

$$p_{\text{ctrl}} = \frac{1 - b^{\text{main}}}{2}$$

$$p_{\text{case}} = \frac{1 + b^{\text{main}}}{2}$$

For each  $a \in \mathcal{A}$

For each  $i = 1, \dots, m_{\text{ctrl}}$

$X_{ia}^{\text{ctrl}} \sim \mathcal{B}(n = 2, p_{\text{ctrl}})$

For each  $a \in \mathcal{A}$

For each  $i = 1, \dots, m_{\text{case}}$

$X_{ia}^{\text{case}} \sim \mathcal{B}(n = 2, p_{\text{case}})$

$$X^{\text{main}} = \begin{bmatrix} X^{\text{ctrl}} \\ \hline X^{\text{case}} \end{bmatrix}$$