**Lab session II Wednesday – Multilevel or Robust SEs?**

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 name: <unnamed>

 log: J:\Multilevel TA\Chp12\_Multilevel\_vs\_Robust.log

 log type: text

 opened on: 17 Apr 2012, 00:09:51

. \*\*chap12.do\*\*

. \*\*Example 12.1\*\*

. \*\*Sandwich estimator for the language test\*\*

.

.

. clear all

. set more off

. cd "J:\Multilevel TA"

J:\Multilevel TA

.

. \*Read in the data

.

. \*infile schoolnr pupilNR\_new langpost ses IQ\_verb sex Minority denomina sch\_ses sch\_iqv sch\_min usi

> ng "/Users/Jon/Documents/Snijders/SecondEditionExamples/DataSnijdersSecondEdition/mlbook2\_r.txt" in

> 2/3759, clear

. infile schoolnr pupilNR\_new langpost ses IQ\_verb sex Minority denomina sch\_ses sch\_iqv sch\_min usin

> g mlbook2\_r.txt, clear

'schoolnr' cannot be read as a number for schoolnr[1]

'pupilNR\_new' cannot be read as a number for pupilNR\_new[1]

'langPOST' cannot be read as a number for langpost[1]

'ses' cannot be read as a number for ses[1]

'IQ\_verb' cannot be read as a number for IQ\_verb[1]

'sex' cannot be read as a number for sex[1]

'Minority' cannot be read as a number for Minority[1]

'denomina' cannot be read as a number for denomina[1]

'sch\_ses' cannot be read as a number for sch\_ses[1]

'sch\_iqv' cannot be read as a number for sch\_iqv[1]

'sch\_min' cannot be read as a number for sch\_min[1]

(3759 observations read)

.

. \*Example 12.1

.

. egen gmeanIQverb = mean(IQ\_verb), by(schoolnr)

(1 missing value generated)

. egen gmeanSES = mean(ses), by(schoolnr)

(1 missing value generated)

.

.

. \*Hierarchical linear model (compare example 5.4)

.

. xtmixed langpost IQ\_verb ses c.IQ\_verb#c.ses c.gmeanIQverb##c.gmeanSES || schoolnr : IQ\_verb , ml

> e covariance(un) var

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0: log likelihood = -12315.435

Iteration 1: log likelihood = -12314.443

Iteration 2: log likelihood = -12314.44

Iteration 3: log likelihood = -12314.44

Computing standard errors:

Mixed-effects ML regression Number of obs = 3758

Group variable: schoolnr Number of groups = 211

 Obs per group: min = 4

 avg = 17.8

 max = 34

 Wald chi2(6) = 2010.96

Log likelihood = -12314.44 Prob > chi2 = 0.0000

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

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

 IQ\_verb | 2.232803 .0634129 35.21 0.000 2.108516 2.35709

 ses | .1743116 .0116627 14.95 0.000 .1514531 .19717

 |

 c.IQ\_verb#c.ses | -.0174953 .0049019 -3.57 0.000 -.0271027 -.0078878

 |

 gmeanIQverb | .7087748 .3010045 2.35 0.019 .1188169 1.298733

 gmeanSES | -.0839597 .0428118 -1.96 0.050 -.1678693 -.00005

 |

c.gmeanIQverb#c.gmeanSES | -.115429 .0337526 -3.42 0.001 -.1815829 -.049275

 |

 \_cons | 41.58877 .2505505 165.99 0.000 41.0977 42.07984

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 Random-effects Parameters | Estimate Std. Err. [95% Conf. Interval]

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schoolnr: Unstructured |

 var(IQ\_verb) | .1651492 .0714711 .0707138 .3856989

 var(\_cons) | 8.450717 1.063847 6.602937 10.81558

 cov(IQ\_verb,\_cons) | -.9345903 .2174483 -1.360781 -.5083995

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 var(Residual) | 37.381 .9091193 35.64096 39.20599

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LR test vs. linear regression: chi2(3) = 426.85 Prob > chi2 = 0.0000

Note: LR test is conservative and provided only for reference.

. est store mod1

. estat ic

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

 Model | Obs ll(null) ll(model) df AIC BIC

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 mod1 | 3758 . -12314.44 11 24650.88 24719.43

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 Note: N=Obs used in calculating BIC; see [R] BIC note

.

. \*OLS with robust standard errors

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. regr langpost IQ\_verb ses c.IQ\_verb#c.ses c.gmeanIQverb##c.gmeanSES, cluster(schoolnr)

Linear regression Number of obs = 3758

 F( 6, 210) = 418.39

 Prob > F = 0.0000

 R-squared = 0.4177

 Root MSE = 6.7913

 (Std. Err. adjusted for 211 clusters in schoolnr)

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 | Robust

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

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

 IQ\_verb | 2.21002 .0669085 33.03 0.000 2.078121 2.341918

 ses | .1739146 .0120951 14.38 0.000 .1500712 .1977579

 |

 c.IQ\_verb#c.ses | -.017326 .0054684 -3.17 0.002 -.028106 -.0065461

 |

 gmeanIQverb | .9568417 .291583 3.28 0.001 .382037 1.531646

 gmeanSES | -.0998451 .0406272 -2.46 0.015 -.1799345 -.0197556

 |

c.gmeanIQverb#c.gmeanSES | -.1004591 .0397995 -2.52 0.012 -.1789167 -.0220014

 |

 \_cons | 41.65508 .2607095 159.78 0.000 41.14114 42.16903

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. est store mod2

. estat ic

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

 Model | Obs ll(null) ll(model) df AIC BIC

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

 mod2 | 3758 -13544.11 -12527.86 7 25069.72 25113.35

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 Note: N=Obs used in calculating BIC; see [R] BIC note

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. esttab mod1 mod2, se wide nostar ///

> transform(ln\*: exp(2\*@) exp(2\*@) at\*: tanh(@) (1-tanh(@)^2)) ///

> eqlabels("" "var(u1)" "var(u0)" "corr(u1,\_cons)" "var(Residual)", none) ///

> varlabels(,elist(weight:\_cons "{break}{hline @width}")) ///

> varwidth(16)

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

 (1) (2)

 langpost langpost

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

IQ\_verb 2.233 (0.0634) 2.210 (0.0669)

ses 0.174 (0.0117) 0.174 (0.0121)

c.IQ\_verb#c.ses -0.0175 (0.00490) -0.0173 (0.00547)

gmeanIQverb 0.709 (0.301) 0.957 (0.292)

gmeanSES -0.0840 (0.0428) -0.0998 (0.0406)

c.gmeanIQverb#~S -0.115 (0.0338) -0.100 (0.0398)

\_cons 41.59 (0.251) 41.66 (0.261)

var(u1) 0.165 (0.0357)

var(u0) 8.451 (0.532)

corr(u1,\_cons) -0.791 (0.160)

var(Residual) 37.38 (0.455)

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N 3758 3758

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Standard errors in parentheses

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. capture log close