Assignment 3

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Chapter 2

Q1:) (i) There are so many factors that affect the number of children ever born to a woman; including age, income, etc. Also, yes, it is correlated with level of education. People who have higher education are likely to be old. #

(ii) SLR4 fails, due to u is correlated with educ. #

Q4:) (i) $\widehat{bwight} = 119.77 - 0.514(0) = 119.77$

$\widehat{bwight} = 119.77 - 0.514(20) = 109.49$

The effect of smoking on additional 20 cigarettes will cause an estimated 10.28 ounce.

→ (119.77 − 109.49) decrease in the infant birth weight.

(ii) As the amount of cigarettes is the independent variable and the infant weight is dependent, it shows that there is a casual effect. However, there are other factors to be considered as well, such as genetics or parent's weight. Moreover, smoking habits can partially explain baby's weight.

(iii) → $125 = 119.77 - 0.514\,cigs$

$cigs = -10.175097$, which is not possible. The highest possible weight according to the model would be its β_0 or intercept, which is 119.77 ounces.

(iv) In order to get a true sample, we should gain more data from more smokers. This will make our regression less limited and more accurate. We need more sample variation of X (SLR3). This is because 85% of the sample smoke cig. = 0. According to the rule of SLR2, the more sample is better. Hence, we can improve our regression function, so it is not as limited & will give us inaccurate data. #

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Q1:) (i) Yes, it does make sense because if you are top of the class, the 'hsperc' will be low, and top class usually get high 'colgpa'. Hence, the coefficient is negative #

(ii) $\widehat{colgpa} = 1.392 - .0135(20) + .00148(1,050)$

$= 1.392 - .27 + 1.554$

$= 2.676$ #

(iii) $\widehat{colgp} = 1.392 - .0135\ hsperc + .00148\ sat$

→ Thus, increasing in SAT score for 1 mark will make the value of Colgpa changes for .00148

→ $\frac{\partial \widehat{colgpa}}{\partial sat} = .00148$

→ A is predicted to have a score of .207 = (140)(.00148) higher.

It is quite large if we consider the standard deviation. #

(iv) $.5 = .00148(sat)$

$sat = \frac{.5}{.00148} = 337.837838$ #

→ We know that about 337.837838 in SAT score will make difference in .5 of a grade point #

Q2:) (i) Yes, the higher the number of year, the lower the year of schooling. This is because of the budget constraint. To hold other things constant,

→ $\Delta z = -.094 sibs$

→ sibs = 10.638 to reduce predicted years of education

(ii) If mother's years of schooling increase by 1, the predicted year of school would increase by .131 #

(iii) Man A predicted year of education

$= 10.36 - .094(0) + .131(2) + .210(12)$

$= 10.36 + 1.572 + 2.52 = 14.452$ #

Man B predicted year of education

$= 10.36 - .094(0) + .131(16) + .210(16)$

$= 10.36 + 2.096 + 3.36 = 15.816$

∴ The predicted different is 1.364 #