

# Introduction to Industrial Organization

## Cost Theory

Jian-Da Zhu

National Taiwan University

# Cost Theory

- Cost function:

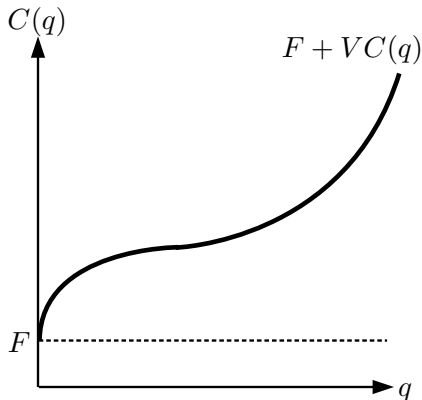
$$C(q) = F + VC(q),$$

where

- $F$ : fixed costs
- $VC(q)$ : variable costs

- Note (Sunk cost):

- Sunk cost: It should not affect the future decision.
- Not a sunk cost: Recoverable, so it should affect the decision.



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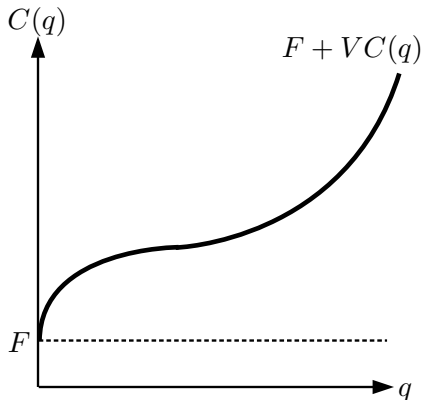
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- Average Cost (AC)

$$AC(q) = \frac{C(q)}{q} = \frac{F + VC(q)}{q} = \frac{F}{q} + AVC(q),$$

where  $AVC(q)$ : average variable cost;  $\frac{F}{q}$ : average fixed cost

- Marginal Cost (MC)

$$MC(q) = \frac{\partial C(q)}{\partial q} = C'(q) = 0 + VC'(q)$$

- Example:

- $C(q) = 100 + 10q + 10q^2$
- $AC(q) = \frac{100}{q} + 10 + 10q$
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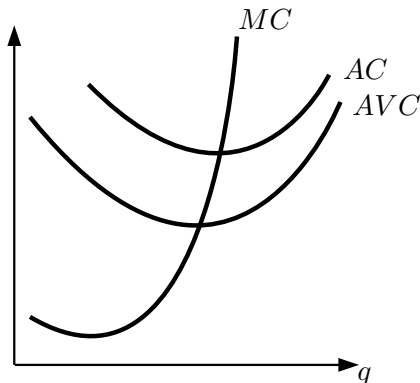
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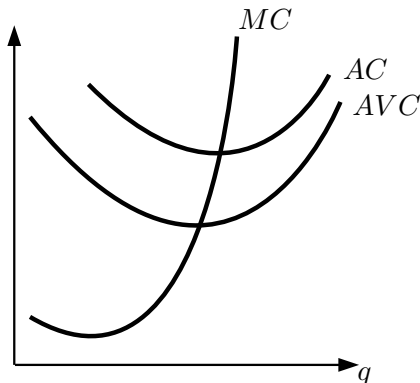
- MC intersects AC at the minimum of AC.
- MC intersects AVC at the minimum of AVC.
- If  $MC < AC$ , then AC falls.
- If  $MC > AC$ , then AC rises.
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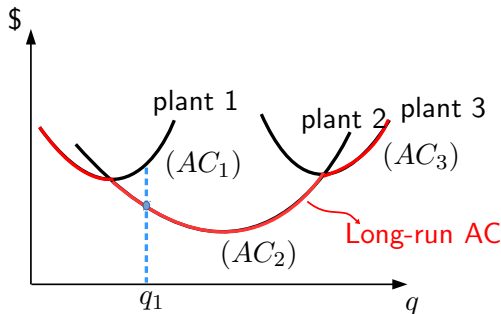


# Short-Run versus Long-Run

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- Note: The long-run AC curve is the envelope of short-run AC curve.

# Economies of Scale

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