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FEL-1234 >>A JOURNEY TO ECONOMETRICS WITH PANEL DATA/LONGIDUDINAL DATA ANALYSIS

ECONOMETRICS MODELING WITH STATA SOFTWARE

STATA COMMAND FOR PANEL DATA ANALYSIS

Declaring panel data

xtset idvar timevar

lets see the duplications

command: duplicates reports

command: duplicates list

Describe up to 15 of the most common participation patterns

xtdescribe, patterns(15)

How to fill missing data for panel time series

bysort countryname: ipolate x time, gen(xi) epolate

Suppose you want to describe data

xtsum y x1 x2 x3

How to run Im-Pesaran-Shin Unit-root test (IPS) >Panel Model Diagnostic

xtunitroot ips x

example output on this

```
Im-Pesaran-Shin unit-root test for Lagdp
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Ho: All panels contain unit roots
Ha: Some panels are stationary

AR parameter: Panel-specific
Panel means:  Included
Time trend:   Not included
```

For constant and trend: xtunitroot ips x, trend

X in my case is lagdp

Panel unit-root test for constant after taking first difference

For constant and trend variable after differencing: xtunitroot ips x, trend

The trend and Seasonality effects have been done away with

How to run correlation matrix(pearson product moment correlation)

pwcorr y x1 x2 x3 x4, sig obs star(.05)

How to run pooled OLS:

reg y x1 x2 x3 x4

y=response variable

x1-x4 =predictors

Alternatively we can create a program for this ie

1) program my myprogram
2) reg `1' `2' `3' `4' `5'
3) predict xb if e(sample) ,xb
4) predict int residuals,resid
5) matrix b = get(_b)
6) end

Command for regression with Driscoll-Kraay standard errors

xtscc y x1 x2 x3 , lag(4)

Command for fixed effect (FE) model

xtreg y x1 x2 x3 , fe

Learn how to store your Estimates After Panel Fixed Estimation

a) Use the following command to store FE(Fixed Effects) estimation results

est sto fe

N/B;est >>estimates,sto>>store them in the STATA memory

OR : eststo D:xtreg y x1 x2 x3 ,fe

How to run random effect (RE) model

Convert data to a form suitable for random-effects estimation using xtset data

xtdata, re

: xtreg y x1 x2 x3 , re

Alternatively you can use Robust standard Errors

xtreg y x1 x2 x3 , re robust

b)Command for storing random effect result

est sto re

PANEL SPECIFICATION MODEL

Now run hausman test to choose suitable model between fixed and random effect If the probability value 0.05 then run PMG (Pool Mean Grroup) otherwise MG (Mean Group) should be estimated Choosing between MG and DFE Run dynamic fixed effect (DFE) model as follows

xtpmg d.y d.x1 d.x2 d.x3, lr(l.y l.x1 l.x2 l.x3) replace dfe

Assuming you already run and stored Mean Group result then

Run hausman specification test to choose between MG and DFE

hausman mg dfe sigmamore If P-value>0.05 use DFE otherwise use MG Running PMG model (individual)

Breusch and Pagan Lagrangian multiplier test for random effects

. xttest0

Command for checking specification error test

estat ovtest

Command for Breusch and Pagan Lagrangian multiplier (LM) test to choose b/w RE model and POLS
xttest0

xtpmg d.y d.x1 d.x2 d.x3, lr(l.y l.x1 l.x2 l.x3) replace

replace full pmg Running MG model (individual)

xtpmg d.y d.x1 d.x2 d.x3, lr(l.y l.x1 l.x2 l.x3) replace full mg

Command for estimating cross sectional dependency (CD)

pescadf x, lags(1)

pescadf d.x, lags(1) >>only for difference panel data structure

Estimating panel unit root test by using CIPS test (2nd generation)

pescadf x, lags(1)

pescadf d.x, lags(1)

