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\*Economics of Energy and the Environment

\*Problem Set 4

capture log close

log using session, replace

clear all

\*\*\*\*\*2.1

insobs 2

gen A = 35

gen Z = -10

gen w = 1

gen b = .5

gen p = 25

replace p = 35 if \_n ==2

gen qs = Z + w\*p

gen qd = A -b\*p

twoway (line p qs) (line p qd, legend(lab(1 “Supply”) lab(2 “Demand”)))

gen pe = (A-Z)/(w+b)

sum pe

\*\*\*\*\*2.2

gen tax = 3

gen pt = p + tax

gen qdt = qd - b\*tax

twoway (line p qs) (line p qd) (line p qdt, legend(lab(1 “Supply”) lab(2 “Demand”) lab(3 “Demand w tax”)))

gen pe\_tax = (A-b\*tax-Z)/(w+b)

sum pe\_tax

\*\*\*\*\*2.3

use "L:\Econ of Energy\oildata.dta", replace

\*checking correlation on this data for part 2.9

corr At tax

mean Zt

\*-10.00289

mean At

\*35.03331

corr Zt At

\* These shocks are positively correlated. This could be because supply shocks and demand shocks interact with each other so that when one occurs, the other also occurs.

\*\*\*\*\*2.4

gen w = 1

gen b = .5

gen pe = (At-Zt)/(w+b)

\*\*\*\*\*2.5

gen pe\_tax = pe + tax

gen Q = At - b\*pe\_tax

\*\*\*\*\*2.6

keep pe pe\_tax tax Q

twoway scatter pe\_tax Q

\* This does not look like a demand curve, although it does slope down. We do not get a smooth line because we are missing many variables and these are individual instances of demand

\*\*\*\*\*2.7

reg Q pe\_tax

\*.3012359 is the estimated demand response according to the regression

\*\*\*\*\*2.8

\*b represents people's responsiveness to demand. Our estimate under-estimates the value of b because it does not account for the fact that, in oil markets, increased demand is often associated with increased price.

\*\*\*\*\*2.9

\*The correlation between At and tax is 0.0220

\*\*\*\*\*2.10

ivregress 2sls Q (pe\_tax = tax)

\*estimated b = .483

\*\*\*\*\*2.11

\*This exercise has important implications for policy makers because it shows that the elasticity of demand can be underestimated fairly easily. Still, it shows that uses taxes as an instrumental variable could solve this problem. Regardless, it helps illustrate some of the difficulties that policy makers face when estimating demand elasticity.

\*\*\*\*\*2.12 Bonus

\*The reason that it is difficult to estimate the elasticity is that data on consumer habits is based on gasoline prices that consumers know will fluctuate. The authors hypothesize that consumers would react differently to a tax, as they know that a tax would have a long-term effect on gasoline prices. Thus, if one estimates the demand elasticity for gas by using purchasing data, one is likely underestimating the reaction that consumers will have to a gas tax. The paper adds another level of complexity by suggesting that consumers react differently to price increases if they come from taxes than if they come from regular price fluxuations.

translate session.smcl ps4\_Harlan\_Patrick.log, replace