

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

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

For  $a = 1, 2, 3$   
 For each  $i = 1, \dots, m_{\text{ctrl}}$   
 $X_{ia}^{\text{ctrl}} \sim \mathcal{B}(n = 2, p_{\text{ctrl}})$

For  $a = 1, 2, 3$   
 For each  $i = 1, \dots, m_{\text{case}}$   
 $X_{ia}^{\text{case}} \sim \mathcal{B}(n = 2, p_{\text{case}})$

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