

Econometrics
Homework 3
Due 1/27/2003

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Download the paper “Air Quality, Infant Mortality, and the Clean Air Act of 1970” NBER working paper #10053 by Kenneth Y. Chay and Michael Greenstone from

<http://papers.nber.org/papers/w10053.pdf>

(If you cannot download the paper, send me an e-mail (kawaguch@sk.tsukuba.ac.jp). I will send you the paper as an attachment.)

This time, you are asked to read the paper and answer following questions. You are NOT allowed to collaborate with your colleague. Please type your answer. The workhorse of this research is instrumental variable estimation. Please read Chapter 5 of Wooldridge (2001) to gain the idea what is the instrumental variable estimation. Wooldridge’s undergraduate text book is also useful.

1. Why statistical association of TSP and adult mortality does not imply the causal effect of environmental pollution on adult mortality? Write down an econometric model and discuss possible correlation of the independent variable and the error term. Specify concretely what variables are included in the error term.
2. Explain why the law, CAAA, is useful to obtain exogenous variation of TSP.
3. This problem is somehow related to the panel estimation that I have not covered yet in the class, but this discussion should be straight forward. In page 9, the authors transform the equations (1) and (2) into the equations (3) and (4). What is the purpose of this transformation?
4. The authors state that $E[(u_{ct} - u_{ct-1})(v_{ct} - v_{ct-1})] = 0$ is required for estimating (3) and (4). How this assumption could be violated? Specify what are included in u and v and give a story how the change of these two factors are correlated.
5. In the last paragraph of page 9, the authors discuss about the possible attenuation bias. Explain what is the attenuation bias.