

Short-Run Equilibrium

number n of firms is **fixed**

aggregate supply : $\sum_{i=1}^n q_i^s(p, \bar{x}, \mathbf{w})$

(where $q_i^s(\dots)$ is the firm's short-run supply function)

Long-Run Equilibrium

2 equilibrium conditions

i the aggregate output is the sum of the quantities supplied by the firms in the industry

$$Q = \sum_{i=1}^n q_i(p, \mathbf{w}) \quad (1)$$

where $q_i(\dots)$ (without the superscript) is the firm's long-run supply function

ii free entry and exit : the number n of firms in the industry is **endogenous**

determined by the **zero-profit** condition

if all firms are **identical**, the zero-profit condition is

$$\pi(p, \mathbf{w}) = 0 \quad (2)$$

MC and AC

condition *i* (each firm is on its supply curve) implies that

$$MC = p \quad (3)$$

for each firm in the industry

condition *ii* (zero profit for the marginal entrant) implies condition (2) when all firms are the same

equation (2) can be written

$$AC = p \quad (4)$$

so that the two long-run equilibrium conditions, (3) and (4) together imply

$$MC = AC \quad (5)$$

for each identical firm in the industry

so with

- identical firms (and lots of them)
- U -shaped long-run average cost curves

then each firm must choose an output at the bottom of its AC curve in long-run equilibrium

implying a **horizontal** industry supply curve

shifts in the industry demand curve result in no change in the price, just entry or exit of firms, each of which is producing at its “minimum efficient scale”

What if...

the AC curve slopes up (everywhere)?

then : an arbitrarily large number of arbitrarily small firms in long-run equilibrium

firms are not all the same?

then we can have an upward-sloping industry supply curve

increases in the market price lead to entry by higher-cost firms