

$$\begin{aligned}
 & P(\hat{\theta}_1, \hat{\theta}_2 \dots \hat{\theta}_k) \overset{r_1, r_2 \dots}{\rightsquigarrow} P\left(\begin{array}{c} \hat{\theta}_1 \geq \hat{\theta}_2 \\ \hat{\theta}_1 \geq \hat{\theta}_3 \\ \vdots \\ \hat{\theta}_1 \geq \hat{\theta}_k \end{array} \right) \\
 & \text{Var}(\hat{\theta}_1) \quad \text{Var}(\hat{\theta}_2) \\
 & a_1 \text{ is Opt. act.} \iff \underbrace{\left(\hat{\theta}_1 \geq \hat{\theta}_k \right)}_{\downarrow} \\
 & \quad \quad \quad =: \pi(a_1)
 \end{aligned}$$

$$\begin{aligned}
 & \text{Prob}(\text{Error in Selecting Opt. act}) \\
 & = \pi(a_1)[1 - \hat{\pi}(a_1)] + \pi(a_2)[1 - \hat{\pi}(a_2)] + \dots
 \end{aligned}$$