

CHAPTER 12 ASDA ANALYSIS EXAMPLES REPLICATION-MPLUS 5.21

GENERAL NOTES ABOUT ANALYSIS EXAMPLES REPLICATION

These examples are intended to provide guidance on how to use the commands/procedures for analysis of complex sample survey data and assume all data management and other preliminary work is done. The relevant syntax for the procedure of interest is shown first along with the associated output for that procedure(s). In some examples, there may be more than one block of syntax and in this case all syntax is first presented followed by the output produced.

In some software packages certain procedures or options are not available but we have made every attempt to demonstrate how to match the output produced by Stata 10+ in the textbook. Check the ASDA website for updates to the various software tools we cover.

NOTES ABOUT ANALYSIS OF LONGITUDINAL DATA IN MPLUS 5.21

The analysis replication examples were all run using Mplus 5.21. Mplus is an advanced modeling tool and offers the ability to correctly account for complex sample survey data for all analytic techniques.

Mplus can perform analysis of longitudinal data using a two-level approach and incorporate level specific weights. In Mplus, the number of levels is assumed to be one more than is used to refer to a model. For example, a two-level model in Mplus is actually performing a three-level analysis. This is due to the way Mplus handles levels in the syntax and setup of the analysis.

The example from Chapter 12 of ASDA uses 4 time points (2000, 2002, 2004, 2006) nested within individuals nested within SECUs, using HRS data from 2000, 2002, 2004 and 2006. The levels, therefore, are time points (level 1) within individuals (level 2) within SECUs (level 3). Through use of "TYPE=TWOLEVEL" along with two variables on the "CLUSTER" statement we properly account for the multi-level approach as well as the complex sample design. In addition, use of the "WITHIN" weight (level 1 weight) with the "BWEIGHT" (level 2 weight) allows the analyst to use weights for levels 1 (within) and 2 (between). Furthermore, the weights can be scaled as needed. In this example, use of the WTSCALE= ECLUSTER (sum to effective sample size) and BWTSCALE = SAMPLE (product of the within weights and the between weights sum to sample size) options are demonstrated to scale the level weights as needed. This approach is comparable to the Stata gllamm command and provides nearly exact results (slightly different due to variable division/rounding).

Some of the fine points of this approach are use of a unique cluster variable with a different value for each person in the data set, setting any missing data on the weights to zero, dividing the total assets variable expressed in \$1000 by 100 to accommodate the Mplus output limits (multiply by 100 to convert to scale presented in ASDA), use of TYPE=COMPLEX TWOLEVEL RANDOM and ESTIMATOR=MLR on the ANALYSIS command, and the declaration of within/between weights. On the MODEL statement, use of the %WITHIN% and %BETWEEN% commands are used to specify the level specific models.

Data preparation in advance of Mplus included extraction of the variables of interest and output to a delimited text file. For additional help and detail, see the Mplus User's Guide.

Mplus VERSION 5

MUTHEN & MUTHEN

INPUT INSTRUCTIONS

Title: ANALYSIS EXAMPLE 12.0 LONGITUDINAL DATA EXAMPLE HRS 2000-2006 DATA

Data:

FILE IS "F:\brahms\applied_analysis_book\Mplus\testmplus_v3.txt";

Variable:

NAMES ARE yrssince00 totassets000 newsecu hhidpn baseweight l1weight ;

Missing are . ;

weight = l1weight ;

wtscale= ecluster ;

bweight = baseweight ;

bwtscale = sample ;

usevar = yrssince00 n_tasset ;

between= ;

within = yrssince00 ;

cluster = newsecu hhidpn ;

Define:

n_tasset = totassets000/100 ;

Analysis:

type is twolevel random complex ;

estimator=mlr ;

Model:

%within%

n_tasset on yrssince00 ;

%between%

n_tasset ;

*** WARNING

Variable name contains more than 8 characters.

