

Economics 413: Economic Forecast & Analysis

Department of Economics, Finance and Legal Studies

University of Alabama

Spring 2016

Midterm I

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

1. State (with a single sentence explanation) whether or not the following series are stationary or non-stationary. In each case assume that ε_t is a white noise sequence, $t = 1, 2, \dots, T$.

(a) $y_t = 0.25 + \varepsilon_t$

(b) $y_t = 1.25 + \varepsilon_t$

(c) $y_t = 0.25 + \varepsilon_t + 0.45\varepsilon_{t-1}$

(d) $y_t = 0.25 + \varepsilon_t + 1.45\varepsilon_{t-1}$

(e) $y_t = 0.25 + \varepsilon_t + 0.45\varepsilon_{t-1} + 0.35\varepsilon_{t-2}$

(f) $y_t = 0.25 + \varepsilon_t + 0.45\varepsilon_{t-1} + 0.05\varepsilon_{t-2} + 0.5\varepsilon_{t-3}$

(g) $y_t = 0.55 + 0.45y_{t-1} + \varepsilon_t$

(h) $y_t = 0.25 + 1.5y_{t-1} + \varepsilon_t$

(i) $y_t = 0.25 + 0.45y_{t-1} + 0.25y_{t-2} + \varepsilon_t$

(j) $y_t = 0.25 + 0.45y_{t-1} + 0.05y_{t-2} + 0.5y_{t-3} + \varepsilon_t$

(k) $y_t = 0.25 + 0.45y_{t-1} + 0.25y_{t-2} + \varepsilon_t + 0.45\varepsilon_{t-1} + 0.55\varepsilon_{t-2}$

2. Consider the following model: $y_t = \mu + \varepsilon_t + \theta_3\varepsilon_{t-3}$

(a) What is the common name for this model?

(b) What type of data frequency would you expect to form this type of model.

(c) Derive the expected value of the series.

(d) Derive the variance of the series.

(e) Derive the autocovariance of the series for all lags $j = 1, 2, \dots$

(f) Derive the autocorrelation for all all lags $j = 1, 2, \dots$. Plot the autocorrelation function.

(g) State the condition for which the model is invertible.

(h) Assuming that the model is invertible, write it as an $AR(\infty)$.

TABLE 6.1 Estimation Output: 5-Year Treasury Yield (Monthly Percentage Changes)

Dependent Variable: DY				
Method: Least Squares				
Sample (adjusted): 1953M05 2007M11				
Included observations: 655 after adjustments				
Convergence achieved after 7 iterations				
Backcast: 1953M04				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.160159	0.258095	0.620544	0.5351
MA(1)	0.485011	0.034468	14.07130	0.0000
R-Squared	0.165370	Mean dependent var		0.168613
Adjusted R-squared	0.164092	S.D. dependent var		4.866609
S.E. of regression	4.449443	Akaike info criterion		5.826484
Sum squared resid	12927.79	Schwarz criterion		5.840177
Log likelihood	-1906.173	F-Statistic		129.3829
Durbin-Watson stat	2.055799	Prob(F-statistic)		0.000000
Inverted MA Roots	-0.49			

3. Consider the EViews output

- Draw the sample ACF and PACF that matches this output (be sure to label axes and spikes).
- Write out the equation (with values plugged in) which matches this output.
- Give the expected value, variance and covariance (for all j) which matches this output (with values plugged in).