
name: <unnamed>
log: /Users/jharit/Desktop/Assignment 7 .smcl
log type: smcl
opened on: 17 Mar 2021, 13:41:16

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1 . xtset crossid time
    panel variable: crossid (strongly balanced)
    time variable: time, 40 to 44
    delta: 1 year

2 . xtgls y x1 x2 x3 x4 x5 x6 x7, igls panels(heteroskedastic)
Iteration 1: tolerance = .08868167
Iteration 2: tolerance = .05849043
Iteration 3: tolerance = .03525359
Iteration 4: tolerance = .02040677
Iteration 5: tolerance = .01187668
Iteration 6: tolerance = .00709681
Iteration 7: tolerance = .00441169
Iteration 8: tolerance = .00291535
Iteration 9: tolerance = .00321184
Iteration 10: tolerance = .00409533
Iteration 11: tolerance = .00580092
Iteration 12: tolerance = .00908183
Iteration 13: tolerance = .01574945
Iteration 14: tolerance = .02974716
Iteration 15: tolerance = .05103653
Iteration 16: tolerance = .04401112
Iteration 17: tolerance = .00723478
Iteration 18: tolerance = .00429598
Iteration 19: tolerance = .0028681
Iteration 20: tolerance = .00195025
Iteration 21: tolerance = .00134658
Iteration 22: tolerance = .00105022
Iteration 23: tolerance = .00117237
Iteration 24: tolerance = .00122304
Iteration 25: tolerance = .00122651
Iteration 26: tolerance = .00119949
Iteration 27: tolerance = .00115339
Iteration 28: tolerance = .00109594
Iteration 29: tolerance = .00103239
Iteration 30: tolerance = .00096626
Iteration 31: tolerance = .00089991
Iteration 32: tolerance = .0008349
Iteration 33: tolerance = .00077221
Iteration 34: tolerance = .00071245
Iteration 35: tolerance = .00065597
Iteration 36: tolerance = .00060292
Iteration 37: tolerance = .00055335
Iteration 38: tolerance = .00050721
Iteration 39: tolerance = .0004644
Iteration 40: tolerance = .00042478
Iteration 41: tolerance = .0003882
Iteration 42: tolerance = .00035448
Iteration 43: tolerance = .00032344
Iteration 44: tolerance = .00029493
Iteration 45: tolerance = .00026875
Iteration 46: tolerance = .00024476
Iteration 47: tolerance = .00022279
Iteration 48: tolerance = .00020268
Iteration 49: tolerance = .0001843
Iteration 50: tolerance = .00016751
Iteration 51: tolerance = .00015219
Iteration 52: tolerance = .00013821
Iteration 53: tolerance = .00012547
Iteration 54: tolerance = .00011386
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Iteration 55: tolerance = .0001033
Iteration 56: tolerance = .00009368
Iteration 57: tolerance = .00008494
Iteration 58: tolerance = .00007699
Iteration 59: tolerance = .00006977
Iteration 60: tolerance = .00006321
Iteration 61: tolerance = .00005725
Iteration 62: tolerance = .00005184
Iteration 63: tolerance = .00004694
Iteration 64: tolerance = .00004249
Iteration 65: tolerance = .00003846
Iteration 66: tolerance = .0000348
Iteration 67: tolerance = .00003149
Iteration 68: tolerance = .00002849
Iteration 69: tolerance = .00002577
Iteration 70: tolerance = .00002331
Iteration 71: tolerance = .00002108
Iteration 72: tolerance = .00001906
Iteration 73: tolerance = .00001724
Iteration 74: tolerance = .00001559
Iteration 75: tolerance = .00001409
Iteration 76: tolerance = .00001274
Iteration 77: tolerance = .00001151
Iteration 78: tolerance = .00001041
Iteration 79: tolerance = 9.406e-06
Iteration 80: tolerance = 8.501e-06
Iteration 81: tolerance = 7.683e-06
Iteration 82: tolerance = 6.943e-06
Iteration 83: tolerance = 6.274e-06
Iteration 84: tolerance = 5.669e-06
Iteration 85: tolerance = 5.122e-06
Iteration 86: tolerance = 4.628e-06
Iteration 87: tolerance = 4.182e-06
Iteration 88: tolerance = 3.778e-06
Iteration 89: tolerance = 3.413e-06
Iteration 90: tolerance = 3.084e-06
Iteration 91: tolerance = 2.786e-06
Iteration 92: tolerance = 2.517e-06
Iteration 93: tolerance = 2.274e-06
Iteration 94: tolerance = 2.054e-06
Iteration 95: tolerance = 1.855e-06
Iteration 96: tolerance = 1.676e-06
Iteration 97: tolerance = 1.514e-06
Iteration 98: tolerance = 1.368e-06
Iteration 99: tolerance = 1.235e-06
Iteration 100: tolerance = 1.116e-06
Iteration 101: tolerance = 1.008e-06
Iteration 102: tolerance = 9.105e-07
Iteration 103: tolerance = 8.224e-07
Iteration 104: tolerance = 7.428e-07
Iteration 105: tolerance = 6.710e-07
Iteration 106: tolerance = 6.060e-07
Iteration 107: tolerance = 5.474e-07
Iteration 108: tolerance = 4.944e-07
Iteration 109: tolerance = 4.466e-07
Iteration 110: tolerance = 4.034e-07
Iteration 111: tolerance = 3.643e-07
Iteration 112: tolerance = 3.291e-07
Iteration 113: tolerance = 2.972e-07
Iteration 114: tolerance = 2.684e-07
Iteration 115: tolerance = 2.425e-07
Iteration 116: tolerance = 2.190e-07
Iteration 117: tolerance = 1.978e-07
Iteration 118: tolerance = 1.786e-07
Iteration 119: tolerance = 1.613e-07
Iteration 120: tolerance = 1.457e-07

reject H_0 $P < P_\alpha$ heteroskedasticity exists.

