

PS2–Q4. Comparison of three estimators

for the slope in a simple regression

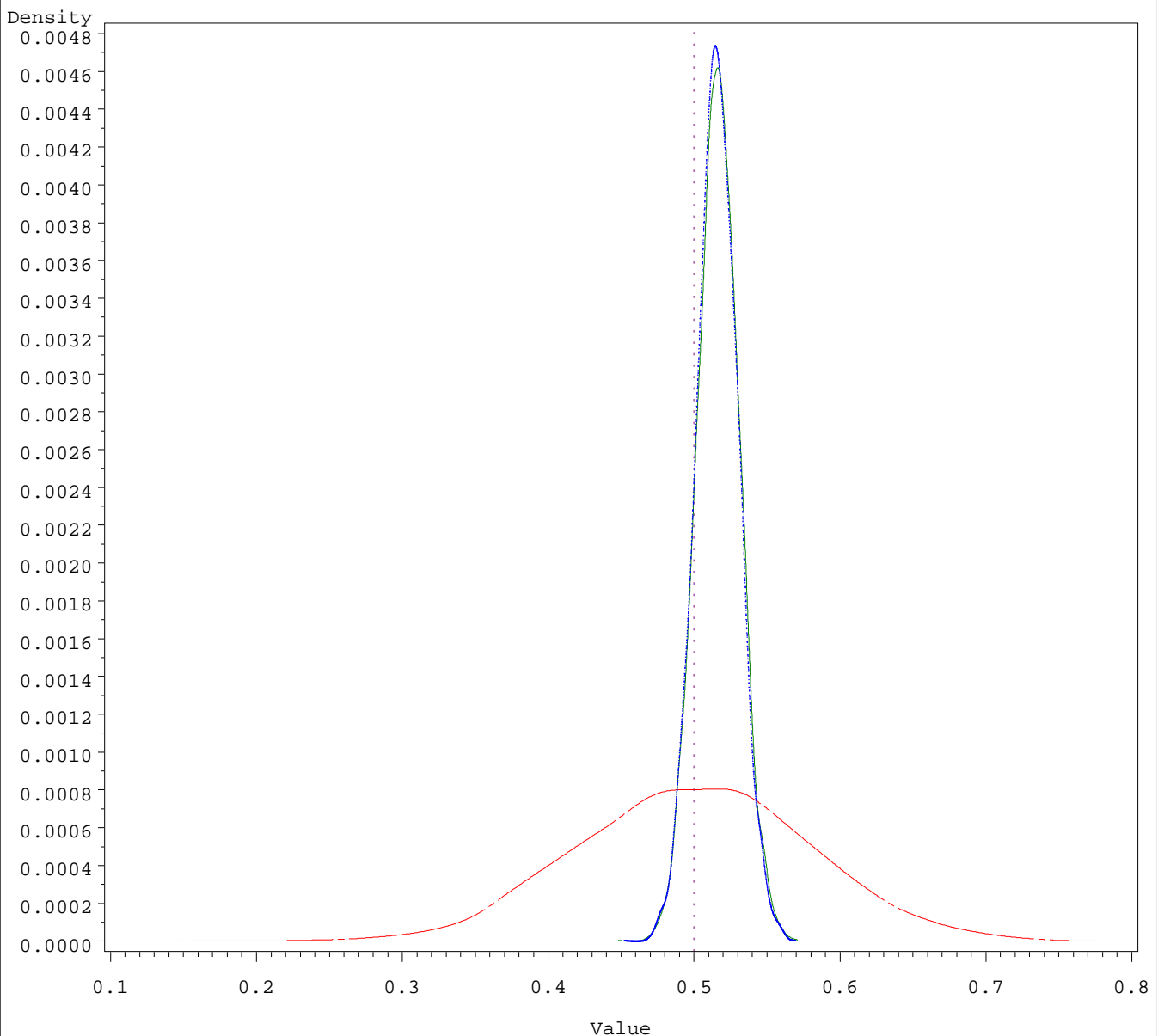
$b_1 = \bar{Y}/\bar{X}$ in green

$b_2 = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sum(X - \bar{X})(X - \bar{X})}$ in red

$b_3 = \frac{\sum(XY)}{\sum(XX)}$ in blue

$Y_i = \beta_1 + \beta_2 X_i + \sigma U_i$ with $U_i \text{ iid } N(0,1)$

$X_i = 21 \dots 40$ $\beta_1 = 0.5$ $\beta_2 = 0.5$ $\sigma = 2$



Recall if $\beta_1 = 0$, b_3 good OLS in blue is BLUE

The number of simulations is 6000

RMSE1=0.021891 RMSE2=0.079035 RMSE3=0.021308