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Variable	Obs	Mean	Std. dev.	Min	Max
GRDP	490	24596.16	23325.7	4010.718	161849.1
GFCF	490	7188.415	12695.58	1191.206	91911.16
Labor	490	519.0999	211.5878	61.06	1075.827
School	490	7.498939	1.320033	4.94	11.24
Agglomerat~n	490	1.018645	.4540585	.1787566	2.630941
CapExp	490	282.9634	171.0273	25.47877	1275.359
Wage	490	1451.321	527.4663	662	3060.349

```

.
. * ubah format data ke logaritma natural
. gen lnGRDP = log(GRDP)

. gen lnGFCF = log(GFCF)

. gen lnLabor = log(Labor)

. gen lnSchool = log(School)

. gen lnAgglomeration = log(Agglomeration)

. gen lnCapExp = log(CapExp)

. gen lnWage = log(Wage)

.
. * regresi cem
. reg lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage, level(90)

```

Source	SS	df	MS	Number of obs	=	490
Model	183.569059	6	30.5948432	F(6, 483)	=	551.33
Residual	26.8032195	483	.055493208	Prob > F	=	0.0000
				R-squared	=	0.8726
				Adj R-squared	=	0.8710
Total	210.372279	489	.430209159	Root MSE	=	.23557

lnGRDP	Coefficient	Std. err.	t	P> t	[90% conf. interval]	
lnGFCF	.6023536	.0257903	23.36	0.000	.5598508	.6448564
lnLabor	.4177699	.0339953	12.29	0.000	.3617451	.4737947
lnSchool	-.3767511	.1426169	-2.64	0.009	-.6117859	-.1417164
lnAgglomeration	.0097763	.0247025	0.40	0.692	-.0309338	.0504863
lnCapExp	.0454432	.0258631	1.76	0.080	.0028205	.0880659
lnWage	.1327405	.0383676	3.46	0.001	.06951	.1959709
_cons	1.773522	.2925496	6.06	0.000	1.291396	2.255648

```

.
. * simpan hasil estimasi cem
. estimates store cem

.
. * regresi fem
. xtreg lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage, fe level(90)

```

```

Fixed-effects (within) regression
Group variable: District

```

```

Number of obs      =      490
Number of groups   =       35

```

```

R-squared:
  Within  = 0.9621
  Between = 0.7625
  Overall = 0.6304

```

```

Obs per group:
  min = 14
  avg = 14.0
  max = 14

```

```

corr(u_i, Xb) = 0.5471
F(6, 449)      = 1901.60
Prob > F       = 0.0000

```

lnGRDP	Coefficient	Std. err.	t	P> t	[90% conf. interval]	
lnGFCF	.1278652	.0219275	5.83	0.000	.0917231	.1640074
lnLabor	.1634861	.0380004	4.30	0.000	.1008517	.2261205
lnSchool	.3900908	.0676546	5.77	0.000	.2785788	.5016027
lnAgglomeration	.0241466	.0100094	2.41	0.016	.0076485	.0406447
lnCapExp	.0184832	.0047581	3.88	0.000	.0106407	.0263257
lnWage	.309662	.0159985	19.36	0.000	.2832925	.3360315
_cons	4.666112	.2098664	22.23	0.000	4.320199	5.012025
sigma_u	.48084954					
sigma_e	.03770222					
rho	.99388983	(fraction of variance due to u_i)				

F test that all u\_i=0: F(34, 449) = 541.39

Prob > F = 0.0000

```
.
. * simpan hasil estimasi fem
. estimates store fem

.
. * pilih cem vs fem (uji chow) -> dari p-value fem
.
. * regresi rem
. xtreg lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage, re level(90)
```

Random-effects GLS regression  
Group variable: District

Number of obs = 490  
Number of groups = 35

R-squared:

Within = 0.9610  
Between = 0.8381  
Overall = 0.7659

Obs per group:

min = 14  
avg = 14.0  
max = 14

corr(u\_i, X) = 0 (assumed)

Wald chi2(6) = 10020.95  
Prob > chi2 = 0.0000

lnGRDP	Coefficient	Std. err.	z	P> z	[90% conf. interval]	
lnGFCF	.1735901	.0223087	7.78	0.000	.1368955	.2102846
lnLabor	.2704306	.0359107	7.53	0.000	.2113628	.3294984
lnSchool	.334553	.0704526	4.75	0.000	.2186687	.4504373
lnAgglomeration	.0264749	.0106706	2.48	0.013	.0089233	.0440264
lnCapExp	.0210979	.005069	4.16	0.000	.0127603	.0294356
lnWage	.2790467	.0164302	16.98	0.000	.2520215	.3060719
_cons	3.944034	.2078647	18.97	0.000	3.602127	4.285941
sigma_u	.25143336					
sigma_e	.03770222					
rho	.9780097	(fraction of variance due to u_i)				

```

.
. * simpan hasil estimasi rem
. estimates store rem

.
. * pilih cem vs rem (uji lagrange multiplier)
. xttest0

```

Breusch and Pagan Lagrangian multiplier test for random effects

$\ln\text{GRDP}[\text{District},t] = Xb + u[\text{District}] + e[\text{District},t]$

Estimated results:

	Var	SD = sqrt(Var)
lnGRDP	.4302092	.6559033
e	.0014215	.0377022
u	.0632187	.2514334

Test:  $\text{Var}(u) = 0$

$\text{chibar2}(01) = 2786.83$   
 Prob > chibar2 = 0.0000

```

.
. * pilih fem vs rem (uji hausman)
. hausman fem rem

```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
	(b) fem	(B) rem		
lnGFCF	.1278652	.1735901	-.0457248	.
lnLabor	.1634861	.2704306	-.1069445	.0124281
lnSchool	.3900908	.334553	.0555378	.
lnAgglomer~n	.0241466	.0264749	-.0023283	.
lnCapExp	.0184832	.0210979	-.0026147	.
lnWage	.309662	.2790467	.0306153	.

b = Consistent under  $H_0$  and  $H_a$ ; obtained from **xtreg**.  
 B = Inconsistent under  $H_a$ , efficient under  $H_0$ ; obtained from **xtreg**.

