series. EViews is insensitive to whether you use upper or lower caseletters.]*

   (c) Obtain a histogram of the quarterly GDP growth rate and also compute the summary sample statistics mean, median and standard deviation for GDPGR. During the period of the global financial crisis, GDP fell by 2.2% in 2008Q4 and then by 2.5% in 2009Q1. Comment on these declines in the light of the histogram and overall sample statistics. *Hint: After selecting the series, then select the following (in order): View/Descriptive Statistics & Tests/Histogram and Stats.*

   (d) A table or graph of the sample autocorrelations is often referred to as the correlogram. Obtain the correlogram for the UKâĂŹs quarterly GDP growth rate. Comment on whether you consider that GDP growth is strongly autocorrelated over time. *Hint: After selecting the series, click View/Correlogram. You do NOT want to take differences again, so leave the default selection as Level and click OK.*

2. Having taken a preliminary look at the data, we will estimate some initial time series models.

   (a) Estimate an AR(1) model for GDP growth. Comment formally on the properties of the estimation output. Does evidence suggest the true process is an AR(1)? *Hint: In the Command Line, type: ls gdpgr c gdpgr(-1)* $< ENTER >$. *Here ls indicates least squares regression, with the first variable being the dependent variable. Lags are specified in EViews as negative values (eg, -1 is 1 period in the past, relative to any given period) and c indicates that a constant or intercept is to be included. There are also other ways to specify a regression in EViews! You can click Quick, Estimate Equation, then specify the variables in the regression (as above) in the Equation specification pane (omit ls).*

(b) Estimate an MA(1) model for GDP growth. Comment formally on the properties of the estimation output. Does evidence suggest the true process is an AR(1)? *Hint: In the Command Line, type: gdpgr c ma(1)*

(c) Guided by your analysis above suggest some candidate ARMA(p,q) processes that may represent the true process. Test between them and select the model you believe evidence suggests is the true process along with your reasoning. *Hint: In the Command Line, to run an ARMA(2,1) for example type: gdpgr c gdpgr(-1 to -2) ma(1)*