Economics 413: Economic Forecast & Analysis

Department of Economics, Finance and Legal Studies

University of Alabama

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Final

The exam consists of four questions on five pages. Each question is of equal value.

1. Consider a model which has a structural break: $Y_t = c + \psi D_t + \varepsilon_t + \theta \varepsilon_{t-1}$, where $\varepsilon_t \sim WN$ and

$$D_t = \begin{cases} 1 \text{ if } t \geq t' \\ 0 \text{ if } t < t' \end{cases}$$

for $t = 1, 2, \ldots, t', \ldots, T$.

   (a) What is the expected value of the series before time period t'? What is the expected value of the series after time period t'?

   (b) What is the variance of the series before time period t'? What is the variance of the series after time period t'?

   (c) What is the covariance of the series before time period t'? What is the covariance of the series after time period t'?

   (d) What is the h-step ahead forecast for this series for $h = 1, 2, \ldots$?

   (e) What is the h-step ahead forecast interval for this series for $h = 1, 2, \ldots$?

2. Suppose we had data on the model: $y_t = y_{t-1} + \varepsilon_t + \theta\varepsilon_{t-1}$, where $\varepsilon_t \sim WN$ for $t = 1, 2, \ldots, T$.

  (a) What is the common name for this type of model (i.e., ARIMA)?

  (b) Draw a figure for both a sample ACF and sample PACF for this time series.

  (c) Draw a figure that represents this time series.

  (d) On the figure from part (c), mark the h-step ahead forecast for $h = 1, 2$ and 3 (be specific).

  (e) On the figure from part (c), mark the h-step ahead forecast interval for $h = 1, 2$ and 3 (be specific).

3. Suppose the true data generating process is $y_t = c + \phi y_{t-1} + \varepsilon_t + \theta \varepsilon_{t-1}$, but you choose your tentative model to be $y_t = c + \phi y_{t-1} + \varepsilon_t$. Assuming that $|\phi| < 1$, answer the following:

   (a) Write both the likelihood function for the true model and for your model.

   (b) Draw a sample ACF and PACF for the *residuals* from both the true model and for your model.

   (c) What will the null hypothesis and conclusion from the Box and Pierce test (Q-statistic) be for both the true model and for your model?

   (d) What is the consequence from choosing the wrong model for point forecasts (for $h = 1, 2$ and 3)?

   (e) What is the consequence from choosing the wrong model for interval forecasts (for $h = 1, 2$ and 3)?

4. A standard EViews regression table has many pieces of information. For the table attached on the next page, give a very brief explanation (an equation or no more than one sentence) for the following 25 items (each with a dot next to them in the table):

(a) Dependent variable

(b) Method

(c) Sample

(d) Coefficient on C

(e) Coefficient on AR(1)

(f) Coefficient on MA(1)

(g) Standard error on C

(h) Standard error on AR(1)

(i) Standard error on MA(1)

(j) t-statistic on C

(k) t-statistic on AR(1)

(l) t-statistic on MA(1)

(m) p-value on C

(n) p-value on AR(1)

(o) p-value on MA(1)

(p) R^2

(q) adjusted R^2

(r) Standard error of the regression

(s) Residual sum of squares

(t) Log-likelihood

(u) F-statistic

(v) Mean dependent variable

(w) Standard deviation of the dependent variable

(x) Akaike informaiton criterion

(y) Schwarz criterion

Dependent Variable: SIERRALEONE
Method: Least Squares
Date: 10/15/12   Time: 14:30
Sample (adjusted): 1966 2007
Included observations: 42 after adjustments
Convergence achieved after 9 iterations
MA Backcast: 1965

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.104062	2.166690	-0.048028	0.9619
AR(1)	0.530569	0.267171	1.985878	0.0541
MA(1)	-0.017524	0.312264	-0.056118	0.9555

R-squared	0.262298	Mean dependent var	-0.245952
Adjusted R-squared	0.224467	S.D. dependent var	7.606705
S.E. of regression	6.698795	Akaike info criterion	6.710482
Sum squared resid	1750.080	Schwarz criterion	6.834601
Log likelihood	-137.9201	Hannan-Quinn criter.	6.755976
F-statistic	6.933439	Durbin-Watson stat	1.986613
Prob(F-statistic)	0.002653		

Inverted AR Roots	.53
Inverted MA Roots	.02