Test of  $H_0$ : Difference in coefficients not systematic

$\text{chi2}(6) = (b-B)'[(V_b-V_B)^{-1}](b-B)$   
 = -250.69

Warning:  $\text{chi2} < 0 \implies$  model fitted on these data  
 fails to meet the asymptotic assumptions  
 of the Hausman test; see **suest** for a  
 generalized test.

```

.
. * ulangi regresi fem
. xtreg lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage, fe level(90)

Fixed-effects (within) regression               Number of obs   =       490
Group variable: District                       Number of groups =       35

R-squared:                                     Obs per group:
    Within = 0.9621                             min =       14
    Between = 0.7625                            avg =      14.0
    Overall = 0.6304                             max =       14

corr(u_i, Xb) = 0.5471                        F(6, 449)        =    1901.60
                                                Prob > F         =     0.0000

```

lnGRDP	Coefficient	Std. err.	t	P> t	[90% conf. interval]	
lnGFCF	.1278652	.0219275	5.83	0.000	.0917231	.1640074
lnLabor	.1634861	.0380004	4.30	0.000	.1008517	.2261205
lnSchool	.3900908	.0676546	5.77	0.000	.2785788	.5016027
lnAgglomeration	.0241466	.0100094	2.41	0.016	.0076485	.0406447
lnCapExp	.0184832	.0047581	3.88	0.000	.0106407	.0263257
lnWage	.309662	.0159985	19.36	0.000	.2832925	.3360315
_cons	4.666112	.2098664	22.23	0.000	4.320199	5.012025
sigma_u	.48084954					
sigma_e	.03770222					
rho	.99388983	(fraction of variance due to u_i)				

F test that all u\_i=0: F(34, 449) = 541.39                      Prob > F = 0.0000

```

.
. * simpan residual error
. predict resid, r

```

```

.
. * uji normalitas
. sktest resid

```

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	—— Joint test ——	
				Adj chi2(2)	Prob>chi2
resid	490	0.0000	0.0000	44.23	0.0000

```

.
. * uji multikolinearitas
. corr lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage
(obs=490)

```

	lnGFCF	lnLabor	lnSchool	lnAggl~n	lnCapExp	lnWage
lnGFCF	1.0000					
lnLabor	0.3048	1.0000				
lnSchool	0.5419	-0.4652	1.0000			
lnAgglomer~n	0.2741	-0.0698	0.3505	1.0000		
lnCapExp	0.4822	0.4594	0.1312	-0.0700	1.0000	
lnWage	0.3809	0.0901	0.4534	0.1453	0.5484	1.0000

```
.
. * uji heteroskedastisitas
. xttest3
```

Modified Wald test for groupwise heteroskedasticity  
in fixed effect regression model

H0:  $\sigma(i)^2 = \sigma^2$  for all i

```
chi2 (35) =    2507.38
Prob>chi2 =    0.0000
```

```
.
. * uji autokorelasi
. xtserial lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage
```

Wooldridge test for autocorrelation in panel data  
H0: no first-order autocorrelation

```
F( 1,      34) =    371.678
Prob > F =    0.0000
```

```
.
. * ulangi regresi fem robust se
. xtreg lnGRDP lnGFCF lnLabor lnSchool lnAgglomeration lnCapExp lnWage, fe robust level(90)
```

```
Fixed-effects (within) regression          Number of obs   =    490
Group variable: District                  Number of groups =    35
```

```
R-squared:                                Obs per group:
  Within = 0.9621                          min =    14
  Between = 0.7625                         avg =   14.0
  Overall = 0.6304                         max =    14
```

```
corr(u_i, Xb) = 0.5471                    F(6, 34)         =   457.42
                                           Prob > F         =   0.0000
```

(Std. err. adjusted for 35 clusters in District)

lnGRDP	Coefficient	Robust std. err.	t	P> t	[90% conf. interval]	
lnGFCF	.1278652	.0643043	1.99	0.055	.0191316	.2365989
lnLabor	.1634861	.040078	4.08	0.000	.0957172	.231255
lnSchool	.3900908	.1525567	2.56	0.015	.132129	.6480526
lnAgglomeration	.0241466	.0207256	1.17	0.252	-.0108989	.059192
lnCapExp	.0184832	.0054736	3.38	0.002	.0092278	.0277386
lnWage	.309662	.0487123	6.36	0.000	.2272932	.3920308
_cons	4.666112	.237381	19.66	0.000	4.264719	5.067505
sigma_u	.48084954					
sigma_e	.03770222					
rho	.99388983	(fraction of variance due to u_i)				

```
.
end of do-file
```

```
.
```