ECONOMIA APPLICATA M - ESERCITAZIONE 3

Titolo nota 21/12/2016

MODELLI DI INVESTIMENTO ARDL(p,q)

DATASET : KOPCHE.DTA

USE KOPCHE.DTA

DES

TSSET t, QUARTERLY

$$I_t = \alpha + \sum_{i=1}^{p} \beta_i I_{t-i} + \sum_{j=0}^{q} \gamma_j X_{t-j} + u_t$$

DOVE X_t = OUTPUT, CASH-FLOW, VALORE DI MERCATO DELL'IMPRESA, ETC

PROBLEMI : SCELTA DI p, q

NON STAZIONARIETÀ DI I_t E X_t

TRASFORMAZIONI SULLE VARIABILI

GEN LIS = log(IS)

GEN LY = log(Y)

GEN DLIS = D. LIS

GEN DLY = D. LY

GRAFICI

TSLINE LIS, NAME(G1)

TSLINE DLIS, NAME(G2)

TSLINE L4, NAME(G3)

TSLINE DL4, NAME (G4)

GRAPH COMBINE G1 G2 G3 G4

GRAPH DROP G1 G2 G3 G4

TESTS DI RADICE UNITARIA (DF/ADF)

$z_t \sim I(1)$?

EQUAZIONE TEST DF: $\Delta z_t = \gamma z_{t-1} + \varepsilon_t$, NO CONST, NO TREND

$\Delta z_t = \alpha + \gamma z_{t-1} + \varepsilon_t$, NO TREND

$\Delta z_t = \alpha + \beta t + \gamma z_{t-1} + \varepsilon_t$, CONST E TREND

$H_0 : \gamma = 0$ (UNIT ROOT)

VS $H_1 : \gamma < 0$ (NO UNIT ROOT)

EQUAZIONE TEST ADF: $\Delta z_t = \gamma z_{t-1} + \sum_{i=1}^{r} \gamma_i \Delta z_{t-i} + \varepsilon_t$

$$\Delta z_t = \alpha + \gamma z_{t-1} + \sum_{i=1}^{r} \gamma_i \Delta z_{t-i} + \varepsilon_t$$

$$\Delta z_t = \alpha + \beta t + \gamma z_{t-1} + \underbrace{\sum_{i=1}^{r} \gamma_i \Delta z_{t-i}}_{\text{AUGMENTATION}} + \varepsilon_t$$

$H_0: \gamma = 0$ (UNIT ROOT)

vs $H_1: \gamma < 0$ (NO UNIT ROOT)

DFULLER LIS, TREND REGRESS LAGS(1)

DFULLER DLIS, REGRESS

DFULLER LY, TREND REGRESS LAGS(1)

DFULLER DLY, REGRESS

$\Downarrow$

RISULTATO: LIS E LY sono $I(1)$ $\Rightarrow$ USIAMO DLIS E DLY

<u>STIMA DI UN MODELLO ARDL(0,1)</u>

REG DLIS L(0/1) DLY

PREDICT UHAT

AC UHAT

ESTAT BGODFREY

$\Downarrow$ RISULTATO : H_0 : NO AUTOCORR ERRORI <u>RIFIUTATA</u>

STIMA DI UN MODELLO ARDL(1,1)

REG DLIS L.DLIS L(0/1) LY

ESTAT BGODFREY $\Rightarrow$ H_0 : NO ERROR AUTOCORR
RIFIUTATA

STIMA DI UN MODELLO ARDL(1,2)

REG DLIS L.DLIS L(0/2) LY

ESTAT BGODFREY $\Rightarrow$ H_0 : NO ERROR AUTOCORR
NON RIFIUTATA

STIMA DI MODELLI AR(G)DL

G = GEOMETRICALLY

GENERICO MODELLO DL : $y_t = \alpha + \sum_{j=0}^{\infty} \beta_j X_{t-j} + U_t$

DOVE $\boxed{\beta_j = \lambda^j \beta_0}$, $j = 0, 1, 2, \ldots$

$0 < \lambda < 1$

$$\Downarrow$$

$$y_t = \alpha + \beta_0 \left(x_t + \lambda x_{t-1} + \lambda^2 x_{t-2} + \lambda^3 x_{t-3} + \dots \right)$$

MOLTIPLICATORE DI IMPATTO : β_0

" " LUNGO PERIODO : $\sum_{j=0}^{\infty} \beta_j = \beta_0 \sum_{j=0}^{\infty} \lambda^j = \dfrac{\beta_0}{1-\lambda}$

