

$$\mathbf{V}_i \mid \mathbf{k}, \mathbf{Z}, \mathbf{w}_i, \mathbf{B}, \sigma_\epsilon^2 \sim \mathcal{N}_S(\mathbf{B}_i + \mathbf{Q}(\mathbf{k}) \mathbf{Z} \mathbf{w}_i, \sigma_\epsilon^2 \mathbf{I}_S), \quad \text{for } i = 1, \dots, n$$

$$[\mathbf{B}, \sigma_\epsilon^2] \propto \frac{1}{\sigma_\epsilon^2}$$

$$\mathbf{w}_i \sim \mathcal{N}_r(\mathbf{0}, \mathbf{I}_r)$$

$$k_l | \mathbf{p} \overset{\text{iid}}{\sim} \sum_{j=1}^N p_j \delta_j(k_l), \quad \text{for } l = 1, \dots, S$$

$$\mathbf{Z}_j \mid \mathbf{D}_z \overset{\text{iid}}{\sim} \mathcal{N}_r(\mathbf{0}, \mathbf{D}_z), \quad \text{for } j = 1, \dots, N$$

$$\mathbf{p} \sim \mathcal{GD}_N(a_\alpha, b_\alpha)$$

$$\mathbf{D}_z \sim \mathcal{IW}(2+r-1, 4\text{diag}(\frac{1}{\eta_1}, \dots, \frac{1}{\eta_r}))$$

$$\eta_h \sim \mathcal{IG}(\frac{1}{2}, \frac{1}{10^4}), \quad \text{for } h = 1, \dots, r$$

(1)