

Assignment 1

Use the data from file oil.dat to fit an AR(p) model

i) First, run the procedure ARIMA to identify (i.e. plot the autocorrelation and partial autocorrelation functions), estimate the AR(1) and forecast 5 future values and find their prediction intervals.

ii) Next, estimate the AR(1) by regressing y on the lagged y . To do that, build the lagged variables, print them and plot the AR(1). Compare the outcomes.

Interpret your results: discuss the autocorrelation pattern, the significance of the parameters, the fit of the AR(1) to the data, etc.

Check if an AR(2) would provide a better fit to the model. Estimate an AR(2) by the ARIMA procedure with the Maximum Likelihood estimator, and compare your results to the OLS estimators from a regression of y on its two lags. Increase the lag up to lag 5 and compare the results.

CODE

```

* to center the output *;
  options linesize=78;
* to read in the data *;
  data oil;
  infile 'oil.dat';
  input y;
* AR(1) estimation *;
  proc arima data=oil;
  identify var=y nlag=20;
  estimate p=1;
  forecast lead=5;
  run;
* regression approach to AR(1) estimation*;
  data ar1;
  set oil;
  ylag1 = lag (y);
  ylag2 = lag2 (y);
  t = n ;
  proc print data=ar1;
  run;
  proc reg;
  model y = ylag1;
  run;
* to plot the series*;
  proc gplot data=ar1;
  plot y*t;
  symbol interpol=join;

```

```
run;  
*AR(2) estimation*  
proc reg;  
model y = ylag1 ylag2;  
run;  
proc arima;  
identify var=y nlag=20;  
estimate p=2;  
estimate p=2 method=ml;  
forecast lead=5;  
run;
```