Lecture 8

Costs and Output Decisions in the Long Run

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Principles of Microeconomics

Profit-Maximization

(economic) **profit = total revenue – total** (economic) **cost**

total revenue – amount received from the sale of the product (price times number of goods sold)

total (economic) **cost – the total of:**

1. **out of pocket costs** (ex. prices paid to each input)
2. **opportunity costs:**
   a. **normal rate of return on capital and**
   b. **opportunity cost of each factor of production** – ex. if the firm I own pays me $30,000, but I could only earn $10,000 if I worked for another firm, then the "best alternative I forgo" when I work for my own firm is $10,000

In contrast to the examples in Lecture 6, here I'm earning MORE than my opportunity cost.

I'm giving an example of economic profit.

Profit-Maximization

To maximize profit, a firm sets the level of output to the point where marginal revenue equals marginal cost.

But what if the point where MR = MC, causes the firm to lose money?

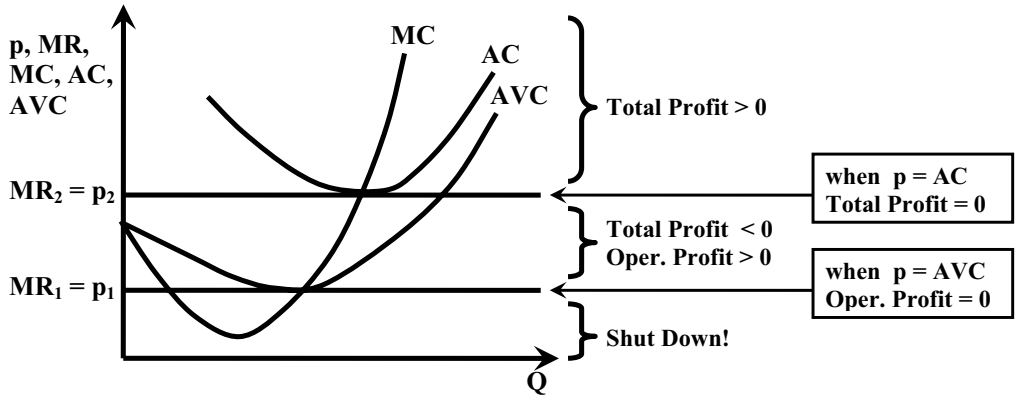
In that case, it has to minimize its losses.

- **Total profit** (or loss) = TR – TC = TR – VC – FC
- **Operating profit** (or loss) = TR – VC

Note: operating profit is greater than total profit when FC > 0

If revenues exceed variable costs, operating profit is positive and can be used to offset fixed costs (thus reducing losses)**, and it will pay the firm to keep operating – <u>in the short-run</u>.**

Profitability



- **When total revenue exceeds total cost (p > AC), firm makes positive profits.**
- **When total cost exceeds total revenue, but revenues exceed variable cost (AC > p > AVC), firm suffers losses, but its operating profit is still positive. It continues operating in the short-run, but exits industry in the long-run.**
- **If revenues are less than variable costs (p < AVC), firm suffers operating losses. Total losses exceed fixed costs. To minimize losses firm shuts down.**

Loss Minimization

losses minimized by operating (TR > VC)			
shut down		operate at p = $3	
Total Rev (Q = 0)	$0	**Total Rev** ($3x800)	**$2400**
Fixed Costs	$2000	Fixed Costs	$2000
Variable Costs	+ 0	**Variable Costs**	+ **1600**
Total Costs	$2000	Total Costs	$3600
		Oper. Profit/Loss	$800
Profit/Loss	**–$2000**	**Total Profit/Loss**	**–$1200**

losses minimized by shutting down (TR < VC)			
shut down		operate at p = $1.50	
Total Rev (Q = 0)	$0	**Total Rev** ($1.50x800)	**$1200**
Fixed Costs	$2000	Fixed Costs	$2000
Variable Costs	+ 0	**Variable Costs**	+ **1600**
Total Costs	$2000	Total Costs	$3600
		Oper. Profit/Loss	–$400
Profit/Loss	**–$2000**	**Total Profit/Loss**	**–$2400**

When TR > VC, the firm's total loss is lower when it continues operating – in the short run.

When TR < VC, the firm's total loss is lower when it shuts down.

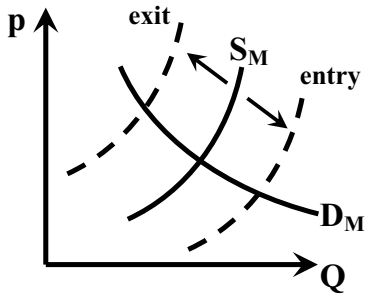
Firm Decisions in the Short and Long Run			
	Short Run Condition	**Short Run Decision**	**Long Run Decision**
Profits	TR > TC	P = MC: operate	Expand: new firms enter
Losses	Operating profit (TR ≥ VC)	P = MC: operate (losses ≤ fixed costs)	Contract: firms exit
Losses	Operating loss (TR ≤ VC)	Shut down: (losses ≥ fixed costs)	Contract firms exit

Short-Run Supply Curve of a Perfectly Competitive Firm

- **In Lecture 3, I wrote that the marginal cost curve is the firm's supply curve when MC > AC. That simplification is not strictly correct.**
- **The short-run supply curve of a competitive firm is the part of its MC curve that lies above its AVC curve.**
- **In the long-run, MC must exceed AC or firm will exit the industry.**

Entry and Exit from the Industry

- **In the long run, firms can enter and exit.**
- **They enter the industry in response to profit opportunities:**
  - shifting out the market supply curve
  - and lowering the market price.
- **They exit when they make losses:**
  - contracting the market supply curve
  - and raising the market price.



