

⑤

• Vector y : observations

• Vector $\beta = \begin{bmatrix} \text{herd}_1 \\ \text{herd}_2 \end{bmatrix}$

• vector $u = \begin{bmatrix} u_1 \\ \vdots \\ u_q \end{bmatrix}$

• vector $e = \begin{bmatrix} e_1 \\ \vdots \\ e_N \end{bmatrix}$

• Matrices X and Z : design matrices

• Model : $y = X\beta + Zu + e$

$$\begin{array}{c} y \\ \rightarrow \begin{bmatrix} 2.61 \\ 2.31 \\ \vdots \\ 1 \\ \rightarrow 3.16 \end{bmatrix} \end{array} = \begin{array}{c} X \\ \begin{bmatrix} 1 & 0 \\ 1 & 0 \\ 1 & 0 \\ 1 & 0 \\ 0 & 1 \\ 0 & 1 \\ 0 & 1 \\ 0 & 1 \\ 0 & 1 \\ 0 & 1 \end{bmatrix} \end{array} \begin{array}{c} \beta \\ \begin{bmatrix} \text{herd}_1 \\ \text{herd}_2 \end{bmatrix} \end{array} + \begin{array}{c} Z \\ \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 1 & 1 \\ 1 & 1 \\ 1 & 1 \\ 1 & 1 \end{bmatrix} \end{array} \begin{array}{c} u \\ \begin{bmatrix} u_1 \\ u_2 \end{bmatrix} \end{array} + e$$