

Instructions for the Spring Essay

A. Do the things listed below, using first data set A and then data set B (both downloadable from the course homepage). Data set A contains data from a market with three firms. Data set B contains data from a market with five firms. Both data sets have 50 observations (quarterly data) of the variables P (market price), Q (industry output), Z (a measure of consumer income) and W (a measure of the cost of labor – an important production factor in both industries).

- i) Study the correlation between the variables. Plot the variables against time (to do this in Stata I think you first have to create a variable T that takes values 1, 2, 3,...; if you prefer to plot the variables in Excel or some other suitable software, then that's also fine).
- ii) Create (using the Stata command “generate”) a new variable that you will need, QZ, as the product of Q and Z.
- iii) Assume a linear demand function and a linear marginal cost function — exactly as in the Lecture Notes. Estimate jointly the demand and the supply relationship from the Lecture Notes. Interpret your results. Do the signs of the coefficients make economic sense? Try to infer the estimated value of the conduct parameter, λ . Does this value suggest any particular oligopoly model? Test (using the Stata command “test”) the hypothesis that λ equals the value that corresponds to Bertrand, Cournot and collusion, respectively. What can you conclude?

* When jointly estimating the equations, you may use the Stata command “reg3 (Demand: $P = Q Z QZ$) (Supply: $P = Q QZ W$)”. In case Stata automatically drops the constant in any one of the equations, this is because the estimate of the constant is

very close to zero. So proceed on that assumption: think of the estimate of the constant as being zero.

* If you want to, you are free to try also other commands/approaches (but you don't have to). For example, you may want to try to instrument the variables Q and QZ using lagged values of these variables as well as W and Z as instruments.

* *Hint*: The hypothesis that λ equals some particular value can be tested by using the following Stata command: “test $\lambda^*[\text{Demand}]QZ + n^*[\text{Supply}]QZ = 0$ ”, where n is the number of firms in the market. When using this command, remember that you should not type the letters λ and n , but the specific numbers that these variables take in your application (n is the number of firms in the data set and the value of λ depends on the particular hypothesis that you want to test).

B. Assuming the same linear demand function as above, formulate three different expressions for the consumer surplus in the market: the first should be stated in terms of Q and Z (and parameters of the demand function); the second should be stated in terms of Q and P (and parameters of the demand function); and the third should be stated in terms of P and Z (and parameters of the demand function).

C. By using the three formulas for consumer surplus that you found above, your estimated demand coefficients and the data in data set B (Q, P and Z), calculate values of the consumer surplus for each of the 50 quarters. Investigate how the three measures (coming from the three different formulas) relate to each other. Are they strongly correlated? Why may there be differences between the three series? Discuss.

You should hand in your answers together with the relevant Stata output.