Final exam

5/5/2014

Instructions: You may use any material whatsoever in completing this exam, though you may not consult with any human, either electronically or in person, other than me. Thoroughly support your answers (although excessive irrelevance in answers may be penalized). Please type your answers using word processing software and send them to me as an attachment, no later than 3pm on May 5, 2014. Good luck!

Problem 1 (10 points) In class, we have studied several methods for measuring the relative prevalence of guns across time and geographic areas. List each method studied, and explain the strength and weakness of each method you list. State what an ideal measure of relative gun prevalence would look like.

Problem 2 (25 points) In class, we discussed the external cost of a household having a firearm.

a. Explain, to the best of your ability, the method used for calculating external cost of one additional gun-owning household.

In 2013, Louisville had 666,200 people living in 287,012 households. There were 62 murders. 20% of households own guns.

b. What is Louisville's homicide rate, as conventionally measured?

c. If the elasticity of gun ownership to homicides is .1, and the cost of a statistical life is \$5M, what is the external cost associated with one more household owning a gun in Louisville? (hint: follow the calculation done in class)

Problem 3 (20 points) A researcher wishes to estimate whether more severe prison conditions deter crime.

a. Discuss at least two pathways identified in class through which this effect might operate.

Consider the following regression equation:

$$crimes\_post\_release = \beta_0 + \beta_1 * condition + \epsilon \tag{1}$$

where *crimes_post_release* measures the number of crimes committed by an individual after being released from prison, and *conditon* measures the condition of the prison. A researcher decides to measure *condition* using the security level of the prison the individual is assigned to.

b. Discuss the appropriateness of this metric, following relevant discussion from class lectures.

c. Does this metric introduce reverse causality or omitted variable bias? If so why, and what can the researcher do to fix the problem?

Problem 4 (15 points) Discuss evidence presented in class as to the relative cost to the legal system of administering the death penalty compared to life without parole.

Problem 5 (10 points) A researcher is interested in the following regression equation:

$$\ln suicides = \beta_0 + \beta_1 * \ln gun\_ownership + \epsilon$$

where *suicides* measures the suicide rate and *gun_ownership* measures the gun ownership rate, with observations at the state level.

Should the researcher be concerned with reverse causality and/or omitted variable bias? Explain why or why not, for each, and if you answer yes, explain what the researcher should do to fix the problem.

Problem 6 (10 points) Discuss evidence presented in class as to whether marijuana and alcohol are complements or substitutes.

Problem 7 (10 points) James Wilson, in "Thinking about crime" (*The Atlantic*, September 1983) takes a dim view of the potential for policy to deter crime. What does he view as the most fundamental determinants of crime?