Only the first 8 characters will be printed in the output.

Variable: YRSSINCE00

*** WARNING

Variable name contains more than 8 characters.

Only the first 8 characters will be printed in the output.

Variable: TOTASSETS000

*** WARNING

Variable name contains more than 8 characters.

Only the first 8 characters will be printed in the output.

Variable: BASEWEIGHT

*** WARNING

Data set contains cases with missing on all variables except
x-variables. These cases were not included in the analysis.

Number of cases with missing on all variables except x-variables: 124

4 WARNING(S) FOUND IN THE INPUT INSTRUCTIONS

ANALYSIS EXAMPLE 12.0 LONGITUDINAL DATA EXAMPLE HRS 2000-2006 DATA

SUMMARY OF ANALYSIS

Number of groups 1

Number of observations 6840

Number of dependent variables 1

Number of independent variables 1

Number of continuous latent variables 0

Observed dependent variables

Continuous

N_TASSET

Observed independent variables

YRSSINCE

Variables with special functions

Cluster variable NEWSECU HHIDPN

Weight variable (effective cluster-size scaling)

L1WEIGHT

Between weight variable (sample-size scaling)

BASEWEIG

Within variables

YRSSINCE

Estimator	MLR
Information matrix	OBSERVED
Maximum number of iterations	1000
Convergence criterion	0.100D-05
Maximum number of EM iterations	500
Convergence criteria for the EM algorithm	
Loglikelihood change	0.100D-02
Relative loglikelihood change	0.100D-05
Derivative	0.100D-02
Minimum variance	0.100D-03
Maximum number of steepest descent iterations	20
Maximum number of iterations for H1	2000
Convergence criterion for H1	0.100D-03
Optimization algorithm	EMA

Input data file(s)

F:\brahms\applied_analysis_book\Mplus\testmplus_v3.txt

Input data format FREE

SUMMARY OF DATA

 Number of missing data patterns 1

COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value 0.100

PROPORTION OF DATA PRESENT

 Covariance Coverage

	N_TASSET	YRSSINCE
N_TASSET	1.000	
YRSSINCE	1.000	1.000

THE MODEL ESTIMATION TERMINATED NORMALLY

TESTS OF MODEL FIT

Chi-Square Test of Model Fit

Value	0.002*
Degrees of Freedom	0
P-Value	0.0000
Scaling Correction Factor	1.000
for MLR	

* The chi-square value for MLM, MLMV, MLR, ULSMV, WLSM and WLSMV cannot be used for chi-square difference tests. MLM, MLR and WLSM chi-square difference testing is described in the Mplus Technical Appendices at www.statmodel.com. See chi-square difference testing in the index of the Mplus User's Guide.

Chi-Square Test of Model Fit for the Baseline Model

Value	10.538
Degrees of Freedom	1
P-Value	0.0012

CFI/TLI

CFI	1.000
TLI	1.000

Loglikelihood

H0 Value	-31768.011
H0 Scaling Correction Factor	100.064
for MLR	
H1 Value	-31768.010
H1 Scaling Correction Factor	100.064
for MLR	

Information Criteria

Number of Free Parameters	4
Akaike (AIC)	63544.022
Bayesian (BIC)	63571.344
Sample-Size Adjusted BIC	63558.633

$$(n^* = (n + 2) / 24)$$

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.000
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SRMR (Standardized Root Mean Square Residual)

Value for Within	0.000
Value for Between	0.000

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
N_TASSET ON				
YRSSINCE00	0.813	0.130	6.258	0.000
Residual Variances				
N_TASSET	440.268	146.438	3.007	0.003
Between Level				
Means				
N_TASSET	7.435	0.790	9.413	0.000
Variances				
N_TASSET	351.063	152.408	2.303	0.021

QUALITY OF NUMERICAL RESULTS

Condition Number for the Information Matrix	0.449E-01
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(ratio of smallest to largest eigenvalue)