

```
use "C:\Users\yangc\Desktop\data.dta"
```

```
encode province , gen(id)
tab year,gen(dyear)
xtset id year
gen ahrh=num_nurse + num_doc
gen lnahrh=ln(ahrh)
```

```
*****
```

```
*Panel unit root test
```

```
xtline theil, overlay
xtunitroot llc theil,demean lags(bic 1)
xtunitroot ips theil,demean lags(bic 1)
xtunitroot fisher theil, dfuller drift lags(1) demean
xtunitroot fisher theil, pperron lags(1) demean
```

```
*****
```

```
xtline cv, overlay
xtunitroot llc cv,demean lags(bic 1)
xtunitroot ips cv,demean lags(bic 1)
xtunitroot fisher cv, dfuller drift lags(1) demean
xtunitroot fisher cv, pperron lags(1) demean
```

```
*****
```

```
xtline gini, overlay
xtunitroot llc gini,demean lags(bic 1)
xtunitroot ips gini,demean lags(bic 1)
xtunitroot fisher gini, dfuller drift lags(1) demean
xtunitroot fisher gini, pperron lags(1) demean
```

```
*****
```

```
xtline ahrh, overlay
xtunitroot llc ahrh,trend demean lags(bic 1)
xtunitroot ips ahrh,trend demean lags(bic 1)
xtunitroot fisher ahrh, dfuller trend lags(1) demean
xtunitroot fisher ahrh, pperron trend lags(1) demean
```

```
*****
```

```
xtline lnahrh, overlay
xtunitroot llc lnahrh,trend demean lags(bic 1)
xtunitroot ips lnahrh,trend demean lags(bic 1)
xtunitroot fisher lnahrh, dfuller trend lags(1) demean
xtunitroot fisher lnahrh, pperron trend lags(1) demean
```

xtline x, overlay

xtunitroot llc x,trend demean lags(bic 1)

xtunitroot ips x,trend demean lags(bic 1)

xtunitroot fisher x, dfuller trend lags(1) demean

xtunitroot fisher x, pperron trend lags(1) demean

xtline lnpgdp, overlay

xtunitroot llc lnpgdp,demean lags(bic 1)

xtunitroot ips lnpgdp,demean lags(bic 1)

xtunitroot fisher lnpgdp, dfuller drift lags(1) demean

xtunitroot fisher lnpgdp, pperron lags(1) demean

xtline lnpgdp, overlay

xtunitroot llc lnpgdp,demean lags(bic 1)

xtunitroot ips lnpgdp,demean lags(bic 1)

xtunitroot fisher lnpgdp, dfuller drift lags(1) demean

xtunitroot fisher lnpgdp, pperron lags(1) demean

xtline ta, overlay

xtunitroot llc ta,trend demean lags(bic 1)

xtunitroot ips ta,trend demean lags(bic 1)

xtunitroot fisher ta, dfuller trend lags(1) demean

xtunitroot fisher ta, pperron trend lags(1) demean

xtline dr, overlay

xtunitroot llc dr,trend demean lags(bic 1)

xtunitroot ips dr,trend demean lags(bic 1)

xtunitroot fisher dr, dfuller trend lags(1) demean

xtunitroot fisher dr, pperron trend lags(1) demean

xtline ir, overlay

xtunitroot llc ir,demean lags(bic 1)

xtunitroot ips ir,demean lags(bic 1)

xtunitroot fisher ir, dfuller drift lags(1) demean

xtunitroot fisher ir, pperron lags(1) demean

* Calculation results of EHRA index for each province

sum theil if id ==1

sum theil if id ==2

sum theil if id ==3

sum theil if id ==4

sum theil if id ==5

```

sum theil if id ==6
sum theil if id ==7
sum theil if id ==8
sum theil if id ==9
sum theil if id ==10
sum theil if id ==11
sum theil if id ==12
sum theil if id ==13
sum theil if id ==14
sum theil if id ==15
sum theil if id ==16
sum theil if id ==17
sum theil if id ==18
sum theil if id ==19
sum theil if id ==20
sum theil if id ==21
sum theil if id ==22

```

```

*****

```

```

* descriptive statistics of different variables

```

```

summarize cv theil gini x x1 lnpgdp lnpgdp ta dr ir
tabstat theil cv gini x lnpgdp lnpgdp ta dr ir, s(mean sd p25 med p75 min max) c(s) f(%8.4f)

