Homework 9 – Tuo Wang

1, Compare median bias with median bias

The mean has a lot of bias for instance beta is supposed to be 3 and the estimate is 0.98. For alpha it is no better it was supposed to be 2 but the estimate is 2.52. However, the median is not bias to one decimal point it estimate 3.00 for beta and 1.9 for alpha. Therefore, median bias does better than mean bias in when errors are a Cauchy. This is because the Cauchy is symmetrical.

N:100

REP:1000

set maxcolon=1000

set nowarn nodoecho

dim bols 2 1000

?do #1,1000

smpl 1 [N]

genr eps=nor(1)/abs(nor(1))

genr x=nor(1)

genr y=2+3\*x+eps

?ols y x/coef=bols:#

?endo

matrix bols=bols’

smpl 1 1000

stat bols/pmedian

…NOTE…TREATING COLUMNS OF BBOX AS VECTORS

NAME N MEAN ST.DEV VARIANCE MINIMUM MAXIMUM

BOLS 1000 0.98577 30.644 939.08 -777.93 125.62

BOLS 1000 2.5274 23.059 531.70 -171.98 562.76

VARIABLE = BOLS

MEDIAN = 3.0055

LOWER 25% = 2.0860 UPPER25% = 3.8002 INTERQUARTILE RANGE = 1.714

MODE NOT APPLICABLE

VARIABLE = BOLS

MEDIAN = 1.9389

LOWER 25% = 1.0448 UPPER25% = 2.9342 INTERQUARTILE RANGE = 1.889

MODE NOT APPLICABLE

2 What happens if use trimmed LS?

If you use trimmed LS the results are very similar. The 2SLAD still has by a little bit less bias. The trim still has the effect of pulling the bias out. Without a trim we notice that the standard errors are wrong since it underestimates it because it does not take into account the actual variable with a fit. Also, even with the trim the standard errors are high as well.

N:100

REP:1000

set maxcolon=[REP]

set nowarn nodoecho

dim blad 3 [REP] b2slad 3 [REP]

?do #=1,[REP]

smpl 1 [N]

genr eps=nor(1)/abs(nor(1))

genr eta=nor(1)/abs(nor(1))

genr income=nor(1)

genr cost=nor(1)

genr weather=nor(1)

genr politic=nor(1)

genr price=(1+(10+3\*income+eta)+cost+weather+politics+eps)/2

genr quantity=10-price+3\*income+eta

?robust quantity price income/coef=blad:#

?robust price income cost weather politic/predict=fitprice

?robust quantity fitprice income/coef=b2slad:#

?endo

matrix blad=blad’

matrix b2slad=b2slad’

smpl 1[REP]

stat blad b2slad

…NOTE…TREATING COLUMNS OF BBOX AS VECTORS

NAME N MEAN ST.DEV VARIANCE MINIMUM MAXIMUM

BLAD 1000 -0.14910 0.77827 0.60570 -1.1362 1.0502

BLAD 1000 1.7135 1.1970 1.4329 -0.86061 3.4131

BLAD 1000 5.3163 4.2882 18.388 -2.0997 10.709

…NOTE…TREATING COLUMNS OF BBOX AS VECTORS

B2SLAD 1000 -0.95656 0.30198 0.91189E-01 -2.4340 -0.97816E-01

B2SLAD 1000 2.9330 0.50452 0.50452 0.25454 1.3331

B2SLAD 1000 9.7494 1.6840 2.8359 4.6997 18.980

3, Bootstrap a 2 stage 20% trim regression. We notice when we bootstrap trim that the standard errors are higher. This is convention since bootstrapping takes into account that we replacing an actual variable with an estimated variable.

set nodoecho nowarn

dim boot2lad 3 400

smpl1 100

genr t=time(0)

genr eps=nor(1)/abs(nor(1))

genr eta=nor(1)/abs(nor(1))

genr income=nor(1)

genr cost=nor(1)

genr weather=nor(1)

genr politic=nor(1)

genr price=(1+(10+3\*income+eta)+cost+politic+weather+eps)/2

genr quantity=10-price+3\*income+eta

robust quantity price income

robust price income cost politic weather/predict=fitprice

robust quantity price income

do%=1,400

genr newt=samp(t)

genr newq=quantity(newt)

genr newp=price(newt)

genr newi=income(newt)

genr newc=cost(newt)

genr neww=weather(newt)

genr newpol=politic(newt)

