

Error variance - $var(\delta)$ - Estimation

Structural Equation modeling (SEM) can estimate parameters if sufficient degrees of freedom exist. From SEM (Bollen, 1989) is known that in Figure 4 for TTPIM model, the variance for each observed variable is as follows (notation according Figure 4):

$$var(TTPIM_i) = var(\delta_i) + \lambda^2 * var(Time_i) \quad \text{where } i = \text{TV, Radio, Newspaper}$$

Our interest is to compute $var(\delta_i)$ for each medium and summing up in order to obtain $var(\delta)$; where $var(TTPIM_i)$ is the variance in the total time spent in political issues in the medium 'i'. Then, $var(\delta_i) = var(TTPIM_i) - \lambda^2 * var(Time_i)$ where λ^2 is the quality for a specific medium in the SB-MTMM.

Deriving the equations we obtain: $var(\delta_i) = var(TTPIM_i) - var(TTPIM_i) * \lambda^2 = (1 - \lambda^2) * var(TTPIM_i)$; where λ is known from the SB-MTMM quality shown in Table A.4, and $var(TTPIM_i)$ is also known because it is the variance of the observed variable for each medium.

Finally, we obtain $var(\delta_{TV}) + var(\delta_{Radio}) + var(\delta_{Newspaper}) = var(\delta)$ for each country.