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Economics 201

Solving for Equilibrium Price and Quantity

There are two settings where we derive equilibrium price and quantity. First, we consider a perfectly competitive industry, followed by a monopolistic industry.

A. Finding Equilibrium in a Perfectly Competitive Industry:

Market Demand: $P = 100 - 0.5Q$
Market Supply: $P = 4Q + 50$

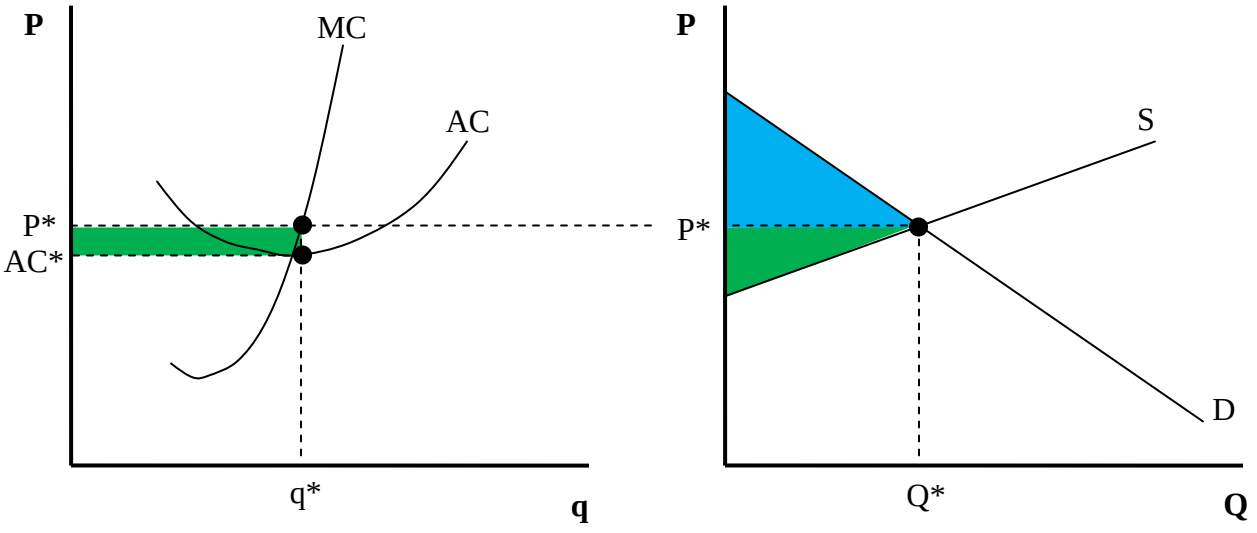
1. Set Demand equal to Supply, and then solve for Q*:

$100 - 0.5Q = 4Q + 50$
$Q^* = 11.1$

2. Plug Q* into either the Demand or Supply equation, and solve for P*:

$P^* = 100 - 0.5(11.1)$
$P^* = 94.45$

Below, we present this information on a graph. The market is represented on the right, with the firm on the left. Within the market, P* and Q* determine areas of Consumer Surplus (blue) and Producer Surplus (green). Profit is also illustrated on the left-side graph as a green area.



B. Finding Equilibrium in a Monopolistic Industry:
Note: to allow for some comparison, we use the same market demand curve as that of our Perfectly Competitive market, and reinterpret the Supply Curve from that setting as a Marginal Cost curve below.

Demand: P = 100 - 0.5Q
Marginal Revenue: MR = 100 - Q
Marginal Cost: MC = 4Q + 50

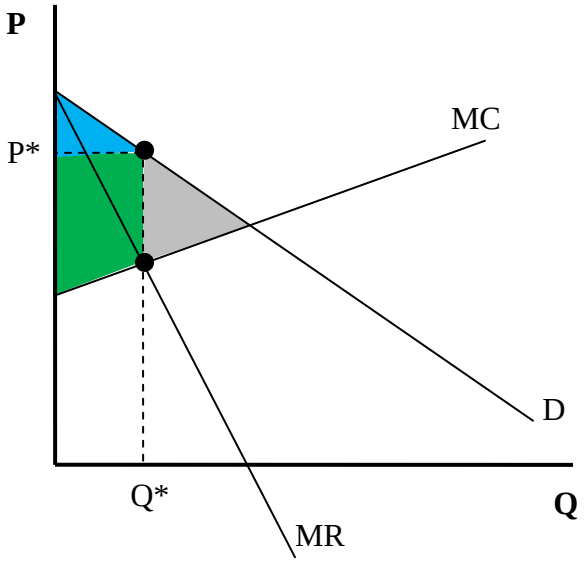
1. Set Marginal Revenue equal to Marginal Cost, and then solve for Q*:

100 - Q = 4Q + 50
Q* = 10

2. Plug Q* into the Demand equation (not MC), and solve for P*:

P* = 100 - 0.5(10) = 95

Below, we present this information on a graph as well. Note that we have also identified the areas of Consumer Surplus (blue) and Producer Surplus (green) within the market. The lower level of output (Q*), relative to the perfectly competitive market, has led to less total surplus and that the difference between the total surplus with perfect competition and monopoly is the gray area below. We call this area deadweight loss.



Generally speaking, we note that the equilibrium price and quantities which result from each market are not the same. Comparing the two outcomes, we find that perfect competition leads to lower prices and greater output. This makes good, intuitive sense since we expect that greater competition should keep prices down.