How to run augmented mean group

xtmg y x1 x2 x3, trend aug

OR

xtmg y x1 x2 x3, aug

How to run common correlated effect mean group

xtpmg y x1 x2 x3, cce xtpmg y x1 x2 x3 x4, cce

N/B;cce>>common correlated effect

full Command for dynamic common correlated effect estimator -pooled mean group

xtdcce2 d.y d.L.y d.x1 d.x2, cr(_all) reportc lr(y x1 x2) p(y x1 x2) d.yl d.l.y d.x1 d.x2 y x1 x2

Command for Instrumental variable (2SLS)>>2 Step Least Square

regression ivreg lncons (l.lncons = l2.lncons) lnrp lnyd lnps

Command for difference (GMM) 1st step Difference System GMM

xtabond2 y L.y L2.y x1 L.x1 L(0/2).(x2 x3) i.timevar, gmm(L.y) iv(x1 L.x1 L(0/2).(x2 x3) i.timevar) nolevel robust.

xtabond2 y L.y L2.y x1 L.x1 L(0/2).(k ys) timevar*, gmm(L.(n w k)) iv(L(0/2).ys yr*) nolevel robust small

xtabond2 y L.y L2.y x1 L.x1 L(0/2).(x2 x3) i.year, gmm (L.(y x1 x2)) iv(L(0/2).x2 i.year) nolevel robust

Two-step Difference System GMM

xtabond2 y L.y L2.y x1 L.x2 L(0/2).(x2 x3) i.timevar, gmm(L.y) iv(x1 L.x1 L(0/2).(x2 x3) i.timevar) nolevel twostep

Two step difference GMM with Orthogonal sub-option command

xtabond2 y L.y L(0/1).(x1 x2) i.year , gmm(L.(x1 x2 y), lag(1 1) orthog) iv(i.timevar) h(2) robust twostep orthog noleveleq

Where xtabond2 stands for gmm command, the variables in the first bracket represents endogenous variables while the second bracket contains instrumental variables of the model.

Command for System GMM

To run system gmm, we remove “nolevel” in the ‘difference gmm’ command above

One step System GMM

xtabond2 y L.y L(0/1).(x1 x2) timevar*, gmmstyle(L.(y x1 x2)) ivstyle(timevar*, equation(level)) robust small xtabond2 y L.y L(0/1).(x1 x2) i.timevar , gmmstyle(L.(y x1 x2)) ivstyle(i.timevar, equation(level)) robust small

Two step System GMM

xtabond2 y L.y L(0/1).(x1 x2) i.timevar , gmmstyle(L.(y x1 x2)) ivstyle(i.timevar, equation(level)) twostep small

xtabond2 y L.y L(0/1).(x1 x2) timevar1-timevar_n, gmm(L.(y x1 x2), lag(1 1)) iv(timevar1-timevar_n, eq(level)) h(2) robust twostep

Command for checking Endogeneity

The first step is normaly to perform regression with following STATA command

ivregress gmm dv X1 X2 X3 (X4=X5 X6)

Then test for endogeneity as follows:

estat endog

A lower probability value is a sign of the endogeneity problem existing in the model

The next step is to test for validity of the instruments used as follows

estat overid

A higher probability value of the Sagan/Hansen test signifies model is correctly specified otherwise instruments are invalid. View publication stats

Time-Invariant Decay Model (Stochastic frontier models for panel data)

xtfrontier y x1 x2, ti

Time –Varying Decay Model for panel

xtfrontier lnwidgets lnmachines lnworkers, tvd

The Parameters here must iterate for convergency achievements

Using constraints

xtfrontier y x1 x2, tvd constraints(1)

Linear combination of panel parameters

lincom x1 + x2

Fit population-averaged panel-data models by using GEE

xtgee y x1 x2 i.x1#c.x2

After estimation, estat wcorrelation reports the working correlation matrix R

Postestimation after xtgee

xtgee y x1 x2 c.x2#c.x2, corr(unstr) nolog