

Assignment #8

Due Friday 11/17/06 by 6 p.m. in the Econ 301-1 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Draw graphs neatly and label axes and points clearly. In general, leave numbers in fractional form while solving problems. Round final answers to the first decimal place if necessary.

A. Two firms, A and B, both have costs $C(Q_i) = 25Q_i$. Market demand is $Q = 100 - 2P$; $Q = Q_A + Q_B$.

(1) a. If this market were perfectly competitive, what would market price, quantity, and profits be?

b. If this market were operating as a cartel, what would market price, quantity, and profits be?

(2) Assume the market is operating as a Cournot duopoly.

a. What is firm A's profit function?

b. What is firm A's reaction function?

c. What is firm A's output? What are market output and price?

d. What is firm A's profit?

(3) Assume the market is a Stackelberg duopoly, and firm A is the leader.

a. What is firm A's profit function?

b. What is firm A's output?

c. What is firm B's output? What are market output and price?

d. What is firm A's profit? What is firm B's profit?

(4) Assume that A and B have agreed to create a cartel in which each member keeps the profit produced by his/her own output.

a. If A decides to cheat, and A assumes that B will produce the agreed-upon level (namely, half the total amount from (1) b.), how much will A produce?

b. How much profit does each firm receive if A cheats and B does not? What is each firm's profit if both firms cheat?

(4) c. This problem can be analyzed using a payoff matrix. Fill in the payoffs/profits for each firm in the following matrix:

		Firm B	
		Cooperate	Cheat
Firm A	Cooperate		
	Cheat		

d. From this matrix, what can you conclude about the possibility of maintaining the cartel?

B. In a famous experiment, two pigs, one little and one big, were put into a long pen that had a lever at one end and a feeding trough at the other end. When the lever was pressed, a serving of food would appear in the trough. If the little pig pressed the lever, the big pig would eat all of the food and keep the little pig from getting any. If the big pig pressed the lever while the little pig waited at the trough, then the little pig could eat the majority of the food before the big pig was able to push him away. The payoffs to the two possible strategies (Press the Lever, Wait at the Trough) in terms of net calorie consumption were as follows:

		Big Pig	
		Press	Wait
Little Pig	Press	(-1,9)	(-1,10)
	Wait	(6,3)	(0,0)

(1) Is there a dominant strategy for the little pig? Is there a dominant strategy for the big pig?

(2) Find a Nash equilibrium for this game. Which pig gets more feed ?

(3) Does the game have more than one Nash equilibrium?

(4) Can you think of an economic situation for which this game might be analogous?