HED 612

Homework #9

**OLS Assumption 1 Questions**

1. Define OLS assumption 1 in words and state the assumption mathematically.

In words: The independent variable, , is unrelated to the “other variables” not included in the model,

Mathematically: ; the expected value of , given any value of , equals zero

1. Under what two conditions would a variable that is omitted from your regression model result in a violation of assumption 1? Is the assumption violated if only one of the two conditions is present or must both conditions be present for the assumption to be violated?
2. Z affects the value of Y (i.e., Z is part of
3. Z has a relationship with X (e.g., correlation)

**Program Evaluation Questions**

1. Create a program evaluation research question of your own choosing. The research question must take the form “What is the effect of X on Y” where X is a variable that could (in theory) be randomly assigned.

What is the effect of receiving a maximum amount pell grant on college completion within 6-years?

1. Write out the population linear regression model associated with this research question. You should have only one independent variable [though this independent variable could be a categorical variable with multiple categories (e.g., marital status)]

Y= College completion (0 =no, 1= Yes)

X= Received a max pell grant (0 =no, 1= Yes)

The change in probability of college completion for those receiving a max pell grant in comparison to those that do not receive a max pell grant.

1. Identify three variables that would result in a violation of OLS assumption 1. For each variable write once sentence why that variable might affect Y and write one sentence about why that variable might have a relationship (e.g., correlation) with X.
2. **Student’s Socioeconomic Status**
   1. *Z affects Y*: Socioeconomic status impacts college completion. From literature, we know higher socioeconomic students have a greater probability of completing college for various reasons, such as ability to pay for college, not having to work while attending college, social capital
   2. *Z has a relationship with X*: The amount of pell grant received is dependent on your financial need. Students with the greatest financial need are more likely to receive full pell grant amount.
3. **Type of higher education institution attended**
   1. *Z affects Y:* The type of higher education institution attended impacts college completion; some institutions have better resources to help students attain their degree and therefore have better college completion rates than others
   2. *Z has a relationship with X:* The amount of pell grant received is dependent on the cost of attendance at the higher education institution the student attends. Cost of attendance ranges dramatically based on institution type and students attending schools with larger cost of attendance are more likely to receive the full pell grant amount.
4. **Student/Time Status**
   1. *Z affects Y:* whether a student is a full-time or part-time student impacts their probability of completing their degree within 6-years. Full-time students are more likely to “complete on time to degree” than part-time students
   2. *Z has a relationship with X:* The amount of pell grant received is dependent on whether or not the student is full-time or part-time. Full-time students pay a larger cost of attendance than part-time students and thus are more likely to receive the full pell grant amount.