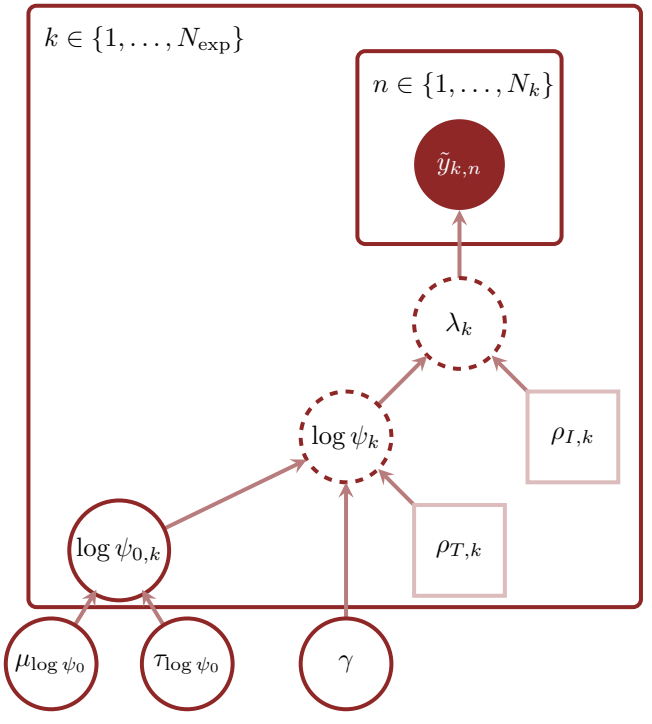

$$\tilde{y}_{k,n} \sim \text{Poisson}(\lambda_k)$$

$$\lambda_k = \exp(\log \psi_k) \cdot \rho_{I,k}$$

$$\log \psi_k = \log \psi_{0,k} + \gamma \cdot \rho_{T,k}$$

$$\log \psi_{0,k} \sim \text{normal}(\mu_{\log \psi_0}, \tau_{\log \psi_0})$$

$$\mu_{\log \psi_0} \sim \text{normal}(0, \log 2)$$

$$\tau_{\log \psi_0} \sim \text{half-normal}(0, \tfrac{\log 2}{2})$$

$$\gamma \sim \text{normal}(1.25, 0.25)$$