



Estimating asymptotic variances and covariances, MA = PM

This is the third of three examples illustrating how to obtain estimates of asymptotic variances and covariances of the estimated variances, covariances, or correlations between the variables. They are based on generated data consisting of 200 cases on five variables, where the first two variables are continuous and the last three are ordinal. Variables 3, 4, and 5 have 2, 3, and 4 categories, respectively. The data were generated from a population in which all variances were 1.0 and all intercorrelations were 0.5. The files **ACOV.CM6**, **ACOV.KM6**, and **ACOV.PM6** used in the examples are files where the asymptotic covariance matrices are stored. These can be read directly by LISREL and used with the WLS option. (see **EX6C.PRL**)

EXAMPLE 6C: TESTING ASYMPTOTIC VARIANCES AND COVARIANCES MA=PM
 DA NI=5;RA FI=DATA.EX6;CO 1 2;OU MA=PM BT SA=ACOV.PM6 PA

In this example, we use the PM specification to estimate polychoric and polyserial correlations between the variables, and the asymptotic variances and covariances of these. We give only the parts of the output that differ from the previous two examples.

Bivariate Distributions for Ordinal Variables (Frequencies)

VAR 3	VAR 4			VAR 5			
	1	2	3	1	2	3	4
1	33	38	17	30	28	16	14
2	13	36	63	12	15	35	50

VAR 4	VAR 5			
	1	2	3	4
1	21	11	8	6
2	13	25	21	15
3	8	7	22	43

Bivariate Summary Statistics for Pairs of Variables
 (The First Variable is Ordinal and the Second is Continuous)

VAR 3 vs. VAR 1				
Category	Number of Observations	Mean	Standard Deviation	
1	88	-0.379	0.892	
2	112	0.448	1.010	

VAR 3 vs. VAR 2				
Category	Number of Observations	Mean	Standard Deviation	
1	88	-0.433	0.872	
2	112	0.358	0.986	

VAR 4 vs. VAR 1				
Category	Number of Observations	Mean	Standard Deviation	
1	46	-0.652	1.071	
2	74	0.072	0.854	
3	80	0.518	0.950	

VAR 4 vs. VAR 2				
Category	Number of Observations	Mean	Standard Deviation	
1	46	-0.594	0.928	
2	74	0.010	0.950	
3	80	0.357	0.967	

VAR 5 vs. VAR 1				
Category	Number of Observations	Mean	Standard Deviation	
1	42	-0.621	0.942	
2	43	-0.280	0.929	
3	51	0.297	0.856	
4	64	0.621	0.971	

VAR 5 vs.	VAR 2			
Category	Number of Observations	Mean	Standard Deviation	
1	42	-0.571	0.826	
2	43	-0.328	1.069	
3	51	0.001	0.706	
4	64	0.625	0.982	

Correlations and Test Statistics

(PE=Pearson Product Moment, PC=Polychoric, PS=Polyserial)

Variable vs. Variable	Correlation	Test of Model			Test of Close Fit	
		Chi-Squ.	D.F.	P-Value	RMSEA	P-Value
VAR 2 vs. VAR 1	0.471 (PE)					
VAR 3 vs. VAR 1	0.500 (PS)	1.306	1	0.253	0.039	0.612
VAR 3 vs. VAR 2	0.491 (PS)	1.273	1	0.259	0.037	0.618
VAR 4 vs. VAR 1	0.481 (PS)	3.726	3	0.293	0.035	0.840
VAR 4 vs. VAR 2	0.395 (PS)	1.224	3	0.747	0.000	0.976
VAR 4 vs. VAR 3	0.544 (PC)	0.409	1	0.522	0.000	0.801
VAR 5 vs. VAR 1	0.502 (PS)	2.595	5	0.762	0.000	0.993
VAR 5 vs. VAR 2	0.492 (PS)	11.051	5	0.050	0.078	0.679
VAR 5 vs. VAR 3	0.531 (PC)	3.661	2	0.160	0.064	0.639
VAR 5 vs. VAR 4	0.532 (PC)	7.096	5	0.214	0.046	0.885

Correlation Matrix

	VAR 1	VAR 2	VAR 3	VAR 4	VAR 5
VAR 1	1.000				
VAR 2	0.471	1.000			
VAR 3	0.500	0.491	1.000		
VAR 4	0.481	0.395	0.544	1.000	
VAR 5	0.502	0.492	0.531	0.532	1.000

Asymptotic Covariance Matrix of Correlations

	R(2,1)	R(3,1)	R(3,2)	R(4,1)	R(4,2)	R(4,3)
R(2,1)	0.00765					
R(3,1)	0.00229	0.00346				
R(3,2)	0.00206	0.00155	0.00341			
R(4,1)	0.00379	0.00215	0.00127	0.00878		
R(4,2)	0.00385	0.00105	0.00193	0.00338	0.00671	
R(4,3)	0.00061	0.00132	0.00091	0.00132	0.00122	0.00593
R(5,1)	0.00316	0.00210	0.00059	0.00470	0.00164	0.00011
R(5,2)	0.00394	0.00100	0.00184	0.00181	0.00360	0.00041
R(5,3)	0.00046	0.00155	0.00120	0.00027	0.00029	0.00214
R(5,4)	0.00087	0.00031	0.00029	0.00191	0.00150	0.00118

Asymptotic Covariance Matrix of Correlations

	R(5,1)	R(5,2)	R(5,3)	R(5,4)
R(5,1)	0.00982			
R(5,2)	0.00316	0.00880		
R(5,3)	0.00086	0.00119	0.00578	
R(5,4)	0.00193	0.00152	0.00084	0.00480

All polychoric and polyserial correlations are closer to the true value 0.5 than were the corresponding product-moment correlations in the previous example.

The product-moment correlation (2,1) has a smaller variance than the polychoric correlations (4,3), (5,3), and (5,4) which in turn have smaller variances than the polyserial correlations. Note that the variances of the polychoric and polyserial correlations tend to get smaller as the number of categories increases.