```

```

twoway (scatter theil x) (lfit theil x)
reg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10 i.id //LSDV
avplot x
avplots
xtline theil
xtline x

```

```

reg cv x lnpgdp lnpgdp ta dr ir,r
estat vif

```

```

xtreg theil x lnpgdp lnpgdp ta dr ir i.year,fe
**model choosing**

```

```

*1.fe and ols*
xtreg theil x lnpgdp lnpgdp ta dr ir i.year,fe
xtcsd,pes
xtcsd,fri
xtcsd,fre
*fre test's alpha=0.01:0.5198,
testparm _lid* //province dummy variable F test

```

*choosed fe model

2.ols and re

```
xtreg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10, re //re regression
xttest0 //LM test
xttest1 //LM test
```

*choosed re model

3.re and fe

Hausman test1

```
xtreg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10, fe //fe regression
est store FE
xtreg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10, re //re regression
hausman FE, sigmamore
```

Hausman test2

```
quietly xtreg theil x lnpgdp lnpgdp ta dr ir dyear2 dyear3 dyear4 dyear5 dyear6 dyear7 dyear8
dyear9 dyear10, re
```

scalar theta=e(theta)

```
global yandxforhausman theil x lnpgdp lnpgdp ta dr ir dyear2 dyear3 dyear4 dyear5 dyear6
dyear7 dyear8 dyear9 dyear10
```

sort id

```
foreach x of varlist $yandxforhausman{
    by id:egen mean`x'=mean(`x')
    gen md`x'=`x'-mean`x'
    gen red`x'=`x'-theta*mean`x'
}
```

```
quietly reg redtheil redx redlnpgdp redlnpgdp redta reddr redir reddy2 reddy3
reddy4 reddy5 reddy6 reddy7 reddy8 reddy9 reddy10 mdx
mdlpgdp mdlpgdp mdta mddr mdir mddy2 mddy3 mddy4 mddy5
mddy6 mddy7 mddy8 mddy9 mddy10, vce(cluster id)
```

```
test mdx mdlpgdp mdlpgdp mdta mddr mdir mddy2 mddy3 mddy4
mddy5 mddy6 mddy7 mddy8 mddy9 mddy10
```

Hausman test3

```
xtreg theil x lnpgdp lnpgdp ta dr ir i.year, re //re regression
xtcsd, pes
xtcsd, fri
xtcsd, fre
```

```
quietly xtscd redtheil redx redlnpgdp redlnpd redta reddr redir redyear2 redyear3
redyear4 redyear5 redyear6 redyear7 redyear8 redyear9 redyear10 mdx mdlngdp
mdlndp mdtta mddr mdir mddyear2 mddyear3 mddyear4 mddyear5 mddyear6
mddyear7 mddyear8 mddyear9 mddyear10
```

```
test mdx mdlngdp mdlndp mdtta mddr mdir mddyear2 mddyear3 mddyear4
mddyear5 mddyear6 mddyear7 mddyear8 mddyear9 mddyear10
```

*choosed fe model

**regression

*vif test

```
reg theil x lnpgdp lnpd ta dr ir
```

```
estat vif
```

*1.fe regression *

*cross-section correlation test

```
xtreg theil x lnpgdp lnpd ta dr ir dyear2-dyear10, fe
```

```
xtcsd,pes abs
```

```
xtcsd,fri abs
```

```
xtcsd,fre abs
```

heteroskedasticity test

```
xtreg theil x lnpgdp lnpd ta dr ir dyear2-dyear10, fe
```

```
xttest3
```

*autocorrelation test *

```
tab id,gen(id)
```

```
xtserial theil x lnpgdp lnpd ta dr ir id2-id22 dyear2-dyear10
```

