Topic 4A: A Short Review of Perfect Competition

Business Economics, Organization, and Management (BUEC 211)

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Outline

1. **Perfect Competition**
   Defining characteristics and price-taking behaviour

2. **Competition in the Short Run**
   Profit maximisation, shutdown rule, and supply curves

3. **Competition in the Long Run**
   Entry/exit, long-run equilibrium, and zero economic profit

4. **Competition & Economic Wellbeing**
   Total surplus, consumer/producer surplus, deadweight loss

What is Perfect Competition?

Definition: Perfect Competition

A market structure in which all buyers and sellers are **price takers** — no single participant can influence the market price.

Five Key Features

1. Large number of buyers and sellers
2. Identical (homogeneous) products
3. Full information about prices
4. Negligible transaction costs
5. Free entry and exit

Example: Chicago Mercantile Exchange — commodities like corn, soybeans, and oil trade with all five features present.

Short Run: Profit Maximization Framework

In the short run, at least one input is fixed and firms cannot enter or exit. Firms use a **2-step method**:

Step 1 — How much to produce?

Choose output q that maximises profit:

$$MR(q) = MC(q)$$

Step 2 — Whether to produce?

Should the firm operate or shut down?

Compare price to average variable cost.

Short Run Step 1: How Much to Produce

Key insight: Because competitive firms are **price takers**, firms treat prices as fixed. This implies

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which implies

$$MR = \frac{dR}{dq} = P$$

so the profit-maximizing rule simplifies to:

$$\boxed{P = MC(q)}$$

- For every market price P, the firm will produce up to the q such that short run marginal costs equal P.

Short Run Step 2: Whether to Produce — The Shutdown Rule

Operate only if revenue covers variable costs: **shut down if** $p < AVC$

Condition	**Decision**	**Reason**
$P > AC$	Produce	Earns positive economic profit
$AVC < P \leq AC$	Produce	Fixed costs are sunk, so shutting down does not avoid them
$P < AVC$	**Shut down**	Revenue doesn't cover variable (non-sunk) costs

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Short Run Supply Curve

The firm's short-run supply curve is the **MC curve above minimum AVC**. Below that price, quantity supplied $= 0$.

Example

You manage a firm that produces picture frames in a perfectly competitive market.

Your short run total cost function is

$$C(q) = 5 + 25\sqrt{q} + q^2$$

- Derive the MC, AVC, and AC curves from this total cost function!

The current market price is $P = \$20$.

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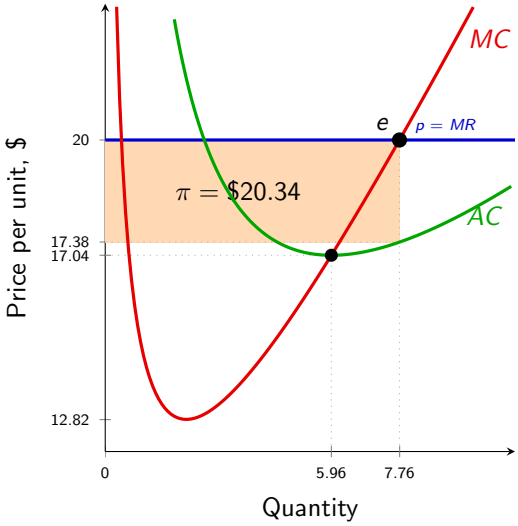
In class: we illustrate the level of production when $P = MC$ on a graph, compare that to AC and AVC at that level of production

Example: How Much to Produce when $C(q) = 5 + 25\sqrt{q} + q^2$ and $P = \$20$



$$\pi = P \cdot q - AC \cdot q$$

$$AVC(q) = \frac{25}{\sqrt{q}} + q$$

$$AC(q) = \frac{25}{\sqrt{q}} + q + \frac{5}{q}$$

$$MC(q) = \frac{12.5}{\sqrt{q}} + 2q$$

Produce at point e:

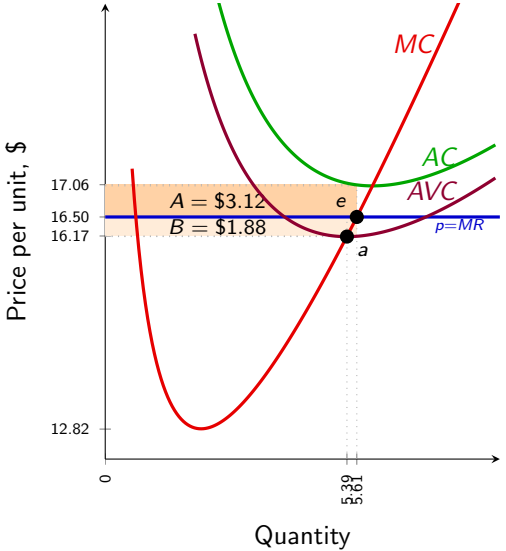
$q^* = 7.76$

$p = \$20$

$AC(q^*) = \$17.38$

$\pi = \$20.34$

If Prices drop to $16.5, should we shut down in the short run?



