

Within-model.

$$\begin{bmatrix} y_{1,t}^w \\ y_{2,t}^w \end{bmatrix} = \begin{bmatrix} \phi_{11(1)} & \phi_{11(2)} & \phi_{12(1)} & \phi_{12(2)} \\ \phi_{21(1)} & \phi_{21(2)} & \phi_{22(1)} & \phi_{22(2)} \end{bmatrix} \begin{bmatrix} y_{1,t-1}^w \\ y_{1,t-2}^w \\ y_{2,t-1}^w \\ y_{2,t-2}^w \end{bmatrix} + \begin{bmatrix} \zeta_{y,1,t} \\ \zeta_{y,2,t} \end{bmatrix},$$

with  $\zeta_{y,i} \sim MVN(\mathbf{0}, \mathbf{\Psi})$