Likelihood-ratio test LR chi2(254) = 619.86
 (Assumption: pgl_s nested in hetero) Prob > chi2 = 0.0000

b.)

8 . xtgl_s y x1 x2 x3 x4 x5 x6 x7 → panel least square

Cross-sectional time-series FGLS regression

Coefficients: **generalized least squares**
 Panels: **homoskedastic**
 Correlation: **no autocorrelation**

Estimated covariances = 1 Number of obs = 1,275
 Estimated autocorrelations = 0 Number of groups = 255
 Estimated coefficients = 8 Time periods = 5
 Log likelihood = 209.4322 Wald chi2(7) = 899.95
 Prob > chi2 = 0.0000

y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
x1	.0794732	.0093881	8.47	0.000	.0610728	.0978735
x2	.0183375	.0051421	3.57	0.000	.0082592	.0284158
x3	.0977707	.0526329	1.86	0.063	-.0053879	.2009293
x4	.0873838	.2186064	0.40	0.689	-.3410767	.5158444
x5	-.1076457	.0069214	-15.55	0.000	-.1212114	-.0940801
x6	-.1432493	.0186811	-7.67	0.000	-.1798637	-.106635
x7	-.2712849	.011995	-22.62	0.000	-.2947946	-.2477753
_cons	-.0107965	.0860341	-0.13	0.900	-.1794201	.1578272

9 . xtreg y x1 x2 x3 x4 x5 x6 x7, fe → fixed effect

Fixed-effects (within) regression Number of obs = 1,275
 Group variable: **crossid** Number of groups = 255

R-sq: within = 0.3772 min = 5
 between = 0.1103 avg = 5.0
 overall = 0.1644 max = 5

corr(u_i, Xb) = -0.2003 F(7, 1013) = 87.64
 Prob > F = 0.0000

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1	-.1256447	.0180942	-6.94	0.000	-.161151	-.0901384
x2	.0123739	.008023	1.54	0.123	-.0033697	.0281176
x3	.0747825	.039773	1.88	0.060	-.0032643	.1528293
x4	.6493144	.2855092	2.27	0.023	.0890573	1.209572
x5	-.1104883	.0061097	-18.08	0.000	-.1224773	-.0984992
x6	-.1461423	.0141035	-10.36	0.000	-.1738178	-.1184669
x7	-.0951497	.0121853	-7.81	0.000	-.1190611	-.0712383
_cons	1.756067	.1658407	10.59	0.000	1.430636	2.081497
sigma_u	.22676694					
sigma_e	.11725953					
rho	.78902632	(fraction of variance due to u _i)				

Fixed effect test

F test that all u_i=0: F(254, 1013) = 11.40 Prob > F = 0.0000

10 . est store fixed → random effect reject H_0 → FE exist

11 . xtreg y x1 x2 x3 x4 x5 x6 x7, re

Random-effects GLS regression Number of obs = 1,275

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Group variable: crossid                                Number of groups =      255

R-sq:                                                    Obs per group:
  within = 0.3492                                       min =                    5
  between = 0.3404                                       avg =                    5.0
  overall = 0.3377                                       max =                    5

corr(u_i, X) = 0 (assumed)                               Wald chi2(7) =          663.43
                                                         Prob > chi2 =           0.0000
    
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y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
x1	-.0145018	.0133366	-1.09	0.277	-.040641	.0116375
x2	.0146948	.0064463	2.28	0.023	.0020604	.0273292
x3	.0985565	.0399464	2.47	0.014	.020263	.1768501
x4	.4693539	.2493856	1.88	0.060	-.0194329	.9581407
x5	-.1117985	.005959	-18.76	0.000	-.1234779	-.100119
x6	-.1541318	.014125	-10.91	0.000	-.1818163	-.1264472
x7	-.1494529	.0115006	-13.00	0.000	-.1719937	-.1269122
_cons	.7714573	.1226841	6.29	0.000	.5310009	1.011914
sigma_u	.15944933					
sigma_e	.11725953					
rho	.64900604	(fraction of variance due to u_i)				

12 . est store re

13 . hausman fixed re

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) re		
x1	-.1256447	-.0145018	-.1111429	.0122284
x2	.0123739	.0146948	-.0023208	.0047765
x3	.0747825	.0985565	-.0237741	.
x4	.6493144	.4693539	.1799605	.1390048
x5	-.1104883	-.1117985	.0013102	.0013484
x6	-.1461423	-.1541318	.0079894	.
x7	-.0951497	-.1494529	.0543033	.0040273

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 190.39
 Prob>chi2 = 0.0000 *Hausman test*
 (V_b-V_B is not positive definite)
reject Ho

14 . log close

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name: <unnamed>
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log type: smcl
closed on: 17 Mar 2021, 14:13:13
    
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According to the fixed effect test, there's fixed effect exist and on the Hausman test we reject the Ho so, the fixed effect model is the most appropriated one.