TRASFORMAZIONE (KOYCK)

$$y_t = \alpha + \beta_0 (x_t + \lambda x_{t-1} + \lambda^2 x_{t-2} + \lambda^3 x_{t-3} + \dots)$$

$$y_{t-1} = \alpha + \beta_0 (x_{t-1} + \lambda x_{t-2} + \lambda^2 x_{t-3} + \dots)$$

$$\lambda y_{t-1} = \alpha\lambda + \beta_0 (\lambda x_{t-1} + \lambda^2 x_{t-2} + \lambda^3 x_{t-3} + \dots)$$

$$\Downarrow$$

ARDL(1,1)

$$y_t - \lambda y_{t-1} = \alpha(1-\lambda) + \beta_0 x_t \Rightarrow \boxed{y_t = \alpha(1-\lambda) + \beta_0 x_t + \lambda y_{t-1}}$$

STIMA MODELLO AR(G)DL(1,0)

$$\Delta \bar{I}_t = \alpha(1-\lambda) + \beta_0 \Delta Y_t + \lambda \Delta \bar{I}_{t-1} + u_t$$

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REG DLIS DLY L.DLIS
SCALAR BETA0 = _B[DLY]
SCALAR LAMBDA = _B[L.DLIS]
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SCALAR LRMULT = BETA0//(1-LAMBDA)

SCALAR LIST BETA0 LAMBDA LRMULT

STIMA MODELLO PDL

P = ALMON'S POLYNOMIAL

$$y_t = \alpha + \sum_{j=0}^{m} \mu_j X_{t-j} + u_t$$

DOVE $\mu_j = \sum_{i=0}^{k} \alpha_i j^i$, $\boxed{k < m}$

SOSTITUENDO :

$$y_t = \alpha + \sum_{j=0}^{m} \left(\sum_{i=0}^{k} \alpha_i \cdot j^i \right) x_{t-j} + u_t$$

$$= \alpha + \sum_{i=0}^{k} \alpha_i X_{it} + u_t \quad , \quad \text{DOVE } X_{it} \equiv \sum_{j=0}^{m} j^i x_{t-j}$$

IPOTIZZIAMO $m = 5$, $k = 2$

$$i=0 \Rightarrow X_{0t} = \sum_{j=0}^{5} j^0 X_{t-j} = 0^0 X_t + 1^0 X_{t-1} + 2^0 X_{t-2} + 3^0 X_{t-3} +$$
$$+ 4^0 X_{t-4} + 5^0 X_{t-5}$$

$$i=1 \Rightarrow X_{1t} = \sum_{j=0}^{5} j^1 X_{t-j} = 0^1 X_t + 1^1 X_{t-1} + 2^1 X_{t-2} + 3^1 X_{t-3} + 4^1 X_{t-4} + 5^1 X_{t-5}$$

$$i=2 \Rightarrow X_{2t} = \sum_{j=0}^{5} j^2 X_{t-j} = 0^2 X_t + 1^2 X_{t-1} + 2^2 X_{t-2} + 3^2 X_{t-3} + 4^2 X_{t-4} + 5^2 X_{t-5}$$

IPOTIZZANDO : y = DLIS

x = DLY

GENERIAMO X0, X1 E X2 :

GEN X0 = (0^0) * DLY + (1^0) * L.DLY + (2^0) * L2.DLY + (3^0) * L3.DLY +

+ (4^0) * L4.DLY + (5^0) * L5.DLY

ETC.

REG OLIS X0 X1 X2

RICAVIAMO I COEFFICIENTI STIMATI $\hat{\alpha}_0, \hat{\alpha}_1, \hat{\alpha}_2$:

SCALAR ALFA0 = _B[X0]

SCALAR ALFA1 = _B[X1]

SCALAR ALFA2 = _B[X2]

DAI COEFFICIENTI $\hat{\alpha}_0, \hat{\alpha}_1, \hat{\alpha}_2$ RICAVIAMO I PARAMETRI $\hat{\mu}_j$ SFRUTTANDO LA RELAZIONE $\mu_j = \sum_{i=0}^{K} \alpha_i j^i$:

$$j=0 \Rightarrow \mu_0 = \sum_{i=0}^{2} \alpha_i 0^i = \alpha_0 0^0 + \alpha_1 0^1 + \alpha_2 0^2$$

$$j=1 \Rightarrow \mu_1 = \sum_{i=0}^{2} \alpha_i 1^i = \alpha_0 1^0 + \alpha_1 1^1 + \alpha_2 1^2$$

$$j=2 \Rightarrow \mu_2 = \sum_i \alpha_i 2^i = \alpha_0 2^0 + \alpha_1 2^1 + \alpha_2 2^2$$

$$j=3 \Rightarrow \mu_3 = \sum_i \alpha_i 3^i = \alpha_0 3^0 + \alpha_1 3^1 + \alpha_2 3^2$$

⋮

$$j = m \Rightarrow \quad \mu_m = \alpha_0 + \alpha_1 m + \alpha_2 m^2$$

SCALAR M0 = ALFA0 + ALFA1*0 + ALFA2*(0^2)

SCALAR M1 = ALFAϕ + ALFA1*1 + ALFA2*(1^2)

ETC

DOMANDA : COME SCEGLIERE TRA MODELLI DIVERSI ?

RISPOSTA : PREVISIONI