HW6 Patrick Neyland

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## Question 1

end of recording on 10/11 ### Part i is unbiased. Expected value of theta hat is equal to theta hat. theta hat is equal to beta hat 1 + beta hat 2 E(theta hat) = E(beta hat 1 +beta hat 2) = E(beta hat 1) E(beta hat 2) = beta 1 + beta 2 = theta

### Part ii

going from cov to corr Define unbiasedness

### Part ii

## Question 2

The bias will be negative because I think avg ability will be positive and the correlation between variables is negative.

## Question 3

### Part i

Model 1 has df of 351 Model 2 has df of 350 Because SER is controlling for RBIS. less variance in sigma squared

### Part ii

Yeah, it makes sense. While having a little more experience can help someone have more RBIs, However

Variance inflation factor VIF\_year = 1/(1-R^2\_year) Cor(yr,rbiyr) = 0.487 R^2 = [Cor(yr,rbiyr)]^2 R^2 = 0.487^2 VIF\_year = 1/(1-0.237)

1/(1-0.237)

## [1] 1.310616

### Part iii

Because the signma squared are different.

Square the SER to get Sigma^2

Because we are transition from the

## Question 5

### Part i

model5\_1 <- lm(math4 ~ pctsgle, data = meapsingle)  
stargazer(model5\_1, type = "text")

##   
## ===============================================  
## Dependent variable:   
## ---------------------------  
## math4   
## -----------------------------------------------  
## pctsgle -0.833\*\*\*   
## (0.071)   
##   
## Constant 96.770\*\*\*   
## (1.597)   
##   
## -----------------------------------------------  
## Observations 229   
## R2 0.380   
## Adjusted R2 0.377   
## Residual Std. Error 12.480 (df = 227)   
## F Statistic 138.853\*\*\* (df = 1; 227)   
## ===============================================  
## Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The effect of single parenthood seems large.

### Part ii

model5\_2 <- lm(math4 ~ pctsgle + lmedinc + free, data = meapsingle)  
stargazer(model5\_2, type = "text")

##   
## ===============================================  
## Dependent variable:   
## ---------------------------  
## math4   
## -----------------------------------------------  
## pctsgle -0.200   
## (0.159)   
##   
## lmedinc 3.560   
## (5.042)   
##   
## free -0.396\*\*\*   
## (0.070)   
##   
## Constant 51.723   
## (58.478)   
##   
## -----------------------------------------------  
## Observations 229   
## R2 0.460   
## Adjusted R2 0.453   
## Residual Std. Error 11.696 (df = 225)   
## F Statistic 63.848\*\*\* (df = 3; 225)   
## ===============================================  
## Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

It decreases significantly because other important variables are being controlled for. It seems that free lunch is a much better indicator of math scores.

### Part iii

cor(meapsingle$lmedinc,meapsingle$free)

## [1] -0.7469703

The sample correlation between and is -0.747