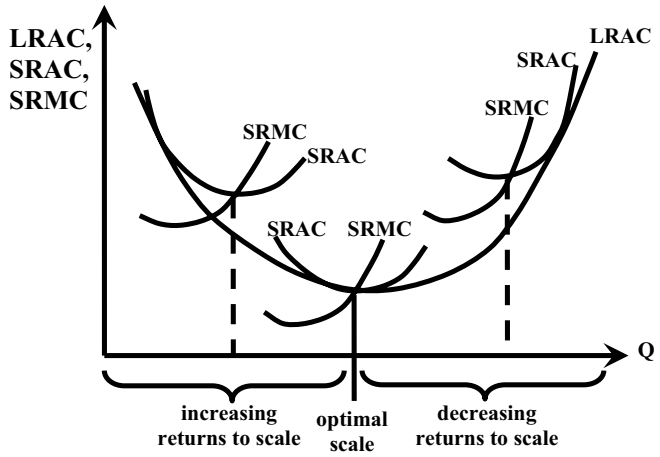
Long-Run Costs: Returns to Scale

- **In the short run, firms have to decide how much to produce in the current scale of plant** (factory size is fixed)**.**
- **In the long run firms, have to choose among many potential scales of plant** (they can expand the factory)**.**

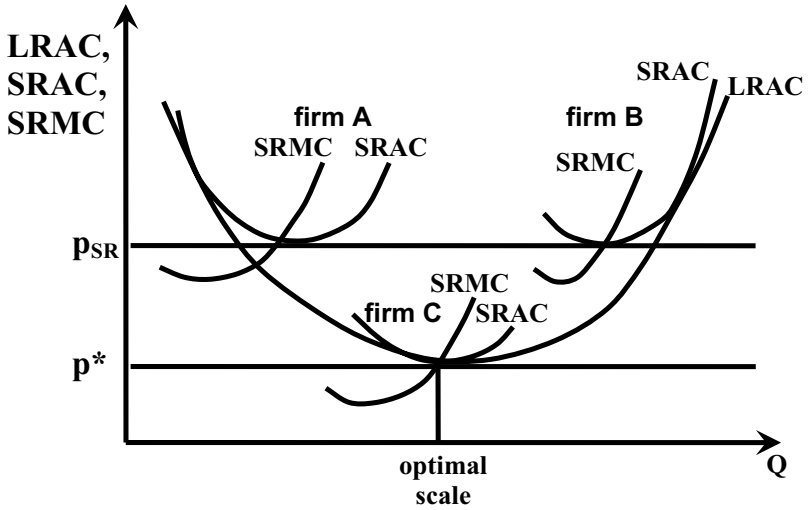
- **Increasing returns to scale** (or economies of scale)**, refers to an increase in a firm's scale of production, which leads to lower average costs per unit produced.**
- **Constant returns to scale refers to an increase in a firm's scale of production, which has no effect on average costs per unit produced.**
- **Decreasing returns to scale** (or diseconomies of scale) **refers to an increase in a firm's scale of production, which leads to higher average costs per unit produced.**

Long-Run Average Cost Curve

- **The Long-Run Average Cost (LRAC) curve shows the different scales on which a firm can operate in the long-run. Each scale of operation defines a different short-run.**
- **The Long-Run Average Cost curve of a firm:**
  - **is downward-sloping when the firm exhibits increasing returns to scale.**
  - **is upward sloping when the firm exhibits decreasing returns to scale.**
- **The optimal scale of plant is the scale that minimizes long-run average cost.**



Long-Run Adjustments to Short-Run Conditions



In the short-run, firms A and B are breaking even.

In the long run, firms producing at the optimal scale (like firm C) **will force firms A and B to become more efficient.** (Firm C can profit at lower price)**.**

Eventually, all firms will produce at the optimal scale.

- **In the long run, firms expand when increasing returns to scale are available** (and contract when they face decreasing returns to scale)**.**
- **In the long run, the market price will be driven down to the minimum point on the LRAC curve and profits go to zero.**

Long-Run Adjustment Mechanism

The central idea behind the discussion of entry, exit, expansion and contraction is:

- **In efficient markets, investment capital flows toward profit opportunities.**
- **Investment – in the form of new firms and expanding old firms**
  - **will over time tend to favor those industries in which profits are being made,**
  - **and over time industries in which firms are suffering losses will gradually contract from disinvestment.**