CLASSES – MICROECONOMETRIA – LABORATORIO 5a

Titolo nota 08/06/2018

BINARY DTA

$$M_1: \underbrace{E(\text{GRADE}_i)}_{P_i} = F(\beta_1 + \beta_2 GPA_i + \beta_3 TUCE_i + \beta_4 PSI_i)$$

$p_i \in (0,1) \quad i = 1 \dots N$

$$\widehat{U_i} = GRADE_i - \widehat{p_i} \qquad i = 1 - N$$

$GRADE_i \in \{0, 1\}$ $\qquad \widehat{p_i} \in (0,1)$

REGOLA: $\widehat{y_i} = 1$ SE $\widehat{p_i} > 0.5$

$= 0$ SE $\widehat{p_i} \leq 0.5$

$$\widehat{\widehat{U_i}} = GRADE_i - \widehat{y_i}$$

$$MSFE_1 = \frac{1}{N}\sum_{i=1}^{N} \hat{u}_i^2 = \frac{1}{N}\sum_i (\text{GRADE}_i - \hat{y}_i)^2$$

MODELLO DI RIFERIMENTO (M_0):

$$M_0: \quad E(\text{GRADE}_i) = F(\beta_1)$$

$$\hookrightarrow \quad \hat{p} = \frac{N_1}{N}$$

$$MSFE_0 = \frac{1}{N}\sum_i \left(CMODE_i - \hat{y}_i\right)^2$$

N.B. SE $\hat{p} > 0.5$, ALLORA $\hat{y}_i = 1 \ \forall i$

$$MSFE_0 = \frac{1}{N}\sum_i \left(CMODE_i - 1\right)^2 =$$

$$= \frac{1}{N}\sum_i \left(CMODE_i^2 + 1 - 2\,CMODE_i\right) = \hat{p}$$

$$= \frac{1}{N}\left(N_1 + N - 2N_1\right) = 1 - \frac{N_1}{N} = 1 - \hat{p}$$

SE $\hat{p} \leq 0.5$, ALLORA $\hat{y}_i = 0 \quad \forall i$

$$MSE_0 = \frac{1}{N_1} \sum_i (GNODE_i - 0)^2 = \frac{1}{N} \sum_i GNODE_i^2 =$$

$$= \frac{1}{N_1} \sum_i GNODE_i = \frac{N_1}{N} \hat{p}$$

$$\Downarrow$$

$$MSE_0 = \begin{cases} 1 - \hat{p} & \text{SE } \hat{p} > 0.5 \\ \hat{p} & \text{SE } \hat{p} \leq 0.5 \end{cases}$$

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SUM
SCALAR NN = R(N)
SUM IF GRADE == 1
SCALAR N1 = R(N)
SCALAR N0 = NN-N1
SCALAR PCT = N1/N
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SCALAR LIST PGST

PROBIT GRADE GPA TUCE PSI

PREDICT ~~PHAT~~ PHAT_PB

GEN YHAT = ~~PHAT~~ PHAT_PB > 0.5

GEN ERRPREV2 = (GRADE - YHAT)^2

SUM ERROR2

SCALAR MSE1 = R(MEAN)

SCALAR LIST MSE2 MSE4

LDV1.DTA

Y_i , X_i $\quad i = 1 - - N = 200$

DGP (PROCESS): $Y_i = -800 + 300 \cdot X_i + U_i$

DATA ↓ GENERATING

(DATI SIMULATI) $\quad \beta_1 \quad \beta_2$

SCATTER y x, YLINE(0)

CENSURA: $y = y^*$ SE $y^* > 0$

$= 0$ SE $y^* \leq 0$

GEN YCEN = 0

REPLACE YCEN = y SE y > 0

TRUNCAMENTO: $y = y^*$ SE $y^* > 0$

NULA SE $y^* \leq 0$

GEN YTRU = .

REPLACE YTRU = Y IF Y > 0

REG y x

↳ TUTTO IL CAMPIONE

OLS "NON DI STATO"

REG yCEN x

↳ OLS SU DATI CENSURATI (DI STATO (NON CORRENTI))

REG YORU X

↳ dj su DATI TRONCATI (DISTINTO)

SOLUZIONE 1 : MLE

CENSURA : $\log L = \sum_{i \in y>0} \log f(y_i) + \sum_{i \in y=0} \log(1-P_i)$

TOBIT y x, ll(0)

TRONCAMENTO : $\log L = \sum_{i \in y>0} \log f(y_i | y_i>0)$

TRUNCREG y x, ll(0)

SOLUZIONE 2 : OLS "CORRETTI" (MILLS RATIO)

TRONCAMENTO : $E(y_i^* | y_i^* > 0) = \boxed{x_i\beta + \sigma \frac{\phi_i}{\Phi_i}}$

DOVE $\phi_i \equiv \phi\left(\frac{x_i\beta}{\sigma}\right)$

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CENSURA: $\boxed{E(y_i^*) = \Phi_i x_i\beta + \sigma\phi_i}$

PROBIT PER STIMARE ϕ_i E Φ_i

$D_i = 1$ SE $y_i^* > 0$

$= 0$ SE $y_i^* \leq 0$

$\rightarrow$ PROBIT

$E(D_i) = \Phi(x_i\beta)$

$\Downarrow$ $\frac{\beta}{\sigma}$ $\searrow$

$$\widehat{\phi_i} \equiv \phi\left(x_i' \widehat{\frac{\beta}{\sigma}}\right)$$

$$\widehat{\Phi_i} \equiv \Phi\left(x_i' \widehat{\frac{\beta}{\sigma}}\right)$$

GEN DUMMY = 1 SE $y > 0$

PROBIT DUMMY X $\Rightarrow$ $\widehat{\frac{\beta_1}{\sigma}}$ E $\widehat{\frac{\beta_2}{\sigma}}$

PREDICT XBP , XB

$$XBP_i = \frac{\hat{\beta}_1}{\sigma} + \frac{\hat{\beta}_2}{\sigma} X_i$$

GEN f_i = NORMALDEN(XBP)

GEN F_i = NORMAL(XBP)

GEN NILS = fi/Fi

REG YTRU X NILS (TRANSPONENDO)

GEN Fix = Fi * X

REG YGEN Fix fi Fi, NOCONST

THE END _

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