

EC 131 - Monopolistic markets - firms' decisions

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In general, you will be given the firm's cost structure and some demand information. Throughout this handout, consider the following cost structure and demand:

$$TC = 3 + 3Q + 0.2Q^2$$

$$MC = 3 + 0.4Q$$

$$P = 6 - 0.4Q$$

Total revenue is, then:

$$TR = P \times Q = (6 - 0.4Q)Q = 6Q - 0.4Q^2$$

Which allows us to find the marginal revenue:

$$MR = \frac{dTR}{dQ} = 6 - 0.8Q$$

Clearly, the firm faces a fixed cost of \$3, since when $Q = 0$ $TC = \$3$.

1 Monopolist choices

The monopolist will choose a quantity to produce such that profit is maximized. Thus, he will choose Q such that $MR = MC$:

$$6 - 0.8Q = 3 + 0.4Q$$

$$3 = 1.2Q \implies Q = 2.5$$

To find the price, just replace Q in the demand function:

$$P = 6 - 0.4 \times 2.5 = 5$$

Thus, the monopolist will choose to produce 2.5 units of the product. Since consumers are willing to pay \$5 for each unit at this quantity, total revenue is $TR = 2.5 \times 5 = 12.5$. To see the total cost, just replace Q in the expression for TC :

$$TC = 3 + 3 \times 2.5 + 0.2(2.5)^2 = 11.75$$

Profits are, thus:

$$Profits = TR - TC = 12.5 - 11.75 = \$0.75$$

In order to calculate deadweight loss due to monopoly, we calculate the area of the triangle shown in the textbook and in class. First we should find the point where welfare is maximized (the point where MC intersects the demand curve):

$$3 + 0.4Q = 6 - 0.4Q$$

$$Q = 3.75$$

That is, the quantity that maximizes total welfare is $Q = 3.75$. Additionally, we'll need the value of MC for $Q = 2.5$: $MC = 3 + 0.4 \times 2.5 = 4$.

$$DWL = \frac{(5 - 4) \times (3.75 - 2.5)}{2} = \$0.625$$