$$\log Q_{ij} = \beta_0 + \beta_1 \log P_{ij} + \beta_2 D_{ij} + \beta_3 \log P_{ij} \times D_{ij} + \varepsilon_{ij}$$

For store i in 1:88 :

$$\beta_0 \sim N(\mu_0, \tau_0^2)$$

$$\beta_1 \sim N(\mu_1, \tau_1^2)$$

$$\beta_2 \sim N(\mu_2, \tau_2^2)$$

$$\beta_3 \sim N(\mu_3, \tau_3^2)$$

Sample $\beta_0, \beta_1, \beta_2, \beta_3$ from these Normals

$$\mu_0 \sim N(m_0, v_0)$$

$$\mu_1 \sim N(m_1, v_1)$$

$$\mu_2 \sim N(m_2, v_2)$$

$$\mu_3 \sim N(m_3, v_3)$$

Large v_i's

Full Conditional posteriors.

$$\tau_0^2 \sim \mathrm{InvGa}(a_0, b_0)$$

$$\tau_1^2 \sim \mathrm{InvGa}(a_1, b_1)$$

$$\tau_2^2 \sim \mathrm{InvGa}(a_2, b_2)$$

$$\tau_3^2 \sim \mathrm{InvGa}(a_3, b_3)$$

$$y_i \sim N(X\beta_i, \sigma^2 I_{n_i})$$

$$\beta_i \sim N(\underline{\mu}, \mathrm{diag}(\tau_1^2, \tau_2^2, \tau_3^2, \tau_4^2))$$

$$\underline{\mu} \sim N(\underline{m}, \mathrm{diag}(v_0, v_1, v_2, v_3))$$

$$\tau_k^2 \sim \mathrm{InvGa}(a_k, b_k), \quad k = 0,1,2,3$$