

# PRACTICE 7 - MICROECONOMICS

Bachelor Degree in Global Governance

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# PERFECT COMPETITION

A market is defined as perfectly competitive providing that four requirements are fulfilled:

**1.Homogeneity of products:** all the products that are marketed by the various firms are identical or perfect substitutes; this means that the only lever that can be exploited by a single firm to compete is price.

**2.High number of economic agents:** there is a significant number of consumers and producers that are not able to individually influence the level of the market demand and the market supply.

## PERFECT COMPETITION

**3. Perfect information:** any producer is perfectly informed about the preferences of all consumers, and any consumer is perfectly informed about the characteristics of the products marketed by all firms.

**4. Absence of barriers to entry and exit:** firms can easily enter or exit the market.

The combination of these requirements causes each firm to consider the market price as given.

## PERFECT COMPETITION IN THE SHORT RUN

We need to maximize profit, i.e., the difference between total revenues and total costs with respect to the only variable we have available,  $Q$ . In this case we also may not have information about the production function, but only about the market price at which this good is sold, so we will perform unconstrained maximization.

$$\max_Q \pi = TR - TC = pQ - TC(Q)$$

To maximize the function, we calculate the first derivative and set it equal to zero.

$$\frac{\partial \pi}{\partial Q} = \frac{\partial(pQ - TC(Q))}{\partial Q} = \frac{\partial(pQ)}{\partial Q} - \frac{\partial TC(Q)}{\partial Q} = p - MC(Q) \rightarrow p - MC(Q) = 0 \rightarrow p = MC(Q)$$

In the short run:

$$\pi^{SR} = pQ^{SR} - TC(Q^{SR})$$

## EXERCISE

In a perfectly competitive market, there are 10 firms operating, each one has the following total cost function:

$$TC(Q_i) = Q_i^2$$

The market is also characterized by the following demand function:

$$Q^d = 100 - 20p$$

Compute:

1. The short run supply curve of the firm
2. The short run supply curve of the industry
3. Price and Quantity at the equilibrium
4. The level of production and the profit realized by one firm in the short run

## EXERCISE

In a perfectly competitive market, there are 50 firms operating, each one has the following total cost function:

$$TC(Q_i) = 2Q_i^2 + 8$$

The market is also characterized by the following demand function:

$$Q^d = 400 - 10p$$

Compute:

1. The short run supply curve of the firm
2. The short run supply curve of the industry
3. Price and Quantity at the equilibrium
4. The level of production and the profit realized by one firm in the short run

## PERFECT COMPETITION IN THE LONG RUN

In the long run, the equilibrium condition is the following:

$$\begin{aligned}\pi = 0 &\rightarrow \pi = pQ - AC(Q)Q = Q(p - AC(Q)) \rightarrow p = AC(Q^{min}) \\ p &= AC(Q^{min})\end{aligned}$$

Therefore, the profits in the long run are:

$$\pi^{LR} = pQ^{LR} - TC(Q^{LR})$$

## EXERCISE

In a perfectly competitive market, there are 100 firms operating, each one has the following total cost function:

$$TC(Q_i) = Q_i^2 + 10$$

The market is also characterized by the following demand function:

$$Q^d = 300 - 20p$$

Compute:

1. The equilibrium price and quantity in the long run for the single firm
2. The equilibrium quantity in the whole industry
3. The number of firms operating in the long run
4. The long-run profit incurred by each firm in the case where the size of plants is not free to vary



## EXERCISE

In a perfectly competitive market, there are 40 firms operating, each one has the following total cost function:

$$TC(Q_i) = 4Q_i^2 + 20$$

The market is also characterized by the following demand function:

$$Q^d = 800 - 20p$$

Compute:

1. The equilibrium price and quantity in the long run for the single firm
2. The equilibrium quantity in the whole industry
3. The number of firms operating in the long run
4. The long-run profit incurred by each firm in the case where the size of plants is not free to vary