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PS4

Exercise 9.2

a) **Interpret the coefficient on voteA88 and discuss its statistical significance.**
   - **a.** When you increase the candidate's vote in 1998's 1% , their vote in 1990 increases by .067%
   - **b.** Not Statistically significant
     i. (.067 – 0)/.053 = 1.264
     ii. Small t-stat under 5% interval indicates that it is not statistically significant.

b) **Does adding voteA88 have much effect on the other coefficients?**
   a. It decreases them slightly.

Exercise 9.4

We are worried that is measured with error in our survey. Let tvhours denote the reported hours of television viewing per week.

1. **What do the classical errors-in-variables (CEV) assumptions require in this application?**
   a. CEVdoes not apply because it is used when there is a measurement error in x, not y.
2. **Do you think the CEV assumptions are likely to hold? Explain.**
   a. No because the variables could be correlated with the true x1.

Exercise 15.2

Suppose that you wish to estimate the effect of class attendance on student performance, as in Example 6.3. A basic model is

1. **Let dist be the distance from the students' living quarters to the lecture hall. Do you think dist is uncorrelated with u?**
   a. There is definitely correlation between dist and the error term.
2. **Assuming that dist and u are uncorrelated, what other assumption must dist satisfy to be a valid IV for atndrte?**
   a. Dist must be correlated with atndrte
3. **Suppose, as in equation (6.18), we add the interaction term priGPA·atndrte: If atndrte is correlated with u, then, in general, so is priGPA·atndrte. What might be a good IV for priGPA·atndrte? [Hint: If , as happens when priGPA, ACT, and dist are all exogenous, then any function of priGPA and dist is uncorrelated with u.]**
   a. priGPA time GPA may function as an instrumental variable.

Computer Exercise 9.C2

1. **Use the variable KWW (the "knowledge of the world of work" test score) as a proxy for ability in place of IQ in Example 9.3. What is the estimated return to education in this case?**
    a. .00913 % increase in wage with every year of education increase

2. **Now, use IQ and KWW together as proxy variables. What happens to the estimated return to education?**
    a. Within my estimate, it stays exactly the same.
3. **In part (ii), are IQ and KWW individually significant? Are they jointly significant?**
    a. They appear to be jointly significant.

Computer Exercise 15.C3

1. **The equation we estimated in Example 15.4 can be written as where the other explanatory variables are listed in Table 15.1. In order for IV to be consistent, the IV for educ, nearc4, must be uncorrelated with u. Could nearc4 be correlated with things in the error term, such as unobserved ability? Explain.**
    a. For IV to be consistent, edc and nearc4 will have to be uncorrelated with u.

2. **For a subsample of the men in the data set, an IQ score is available. Regress IQ on nearc4 to check whether average IQ scores vary by whether the man grew up near a four-year college. What do you conclude?**
    a. IQ score increases by 2.6 if you grow up near a 4 year college

3. **Now, regress IQ on nearc4, smsa66, and the 1966 regional dummy variables reg662, …, reg669. Are IQ and nearc4 related after the geographic dummy variables have been partialled out? Reconcile this with your findings from part (ii).**
    a. They are less related now. It is now a .348 increase in IQ when being close to a four year college.
4. **From parts (ii) and (iii), what do you conclude about the importance of controlling for smsa66 and the 1966 regional dummies in the equation?**
    a. It is very important to conclude that controlling for more variables allow you to understand the impact that one variable has.

Exercise 15.1

1. **Why might PC ownership be correlated with u?**
    a. PC ownership may be correlated with ability or drive, so it is hard to explain if it actually correlated with u. There are very few independent variables involved.
2. **Explain why PC is likely to be related to parents' annual income. Does this mean parental income is a good IV for PC? Why or why not?**
    a. If your parents have a steady income, then they are more likely to have the ability to increase spending on something like a PC for their child. I believe that this IV could help but it will not explain everything.
3. **Suppose that, four years ago, the university gave grants to buy computers to roughly one-half of the incoming students, and the students who received grants were randomly chosen. Carefully explain how you would use this information to construct an instrumental variable for PC.**
    a. You could use the grant recipients as a instrument to see the effects of having a computer has upon your GPA. Some may have had parental income already, but some may not. It will be able to narrow out the effects of having a PC is on GPA.