**Profit maximization**

Firm assumed to maximize difference between total revenue and total cost (explicit and implicit)

Maximizes difference:

$$π=TR-TC$$

The profit maximizing firm should behave in ways described by economic model

For example, shouldn’t consider fixed cost in determining output

Consider a continuous profit function:

$$π$$

q\*

Output

The

Profit maximum at q\*

for output from 0 to q\* $\frac{∂π}{∂q}>0$ **;** for output beyond q\* $\frac{∂π}{∂q}<0$**;** at q\* $\frac{∂π}{∂q}=0$

Profit increasing from output zero to q\*; decreasing beyond q\*

I. $\frac{∂π}{∂q}= \frac{∂TR}{∂q}- \frac{∂TC}{∂q}=0$

II. $\frac{∂TR}{∂q}= \frac{∂TC}{∂q}$ at max profit

Marginal revenue equals marginal cost at profit max.

Marginal revenue is the rate at which total revenue is changing with output

How much does TR change when next unit is produced and sold?

Firms normally don’t decide to produce next single unit

Decisions are normally “lumpy”

For “lumpy” decisions, how can we still use the profit-maximizing condition?

Firm’s total revenue:

TR = Pq

For many firms, quantity sold will affect output price

Price is a function of output

TR = P(q) ·q

Marginal revenue:

**MR =** $\frac{∂TR}{∂q}= \frac{∂[P\left(q\right)∙q]}{∂q}=P\frac{∂q}{∂q}+q\frac{∂P}{∂q}$

 $=P+q\frac{∂P}{∂q}$

Why would $\frac{∂P}{∂q}$ be negative?

If $\frac{∂P}{∂q}$ is negative, what does that imply about the relationship between MR (marginal revenue) and P (price)?

Marginal rule holds for profit maximizing firm, regardless of market structure

Structure may shape firm’s behavior in maximizing profit

**Market Structure and the firm’s profit maximizing decision**

1. Individual firm has no control over price of good

Price set by market

Firm’s own output decision does not influence price of good

$\frac{∂P}{∂q}= 0$ therefore MR=P

**Perfect Competition**

2. Firm has influence over price

Its output decision causes price to change

Assume the firm cannot price discriminate

$\frac{∂P}{∂q} < 0$ reflects downward sloping demand for individual firm’s good

$$MR= P+q\frac{∂P}{∂q}$$

Because $\frac{∂P}{∂q}$ is negative, the MR will be less than the price of the firm’s product

The rate at which total revenue is changing with output will be less than the prevailing price of the good

**Monopoly, Monopolistic Competition**

3. For some firms, the demand curve is uncertain. The firm’s demand is dependent on decisions of competing firms

Firm bases profit-maximizing decision on the best assumption regarding competitors’ decisions

**Oligopoly**