

Econ 301 Intermediate Microeconomics

# Problem Set 9

**Problem 1 (Equilibrium with N Firms)**

The GMC company is considering building a new car factory in China. The total (fixed) cost of the investment is  $F = 4$  (in billions of dollars). When built, the factory will allow to produce  $y$  cars at the (variable) cost given by

$$c(y) = 4y^2$$

Suppose the car industry in China is regulated (companies must have licences to sell on the Chinese market) and before GMC entry, there are already two firms operating in China. They are all identical to the GMC

- a) Find individual supply of GMC, assuming that GMC has a licence and builds the third factory.
- b) Find aggregate supply of the car industry in China, assuming that GMC has a licence and builds the third factory.
- c) Suppose the aggregate demand for cars in China is  $D(p) = 8 - (1/8)p$ . Find the equilibrium price, individual and aggregate level of production and the level of individual profit.
- d) How much (maximally) GMC is willing to pay for the licence to enter the market? (Hint: it will pay at most the value of the profit it makes after paying fixed cost.)

**Problem 2 (Free Entry and Market Structure)**

Suppose now Chinese government liberalizes the car industry, so that no license is required anymore (in such a case we have free entry.)

a) Given demand for cars equals to  $D(p) = 8 - (1/8)p$ , and costs are as in Problem 1 ( $F = 4$  and  $C(y) = 4y^2$ ), predict the number of firms producing cars, the level of production, the price of a car and the level of profit by each firm.

b) Find the number of firms given different levels of fixed cost  $F$ :

F	64	16	4	1/4	1/16
N					

(Hint: instead of calculating N for each value of F, it is much faster to find a function  $N(F)$  where  $F$  is a parameter. Then only plug concrete values of  $F$ . Use the values for *MES* from point f) in Problem 1)

c) For which values of  $F$  should we observe monopoly, oligopoly or nearly perfectly competitive car industry?