Monopolistic Competition and Oligopoly

1. Consider a monopolistic competition market with N firms. The business opportunities for each company are described with the following equations:

$$\text{Demand: } Q = \frac{100}{N} - P$$

$$\text{Marginal revenue: } MR = \frac{100}{N} - 2Q$$

$$\text{Total cost: } TC = 50 + Q^2$$

$$\text{Marginal cost: } MC = 2Q$$

   (a) How does N, the number of firms in the market, affect each firm's demand curve? Why?

   (b) How many units does each firm produce?

   (c) What price does each firm set?

   (d) How much profit does each firm make?

   (e) In the long run, how many firms will exist in this market?

2. The competition in the jam market is monopolistic and is in long-term equilibrium. One day, the director of consumer protection discovers that all brands of jam are identical. From then on, the market is perfectly competitive and reaches long-term equilibrium again. Explain whether, in equilibrium, each of the following variables increases, decreases, or remains the same in the typical firm of the market: price, quantity, average total cost, marginal cost, profits.

3. A large part of the world supply of diamonds comes from Russia and South Africa. Assume that the diamond is a homogeneous product and that the marginal cost of extracting diamonds is constant and equal to 1,000 per unit. The demand for diamonds is presented in the following table:

Price	Quantity
$8000	5000
$7000	6000
$6000	7000
$5000	8000
$4000	9000
$3000	10000
$2000	11000
$1000	12000

   (a) If there were many diamond suppliers, what would be the equilibrium price and quantity?

   (b) If there were only one diamond supplier (that is, a single company owns 100

   (c) If Russia and South Africa formed a cartel, what would be the equilibrium price and quantity? If the countries divided the market equally, what would South Africa's profits and production amount to? What would happen to South Africa's profits if it increased its production to 1,000 diamonds and Russia respected the cartel agreement?

   (d) Use your answers from section c) to explain why cartel agreements tend not to be very successful.

Solutions

1. (a) When N increases, the y-intercept of demand decreases. That is, as the number of companies increases, they divide up each other's market shares.

   (b) Companies equate marginal revenue to marginal cost:

   $$MR = \frac{100}{N} - 2Q = 2Q = MC$$

   $$25/N = Q$$

   (c) Replace the previous in the demand function:

   $$25/N = 100/N - P$$

   $$75/N = P$$

   (d)
   $$\Pi = (75/N)(25/N) - 50 - (25/N)^2 = 1875/N^2 - 50 - 625/N^2 = 1250/N^2 - 50$$

   (e) In the long run, profits should be zero:

   $$\Pi = 1250/N^2 - 50 = 0$$

   $$N = 5$$

2. The price falls, the quantity increases, the average total cost decreases, the marginal cost increases and profits remain at 0. Both the effect on average total cost and marginal cost occur due to the increase in quantities. In perfect competition, as the quantities produced increase, we reach a point where the average total cost is minimum and the marginal cost is higher than before.
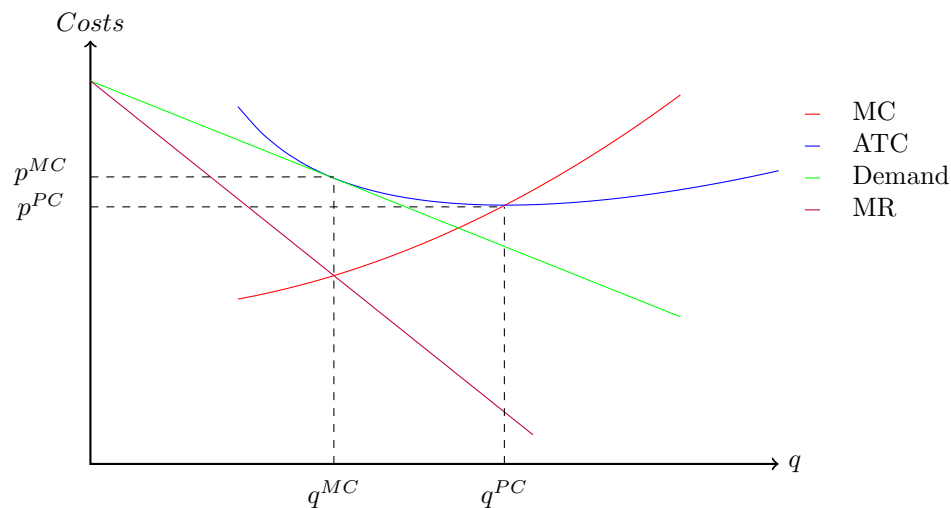
Perfect competition and monopolistic competition (in the long run)

3. (a) We would be in perfect competition then $P = MC = 1000$ and 12000 diamonds would be sold.

   (b) We calculate a new table to find marginal revenue: We equate $MR = MC$. This is done at some point with a quantity of 6000 or 7000. Obtaining the profits for each of these quantities we see that the maximum profit is when $Q = 6000$ and the price 70000

Price	Quantity	Total Revenue	Marginal Revenue
$8000	5000	$40000000	
$7000	6000	$42000000	$2000
$6000	7000	$42000000	$0
$5000	8000	$40000000	-$2000
$4000	9000	$36000000	-$4000
$3000	10000	$30000000	-$6000
$2000	11000	$22000000	-$8000
$1000	12000	$12000000	-$10000

(c) They would be half of monopoly. So if the monopoly profits are:

$$\Pi^M = 42000000 - 6000 * 1000 = 36000000$$

The profits of each would be: $36000000/2 = 18000000$. Another way to calculate them: $3000 * 7000 - 3000 * 1000 = 18000000$. If South Africa increases production now the price would be 6000 and the benefits of South Africa:

$$\Pi = 4000 * 6000 - 4000 * 1000 = 20000000$$

It would benefit by deviating from the agreement

(d) What happens with agreements between companies is that both could increase quantities and take advantage of the fact that the other has limited the quantities it provides to the market, then the firm that increases the quantities gets a higher benefit.