**xtset supergroup wave**

**graph matrix logmortrate ageave logsmokerate logwealth, half**

**** correlate **logmortrate ageave logsmokerate logwealth**

(obs=384)

| logmor~e ageave logsmo~e logwea~h

-------------+------------------------------------

logmortrate | 1.0000

ageave | 0.7315 1.0000

logsmokerate | -0.4062 -0.6947 1.0000

logwealth | -0.2871 -0.2856 -0.2377 1.0000

xtreg logmortrate ageave logsmokerate logwealth i.wave, fe

estimates store fixed

xtreg logmortrate ageave logsmokerate logwealth i.wave, re

estimates store random

hausman fixed random

. xtreg logmortrate ageave logsmokerate logwealth i.wave, fe

note: 5.wave omitted because of collinearity

Fixed-effects (within) regression Number of obs = 192

Group variable: supergroup Number of groups = 48

R-sq: within = 0.2333 Obs per group: min = 4

between = 0.2705 avg = 4.0

overall = 0.2590 max = 4

F(5,139) = 8.46

corr(u\_i, Xb) = -0.0756 Prob > F = 0.0000

------------------------------------------------------------------------------

logmortrate | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

ageave | .0453982 .023514 1.93 0.056 -.0010932 .0918895

logsmokerate | -.0043605 .2247524 -0.02 0.985 -.448736 .440015

logwealth | .4829693 .252345 1.91 0.058 -.0159616 .9819002

|

wave |

3 | .4845938 .0918357 5.28 0.000 .3030183 .6661694

4 | .1163861 .0910758 1.28 0.203 -.063687 .2964591

5 | 0 (omitted)

|

\_cons | -12.5542 2.551273 -4.92 0.000 -17.59852 -7.509883

-------------+----------------------------------------------------------------

sigma\_u | .66721675

sigma\_e | .50325788

rho | .63738321 (fraction of variance due to u\_i)

------------------------------------------------------------------------------

F test that all u\_i=0: F(47, 139) = 2.29 Prob > F = 0.0001

.

. estimates store fixed

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. xtreg logmortrate ageave logsmokerate logwealth i.wave, re

Random-effects GLS regression Number of obs = 192

Group variable: supergroup Number of groups = 48

R-sq: within = 0.2083 Obs per group: min = 4

between = 0.7705 avg = 4.0

overall = 0.6089 max = 4

Wald chi2(6) = 184.13

corr(u\_i, X) = 0 (assumed) Prob > chi2 = 0.0000

------------------------------------------------------------------------------

logmortrate | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-------------+----------------------------------------------------------------

ageave | .0821879 .0095368 8.62 0.000 .0634962 .1008796

logsmokerate | .2744257 .1457281 1.88 0.060 -.0111961 .5600474

logwealth | .0258714 .0943954 0.27 0.784 -.1591401 .210883

|

wave |

3 | .5013106 .105115 4.77 0.000 .2952889 .7073323

4 | .1072283 .1081712 0.99 0.322 -.1047834 .31924

5 | -.0352664 .11249 -0.31 0.754 -.2557428 .18521

|

\_cons | -9.678026 1.348741 -7.18 0.000 -12.32151 -7.034542

-------------+----------------------------------------------------------------

sigma\_u | .28890619

sigma\_e | .50325788

rho | .24787063 (fraction of variance due to u\_i)

------------------------------------------------------------------------------

.

. estimates store random

.

. hausman fixed random

---- Coefficients ----

| (b) (B) (b-B) sqrt(diag(V\_b-V\_B))

| fixed random Difference S.E.

-------------+----------------------------------------------------------------

ageave | .0453982 .0821879 -.0367898 .0214932

logsmokerate | -.0043605 .2744257 -.2787861 .1711052

logwealth | .4829693 .0258714 .4570978 .2340246

wave |

3 | .4845938 .5013106 -.0167168 .

4 | .1163861 .1072283 .0091578 .

------------------------------------------------------------------------------

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(5) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)

= 5.09

Prob>chi2 = 0.4050

(V\_b-V\_B is not positive definite)

bysort supergroup: egen y\_mean = mean(logmortrate)

twoway scatter logmortrate supergroup || connected y\_mean supergroup



bysort wave: egen y\_mean1 = mean(logmortrate)

twoway scatter logmortrate wave || connected y\_mean1 wave



Normal regression

. regress logmortrate age logsmokerate logwealth

Source | SS df MS Number of obs = 192

-------------+------------------------------ F( 3, 188) = 78.24

Model | 88.737484 3 29.5791613 Prob > F = 0.0000

Residual | 71.0734966 188 .378050514 R-squared = 0.5553

-------------+------------------------------ Adj R-squared = 0.5482

Total | 159.810981 191 .836706705 Root MSE = .61486

------------------------------------------------------------------------------

logmortrate | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-------------+----------------------------------------------------------------

ageave | .0828045 .0083205 9.95 0.000 .0663909 .099218

logsmokerate | .3250039 .1358195 2.39 0.018 .0570777 .59293

logwealth | .017514 .0819206 0.21 0.831 -.1440877 .1791157

\_cons | -9.402172 1.181948 -7.95 0.000 -11.73376 -7.070587

------------------------------------------------------------------------------

avplots



xtreg logmortrate logsmokerate logwealth i.wave, re

xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

logmortrate[supergroup,t] = Xb + u[supergroup] + e[supergroup,t]

Estimated results:

| Var sd = sqrt(Var)

---------+-----------------------------

logmort~e | .8367067 .9147167

e | .2532685 .5032579

u | .2486769 .4986752

Test: Var(u) = 0

chibar2(01) = 52.80

Prob > chibar2 = 0.0000

Don’t know if this is appropriate for re but probably is!

xtreg logmortrate logsmokerate logwealth i.wave, re

testparm i.wave

( 1) 3.wave = 0

( 2) 4.wave = 0

( 3) 5.wave = 0

chi2( 3) = 31.36

Prob > chi2 = 0.0000