

Practice Question for the Final Exam No. 2, Answer Key

Question 1

1. Suppose you have data on auctions of oil wells, where some of them are drainage tracts (with neighboring oil wells) and others wildcat tracts (without neighboring oil wells). Suppose we estimate the following regressions for drainage and wildcat tracts separately.

$$Y_i = \beta_0 + \beta_1 V_i + \beta_2 \pi_i + \beta_3 A_i + \epsilon_i$$

where Y_i is the bid price for the bidder i , V_i is the estimate of the ex post value of the tract, which is public information and π_i is the profit for tract, and A_i is the acreage of the tract. Suppose we want to get to know the value of private information from the coefficient estimates of the above regression equation. What should the results be when we can say that the private information has some value?

The coefficient estimates of β_1 and β_2 for the drainage tract should both be positive and significant. On the other hand, the coefficient estimates of β_1 and β_2 for the wildcat tract should be insignificant. This is because the drainage tract bidders have some private information on the tract which helps predict the ex post values and the profits, which wildcat tract bidders do not.

2. What can we say if the error term of the neighboring bidder i , ϵ_i and that of the non-neighboring bidder j for the same tract are correlated? What can we say if they are not?

If the error terms are positively correlated, then it is likely that there are some unobserved factors, i.e. information that is public that affects bids for both drainage and wildcat tracts.

Question 2

Suppose the equilibrium price equation of a house is

$$p(z) = \gamma + \phi z + z' \pi z + \eta$$

and the demand equation of a characteristic z_i is

$$pc(z) = b_{0i} + b_{1i}z + b_{2i}x + b_{3i}\alpha + v_{1i}$$

and the supply equation of a characteristics z_i is

$$pc(z) = c_{0i} + c_{1i}z + c_{2i}x + c_{3i}\beta + v_{2i}$$

where $pc(z)$ is the price of a characteristic, x is the observed individual controls, α is the aggregate demand shifter, and β is the aggregate supply shifter. Assume that supply of housing is fixed.

1. Explain what you would choose as an instruments. There are two candidates of instruments, location dummies, and income, and the interaction between the two. Income is correlated with characteristics z but not correlated with the taste shifter v_{1i} . This is because income enters in the budget constraint, but not in the preference of the individual. Hence, income affects the choice z but not the preference shock v_i .

Different location will have different prices because in different locations the proportion of individuals with different observed characteristics x will be different, thus the demand for z will be different depending on locations.

2. Explain how you would estimate the model. First, estimate the price equation using OLS for each market k separately

$$p_k(z) = \gamma_k + \phi_k z + z' \pi_k z + \eta$$

Then, derive the price of characteristic z separately for each market

$$pc_k(z) = \phi_k + 2\pi_k z$$

Then, using the price of the characteristics, estimate the demand equation

$$\phi_k + 2\pi_k z = b_{0i} + b_{1i} z + b_{2i} x + b_{3i} \alpha + v_{1i}$$

Use income, regional dummy and their interactions as instruments for z . Follow similar estimation procedure to estimate supply function coefficients.