Econ 582 Lec 4

Note Title 4/10/2013

AR(2) $\phi_1 = 0.2 \quad \phi_2 = 0.8$

$$y_t = \phi_1 y_{t-1} + \phi_2 y_{t-2} + \epsilon_t$$

$$y_t = \hat{\pi} y_{t-1} + \hat{\epsilon}_t \qquad \hat{\pi} \neq \hat{\phi}_1$$

Invertible MA(1)

$$y_t = \epsilon_t + \theta \epsilon_{t-1} \qquad |\theta| < 1$$

$$= \epsilon_t - \theta^* \epsilon_{t-1} \qquad \theta^* = -\theta \qquad |\theta^*| < 1$$

$$y_t = (1 - \theta^* L)\epsilon_t$$

Because $|\theta^*| < 1$, $(1-\theta^* L)^{-1} = \sum_{k=0}^{\infty} (\theta^*)^k L^k$

$$(1 - \theta^* L)^{-1} y_t = (1 - \theta^* L)^{-1} (1 - \theta^* L)\epsilon_t$$

$$\sum_{k=0}^{\infty} (\theta^*)^k L^k y_t = \epsilon_t$$

$$y_t + \theta^* y_{t-1} + (\theta^*)^2 y_{t-2} + \cdots = \epsilon_t$$

$$\theta^* = -\theta$$

$$\Rightarrow y_t - \theta y_{t-1} + \theta^2 y_{t-2} - \theta^3 y_{t-3} \cdots = \epsilon_t$$

$$\Rightarrow y_t = \theta y_{t-1} - \theta^2 y_{t-2} + \theta^3 y_{t-3} + \cdots + \epsilon_t$$

$$= \phi_1 y_{t-1} + \phi_2 y_{t-2} + \phi_3 y_{t-3} \cdots$$

$$\phi_1 = \theta, \quad \phi_2 = -\theta^2, \quad \phi_3 = \theta^3, \cdots$$

$$(y_t - \mu) = \phi_1 (y_{t-1} - \mu) + \phi_2 (y_{t-2} - \mu) + \epsilon_t$$

EVIEWS

If you want to estimate mean-adjusted form use

LS Y C AR(1) AR(2)

If you want to estimate regression form

$$y_t = c + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \epsilon_t$$

LS Y C Y(-1) Y(-2)