

$$X^{\text{main}} = (BY)^{\top} + E$$

$$X^{\text{main}} = \begin{bmatrix} b_1 & b_2 & b_3 \\ b_1 & b_2 & b_3 \\ \vdots & \vdots & \vdots \\ b_1 & b_2 & b_3 \\ \text{---} & \text{---} & \text{---} \\ & & \mathbf{0} \end{bmatrix} + E$$

$$Y = [\overbrace{1, 1, \dots, 1}, \overbrace{0, 0, \dots, 0}]$$

$$B^{\top} = [b_1, b_2, b_3]$$

$$b_1, b_2, b_3 \sim \mathcal{N}(0, b^{\text{main}})$$

$$\varepsilon_{ij} \sim \mathcal{N}(0, 1)$$