

Rutgers University  
Department of Economics  
Econ 510 (Applied Econometrics for Macro)  
Spring 2008  
Exercise 1

**Notes**

1. All answers should be typed and written in complete sentences. Your answers should be such that I can recreate your results from reading your write-up.
2. Data for this home work can be found on the class website :  
<http://econweb.rutgers.edu/lane>
3. This assignment is due on Wednesday, February 20, 2008.
4. I would like for you to write your own computer code to answer these questions. Please provide the code as an attachment to your answers. Note, you can use pre-programmed functions to estimate your models i.e if you have a Matlab or Gauss toolbox that estimates an ARMA model then use that.
5. data for each question can be found in the spreadsheet titled *Exercise1.xls* on the website.

**Problem 1**

Determine the appropriate ARMA(p,q) model for the data fir Exercise 1. Report your results and provide evidence that the residuals from the model you choose do not contain any residual autocorrelation.

## **Problem 2**

(a) Using the methods discussed in class, estimate the **best** AR( $p$ ) model for quarterly real GDP growth (expressed in annual terms) for the US for the period 1960Q1 until 2006Q4. Show all working that you did in coming up with the optimal value of  $p$ .

(b) Determine whether this AR( $p$ ) model is stable for this whole period. In particular, test using the structural shift and break-point tests outlined in class whether there is a structural break in the data. Use the bootstrap procedure to compute bootstrapped  $p$ -values for a break at each date. Report your results graphically.

What do you conclude from these results about the stability of the AR( $p$ ) model you estimate?