?robust newp newi newc neww newpol/predict=fitnewp/trim=.2

?robust newq fitnewp newi/coef=boot2lad:%

?endo

smpl 1 400

matrix boot2lad=boot2lad’

stat boot2lad

REQUIRED MEMROY IS PAR= 28 CURRENT PAR = 112400

100 OBSERVATIONS DEPEDENT VARILABLE = QUANITTY

…NOTE..SAMPLE RANGE SET TO: 1, 100

LEAST ABSOLUTE ERROR REGRESSION

OBJECTIVE FUNCTION = 124.54

NUMBER OF SIMPLEX ITERATIONS = 9.0000

EMPIRICAL QUNATILE FUNCTION AT MEANS = 4.2581

SUM OF ABSOLUTE ERRORs = 249.07

USING DIFF= 16 FOR COVARIANCE CALCULATIONS

VARIANCE OF THE ESTIMATE=SIGMA\*\*2 = 3.9578

STANDARD ERROR OF THE ESTIMATE-SIGMA = 1.9894

SUM OF SQUARED ERRORS-SSE= 2567.1

MEAN OF DEPENDENT VARIABLE= 4.7248

VAIRBALE ESITMATED STANDARD T-RATIO PARTIAL STANDARDIZED ELASTICITY

NAME COEFFICIENT ERROR 97 DF P-VALUE CORR.COFFICIENT AT MEANS

PRICE -0.26417 0.4466E-01 -5.196 0.000-0.515 -0.2588 -0.3443

INCOME 2.0104 0.2102 9.565 0.000 0.697 0.4185 0.0074

COSTANT 5.8502 0.3383 17.29 0.000 0.869 0.0000 1.2382

|\_robust price income cost politic weather/predict=fitprice

REQUIRED MEMORY IS PAR= 33 CURRENT PART=112400

100 OBSERVATIONS DEPENDENT VAIRABLE = PRICE

..NOTE..SAMPLE RANGE SET TO: 1,100

LEAST ABSOLUTE ERROR REGRESSION

OBJECTIVE FUNCTION = 109.37

NUMBER OF SIMPLEX ITERATIONS = 15.000

EMPIRICAL QUNATILE FUNCTION AT MEANS = 5.7170

SUM OF ABSOLUTE ERRORs = 218.74

USING DIFF= 15 FOR COVARIANCE CALCULATIONS

VARIANCE OF THE ESTIMATE=SIGMA\*\*2 = 2.9837

STANDARD ERROR OF THE ESTIMATE-SIGMA = 1.7273

SUM OF SQUARED ERRORS-SSE= 1966.2

MEAN OF DEPENDENT VARIABLE= 6.1588

VAIRBALE ESITMATED STANDARD T-RATIO PARTIAL STANDARDIZED ELASTICITY

NAME COEFFICIENT ERROR 97 DF P-VALUE CORR.COFFICIENT AT MEANS

INCOME 1.4280 0.1696 8.420 0.000 0.654 0.3034 0.0040

COST 0.30847 0.1717 1.797 0.076 0.181 0.0640 0.0008

POLITIC 0.40685 0.1865 2.182 0.032 0.218 0.0789 0.0077

WEATHER 0.34076 0.1895 1.798 0.075 0.181 0.063 0.0027

COSTANT 5.6239 0.1745 32.22 0.000 0.957 0.0000 0.9132

|\_robust quantity price income

REQUIRED MEMORY IS PAR= 29 CURRENT PART=112400

100 OBSERVATIONS DEPENDENT VAIRABLE = PRICE

..NOTE..SAMPLE RANGE SET TO: 1, 100

LEAST ABSOLUTE ERROR REGRESSION

OBJECTIVE FUNCTION = 124.54

NUMBER OF SIMPLEX ITERATIONS = 9.0000

EMPIRICAL QUNATILE FUNCTION AT MEANS = 4.2581

SUM OF ABSOLUTE ERRORs = 249.07

USING DIFF= 16 FOR COVARIANCE CALCULATIONS

VARIANCE OF THE ESTIMATE=SIGMA\*\*2 = 3.9578

STANDARD ERROR OF THE ESTIMATE-SIGMA = 1.9894

SUM OF SQUARED ERRORS-SSE= 2567.1

MEAN OF DEPENDENT VARIABLE= 4.7248

VAIRBALE ESITMATED STANDARD T-RATIO PARTIAL STANDARDIZED ELASTICITY

NAME COEFFICIENT ERROR 97 DF P-VALUE CORR.COFFICIENT AT MEANS

PRICE -0.26417 0.4466E-01 -5.196 0.000-0.515 -0.2588 -0.3443

INCOME 2.0104 0.2102 9.565 0.000 0.697 0.4185 0.0074

COSTANT 5.8502 0.3383 17.29 0.000 0.869 0.0000 1.2382

NAME N MEAN ST.DEV VARIANCE MINIMUM MAXIMUM

BOOT2LAD 400 -1.0159 0.45819 0.20994 -3.0555 -0.10026

BOOT2LAD 400 3.2090 0.79427 0.63086 1.7036 7.7203

BOOT2LAD 400 10.340 2.7202 7.3996 5.4661 23.901