Bias and Variance

- Local Constant Estimator (Racine and Li, 2004)

$$\text{Bias}[\hat{m}(x)] \approx \frac{K_2(k(\cdot))}{2} \sum_{d=1}^{q_c} h_d^2 \left[2 \frac{\partial m(x)}{\partial x_d^c} \frac{\partial f(x)}{\partial x_d^c} \frac{1}{f(x)} + \frac{\partial^2 m(x)}{\partial x_d^{c2}} \right] + O\left(\sum_{d=1}^{q} \lambda_d\right)$$

$q_u + q_o = q$

$$= O\left(\sum_{d=1}^{q_c} h_d^2\right)$$

$$\text{Var}(\hat{m}(x)) \approx \frac{\sigma^2 R(k(\cdot))^{q_c}}{n|h| f(x)}$$

- Local Linear Estimator (Li and Racine, 2004)

$$\text{Bias}[\hat{m}(x)] \approx \frac{K_2(k(\cdot))}{2} \sum_{d=1}^{q_c} h_d^2 \frac{\partial^2 m(x)}{\partial x_d^{c2}} + O\left(\sum_{d=1}^{q} \lambda_d\right)$$

- $\text{Var}(\hat{m}(x)) \approx$ ——— same as LC.