*The estimated results after dealing with three major problems

```
xtscd theil x lnpd lnpgdp ta dr ir dyear2-dyear10,fe
```

```
reg theil x lnpgdp lnpd ta dr ir dyear2 dyear3 dyear4 dyear5 dyear6 dyear7 dyear8 dyear9
```

```
dyear10 id2 id3 id4 id5 id6 id7 id8 id9 id10 id11 id12 id13 id14 id15 id16 id17 id18 id19
```

```
id20 id21 id22,r
```

```
est store twoOLS
```

```
xtreg theil x lnpgdp lnpd ta dr ir ,fe r
```

```
est store oneFE
```

```
xtreg theil x lnpgdp lnpd ta dr ir dyear2-dyear10,fe r
```

```
est store towFE
```

```
xtscd theil x i.year,fe
```

```
est store FEdk
```

```
xtscd theil x lnpgdp lnpd ta dr ir,fe
```

```
est store onedk
```

```
xtscd theil x lnpgdp lnpd ta dr ir dyear2-dyear10,fe
```

```

est store twodk
*2.fe regression*
xtreg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10, re r
est store re1
xtscd redtheil redx redlnpgdp redlnpgdp redta reddr redir reddyed2 reddyed3 reddyed4
reddyed5 reddyed6 reddyed7 reddyed8 reddyed9 reddyed10 ,re
est store re2
reg theil x lnpgdp lnpgdp ta dr ir dyear2-dyear10 i.id,r
est store OLS
esttab FEdk onedk twodk towFE re1 OLS using tab3.rtf ,b(%10.4f) ar2(%10.4f) se(%10.4f)
mtitle(FEdk onedk twodk towFE re1 OLS) star (* 0.1 ** 0.05 *** 0.01) replace

```

***Robustness test

```

*1.replace dependent variable theil、gini
xtscd cv x lnpgdp lnpgdp ta dr ir dyear2-dyear10,fe
est store cv

```

```

xtscd gini x lnpgdp lnpgdp ta dr ir dyear2-dyear10,fe
est store gini

```

*2.delete samples of 2020

```

xtreg theil x lnpgdp lnpgdp ta dr ir dyear3-dyear9 if year !=2020 ,fe r
est store shijian

```

*3.add additional variable x2 servi x19

```

xtscd theil x lnpgdp lnpgdp ta dr ir servi pubserv edu dyear2-dyear10,fe
est store kongzhi

```

```

esttab cv gini shijian kongzhi using tab4.rtf ,b(%10.4f) ar2(%10.4f) se(%10.4f) mtitle(cv gini
shijian kongzhi) star (* 0.1 ** 0.05 *** 0.01) replace

```

** Endogenous treatment**

```

xtivreg theil lnpgdp lnpgdp ta dr ir i.year (x = L1.x), fe first
est store re2sls

```

Mechanism analysis

```

xtscd ighe x lnpgdp lnpgdp ta dr ir i.year,fe //channel one
est store jizhi1

```

```

xtscd lnahrh x lnpgdp lnpgdp ta dr ir i.year,fe //channel tow
est store jizhi2

```

```
esttab jizhi1 jizhi2 using tab4.rtf ,b(%10.4f) ar2(%10.4f) se(%10.4f) mtitle( jizhi1 jizhi2) star
(* 0.1 ** 0.05 *** 0.01) replace
```

****Heterogeneity analysis: two-way FE threshold regression****

```
xi:xthreg theil lnpgdp ta dr ir i.year, rx(x) qx(lnpgdp) thnum(2) grid(400) trim(0.01 0.01 )
bs(300 300 )
```

```
_matplot e(LR21), columns(1 2) yline(7.35, lpattern(dash)) connect(direct) msize(small)
mlabp(0) mlabs(zero) ytitle("LR Statistics") xtitle("First Threshold") recast(line) name(LR1)
nodraw
```

```
_matplot e(LR22), columns(1 2) yline(7.35, lpattern(dash)) connect(direct) msize(small)
mlabp(0) mlabs(zero) ytitle("LR Statistics") xtitle("Second Threshold") recast(line) name(LR2)
nodraw
```

```
xi:xthreg theil lnpgdp ta dr ir i.year, rx(x) qx(lnpgdp) thnum(1) grid(400) trim(0.01 ) bs( 300 )
```

```
_matplot e(LR), columns(1 2) yline(7.35, lpattern(dash)) connect(direct) msize(small)
mlabp(0) mlabs(zero) ytitle("LR Statistics") xtitle("Threshold") recast(line) name(LR01)
nodraw
```

```
xi:xthreg theil lnpgdp lnpgdp ta dr ir i.year, rx(x) qx(dr) thnum(1) grid(400) trim(0.01 )
bs( 300 )
```

```
_matplot e(LR), columns(1 2) yline(7.35, lpattern(dash)) connect(direct) msize(small)
mlabp(0) mlabs(zero) ytitle("LR Statistics") xtitle("Threshold") recast(line) name(LR02)
nodraw
```

```
graph combine LR1 LR2 LR01 LR02, cols(2)
```