Structural equation modeling analyse

Science, Statistics

Analysis of SEM Analysis of SEM The Bootstrapping approach uses one figure with 2 models where the exogenous variable (error) and population path value (factor) variances are shown by adjacent letters in the Free State and adjacent numbers is the fixed state. Model 1 with free factor variance is shown on the left side. Factor scale indicator is represented by the first variable measured. Model 2 (shown on the right side) is characterized by a constrained factor variance to unity and a situation where there is free variance of entire indicator paths.

Similar to normal regression, it is important to determine if the DV (dependent variable) regresses on the IV (independent variable). That is, the dependent variable should be predicted by the independent variable. Model 1 covariance results show the following relationship:

or

The relationship fits the theory that the exogenous variable and the endogenous variables regress on the same notation.

With the covariance expression and the derived value of a, a manual approach to the equation system gives the confirmatory and exploratory factor analysis model or structural part. The resulting equation shows the possible causal dependent factors between the exogenous and endogenous variables.

a=(ab)(ac)/(abc)=(7. 560)(30. 660)/(55. 188)= 4. 2

Other parameters yielded for the remaining parameter approximations include 1. 8= b, 7. 3= c, 9. 8= d, 1. 6= e, and 4. 7= f.

The bootstrapped samples in Model 1 indicates a possible trend of multivariate function for the fit as the parameter value approaches zero.

There is also the possibility of deriving sample distributions for parameter estimates from the entire samples bootstrapped.

In Model 2, factor variance is fixed to a uniform value while the loading factors have been left to vary freely. The resulting covariance matrix is indicated below:

In the analysis of the covariance matrix indicated in the diagram above, deriving the solution for g considers the use of g2. The arising systematic equations during the setting of corresponding elements for sample covariance gives the following results:

g2=(gh)(gi)/(hi)=(7. 560)(30. 660)/(55. 188)= 4. 2

The equation above gives either a positive, or negative value. There are no any other equation that can provide the sign choice given for the resulting parameters of the covariance matrix functions. By using the square root of the value of g2, g will approximately be 2. 05. Plugging the new value of g systematically into the equation, the resulting equation sets of parameter approximations are:

m= 4. 72, k= 1, 59, j= 9. 80, i= 14. 96, and h= 3. 69 (note that these are approximately values of the sample parameters)

Consequently, choosing negative values to represent the square root of g gives -2. 05. The remaining estimates for the parameters becomes:

m= 4. 72, k= 1. 59, j= 9. 80, i=-14. 96, h=-3. 69.

The parameter estimates above indicate aspects of similarity in the error estimates of variances of m, k, and j, whereas their loading values have opposite signs.

Looking at the 2 models, bootstrapped samples of Model 2 possess the capacity to yield the two solution types requires for parameter estimates. That is, the loading signs are different. Generally, relative frequency of both solutions are determined by factors such as start values of SEM software, covariance sign, covariance strength, score distribution shape of parent sample, and sample size. Estimates for the loading parameter should be bimodal since there is the presence of 2 global minima for their multivariate fit functionality.

Reference

Hancock, G., R., & Nevitt, J. (1999). Bootstrapping and the identification of exogenous latent variables within structural equation models. Retrieved May 27, 2014 from http://www. education. umd. edu/EDMS/fac/Hancock/writings/Hancock&Nevitt1999. pdf