SSVS in Probit Regression

- Data augmentation Gibbs sampler described earlier easily adapted
- Sample from conditional posterior of β_j, for $j = 1, \ldots, p$:

$$\pi(\beta_j \,|\, \boldsymbol{\beta}_{(-j)}, \mathbf{z}, \mathbf{y}, \mathbf{X}) = \widehat{p}_j \delta_0(\beta_j) + (1 - \widehat{p}_{0j}) N(\beta_j; E_j, V_j),$$

$V_j = (c_j^{-2} + \mathbf{X}_j' \mathbf{X}_j)^{-1}$, $E_j = V_j \mathbf{X}_j' (\mathbf{z} - \mathbf{X}_{(-j)} \boldsymbol{\beta}_{(-j)})$, $\mathbf{X}_j$=jth column of $\mathbf{X}$, $\mathbf{X}_{(-j)}$=$\mathbf{X}$ with jth column excluded, $\boldsymbol{\beta}_{(-j)} = \boldsymbol{\beta}$ with jth element excluded, &

$$\widehat{p}_j = \frac{p_{0j}}{p_{0j} + (1 - p_{0j}) \frac{N(0;0,c_j^2)}{N(0;E_j,V_j)}}$$

is the conditional probability of $\beta_j = 0$ (jth predictor excluded)