

Economics 413: Economic Forecast & Analysis

Department of Economics, Finance and Legal Studies

University of Alabama

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Midterm II – Answers

1. (a) $Q = T \sum_{j=1}^m \hat{\rho}_j^2$
(b) χ_{m-p-q}^2
(c) $\hat{\varepsilon}_t = \rho_0 + \rho_1 \hat{\varepsilon}_{t-1} + \rho_2 \hat{\varepsilon}_{t-2} + \cdots + \rho_m \hat{\varepsilon}_{t-m} + v_t$
(d) $m > p + q \Rightarrow m > 4$
(e) Either answer is sufficient
 - i. Look for significant spikes in the ACF and PACF of the residual series (not really a test, but acceptable for full credit)
 - ii. Lagrange Multiplier test for joint significance of addition MA terms in original model
2. (a) $\hat{Y}_{t+h|t} = E(Y_{t+h}|\Omega_t) = E[(-1)^{t+h} X|\Omega_t] = (-1)^{t+h} E(X|\Omega_t) = 0 \forall h$
(b) $e_{t+h} = Y_{t+h} - \hat{Y}_{t+h|t} = (-1)^{t+h} X - 0 = (-1)^{t+h} X \forall h$
(c) $V(e_{t+h}) = V[(-1)^{t+h} X] = (-1)^{2(t+h)} V(X) = V(X) = \sigma^2 \forall h$
(d) $\hat{Y}_{t+h|t} \pm 1.96\sqrt{V(e_{t+h})} = 0 \pm 1.96\sigma \forall h$
(e) All interval forecasts have a upper bound of 1.96σ and a lower bound of -1.96σ (the point forecast is zero)
3. (a) $\hat{y}_t = 1.387 + 1.109y_{t-1} - 0.245y_{t-2}$
(b) $\hat{y}_{t+1|t} = 1.387 + 1.109y_t - 0.245y_{t-1} = 1.387 + 1.109(1.51) - 0.245(0.75) = 2.878$
(c) $e_{t+1} = y_{t+1} - \hat{y}_{t+1|t} = 1.61 - 2.878 = -1.26784$
(d) $\hat{y}_{t+2|t} = 1.387 + 1.109\hat{y}_{t+1|t} - 0.245y_t = 1.387 + 1.109(2.878) - 0.245(1.51) = 4.209$
(e) $\hat{y}_{t+3|t} = 1.387 + 1.109\hat{y}_{t+2|t} - 0.245\hat{y}_{t+1|t} = 1.387 + 1.109(4.209) - 0.245(2.878) = 5.349671$