

$$\mathbb{E}[m] \lesssim \frac{\sum_{m=0}^M m e^{-K_u m} + \sum_{m=0}^M m e^{\delta - K_u n}}{\sum_{m=0}^k e^{-K_l m} + \sum_{m=k+1}^M e^{\delta - K_l n}}$$

$$\mathbb{E}[m^2] \lesssim \frac{\sum_{m=0}^M m^2 e^{-K_u m} + \sum_{m=0}^M m^2 e^{\delta - K_u n}}{\sum_{m=0}^k e^{-K_l m} + \sum_{m=k+1}^M e^{\delta - K_l n}}$$