Application 1 - Marginal Revenue (MR)

Aim

To demonstrate an application of differentiation.

Learning Outcomes

At the end of this section you will be able to:

- Understand the difference between the total revenue and the marginal revenue,
- Calculate the marginal revenue from the total revenue.

The **total revenue** (TR) received from the sale of Q goods at price P is given by $TR = PQ$. Based on the total revenue we can obtain another key concept: **marginal revenue**. Marginal revenue (MR) can be defined as the additional revenue added by an additional unit of output. In other words marginal revenue is the extra revenue that an additional unit of product will bring a firm. It can also be described as the change in total revenue divided by the change in number of units sold. This brings us back to the idea of differentiation and rates of change.

More formally, marginal revenue is equal to the change in total revenue over the change in quantity when the change in quantity is equal to one unit. It is possible to represent marginal revenue as a derivative;

$$MR = \frac{d(TR)}{dQ}.$$

Marginal revenue is the derivative of total revenue with respect to demand.

Example

If the total revenue function of a good is given by

$$100Q - Q^2$$

write down an expression for the marginal revenue function if the current demand is 60.

$$\begin{aligned} TR &= 100Q - Q^2, \\ \Rightarrow MR &= \frac{d(TR)}{dQ} = \frac{d(100Q - Q^2)}{dQ} = 100 - 2Q \end{aligned}$$

When $Q = 60$,

$$MR = 100 - 2(60) = -20$$

Therefore, when $Q = 60$ the marginal revenue equals -20.

Related Reading

Jacques, I. 1999. *Mathematics for Economics and Business.* 3^{rd} Edition. Prentice Hall.