

EE325: Assignment 3

1.) i) u is the error terms of the observation, let's say that age are contained in u and correlated with education. So this equation cannot be BLUE as violating SLR4 $E(u|x_i) = 0$ which is not be true in this equation.

ii) Ceteris paribus is holding other thing constant, only education cannot explain well about the fertility.

4.) i.) $\widehat{\text{bwght}} = 119.77 - 0.514(10) = 119.77$

$\text{swght} = 119.77 - 0.514(10) = 109.49$

The effect of smoking an additional 20 cigarettes will cause an estimated $(119.77 - 109.49)$ decrease in the birth weight.

ii.) As the amount of cigarettes is independent variable and the infant weight is dependent, it implies that there is a causal effect. However, there are other factor to be considered as well like genetics or parent's weight. Smoking habits can partially explain a baby's weight.

iii.) $125 = 119.77 - 0.514 \text{ cigs}$

$\text{cigs} = -10.175$, which is not possible. The highest possible weight.

iv.) To get an accurate sample, we should consider more smokers to get more data points which will make our regression less limited and more accurate. We need more sample variation in the explanatory variable or SLR3 (b/c r^2). of the sample smoker $\text{cigs} = 0$. In addition, SLR2 means we need the sample to be a better representative. Thus, we can improve our regression du so it is not as limited and will give us possibly inaccurate data.

Chapter 3

Q₁ i.) Yes, it does make sense b/c if you are top of the class, the "hspere" will be low and top class usually get high 'colgpa'. Hence, the coefficient is negative.

$$\begin{aligned}\text{ii.) } \widehat{\text{colgpa}} &= 1.392 - 0.135(20) + 0.00149(1050) \\ &= 1.392 - 0.27 + 1.554 \\ &= 2.676\end{aligned}$$

$$\begin{aligned}\text{iii.) } \widehat{\text{colgpa}} &= 1.392 - 0.0135 \text{ hspere} + 0.00149 \text{ sat} \\ &\rightarrow \text{Thus, increasing in SAT score for 1 mark will raise the value of } \widehat{\text{colgpa}} \text{ change for } 0.00149 \\ &\rightarrow \frac{\partial \widehat{\text{colgpa}}}{\partial \text{sat}} = 0.00149\end{aligned}$$

$\Rightarrow$ A is predicted to have a score of $0.207 = (1407(0.00149))$ higher. It is quite large if we consider the std.

$$\begin{aligned}\text{iv.) } 0.5 &= 0.00149(\text{sat}) \\ \text{sat} &= 332.8379\end{aligned}$$

Q₂ i.) Yes, the higher number of year, the lower the year schooling. This is b/c of the budget constraint

$$\begin{aligned}&\rightarrow 10 - 0.094 \text{ sibs} \\ &\rightarrow \text{sibs} = 10.638 \text{ to reduce years of education}\end{aligned}$$

ii.) If mother yrs of schooling $\uparrow$ by 1, the predicted years of schooling would increase by 0.131

$$\begin{aligned}\text{iii.) Mean A predicted years of education} &= 10.36 - 0.094(60) + 0.131(67) + 0.210(11) \\ &= 10.36 - 5.64 + 8.777 + 2.31 = 15.807 \\ \text{Mean B predicted yrs of edu.} &= 10.36 - 0.094(61) + 0.131(11) + 0.210(11) \\ &= 15.916 \\ \therefore \text{Predicted difference is } 1364\end{aligned}$$