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Total Profit $= A = -\$3.12$

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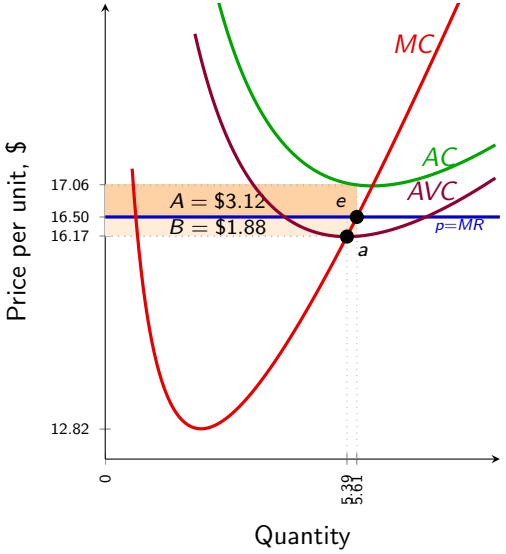

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The firm should produce in the short run!

Competition in the Long Run

1. **All inputs are variable**
   - All costs become avoidable (non-sunk)
   - Firms incur long-run costs (which must be lower than short run costs for all levels of production, why?)
2. **Entry and exit is possible**
   - Firms enter if positive economic profit exists; exit if economic profit is negative
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This is also consistent with price equaling **long run marginal costs** (why?)

Entry, Exit, and the Long Run Supply Curve

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A consequence is that the **long run supply curve is perfectly elastic at price equal to the minimum LRAC**.

Q: What does this mean about the long-run **economies to scale** for a perfectly competititve industry?

Long Run Equilibrium

Long Run Competitive Equilibrium

Occurs at the intersection of long-run market supply and demand. With identical firms, free entry/exit, and constant input prices:

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- **Zero economic profit:** Revenue covers all costs including the opportunity cost of capital.
- **Productive efficiency:** All surviving firms produce at minimum $LRAC$ – the most productive they can possibly be
- **Demand shifts $\Rightarrow$ quantity adjusts, not price** (with identical firms and free entry/exit).
- **Survival requires profit maximization:** Firms that fail to minimize costs will be forced to exit.

Example: Long Run Firm Entry and Exit

Return to our example of a picture frame manufacturer. Suppose that demand at the long run price is 107.2 frames and the long run cost function is

$$LR\ Cost = 25\sqrt{q} + q^2$$

Q: How many firms will exist in the long run equilibrium?

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The number of firms N must meet total demand. So, the number of firms satisfies $107.2 = 5.36 \times N \implies N = 20$ firms.

Total Surplus: Measuring the Gains from Trade

Consumer Surplus (CS)

Difference between willingness to pay and price paid.

= Area *below* demand curve and *above* market price.

Producer Surplus (PS)

Difference between price received and minimum acceptable price.

= Area *above* supply curve and *below* market price.

Total Surplus (TS)

$$TS = CS + PS$$

Measures total gains from trade for all market participants.

Key Result

Perfect competition maximises total surplus. Producing less *or* more than the competitive level reduces TS.

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Perfect competition maximises total surplus. Producing less *or* more than the competitive level reduces TS.

$\Longrightarrow$ Any market structure where $p \neq MC$ will not maximize total surplus!

Perfect Competition as an Economic Benchmark

Where the model applies well:

- Agriculture, construction, parts of labour markets, wholesale and retail trade
- Provides a **baseline** to evaluate market efficiency in any industry – an "ideal" market
- Establishes maximum achievable *TS* as a reference point

Policy implications:

- Any departure from perfect competition (monopoly, oligopoly, externalities) produces less than maximum *TS*
- Underpins the analysis of imperfect competition, which will be the most important thing we study in Topic 4.

Key Takeaways

1. **Definition:** Perfect competition = all buyers and sellers are price takers; five key features including free entry/exit.
2. **Short Run:** Firms produce where $p = MC$; operate if $p \geq AVC$; SR supply = MC above min AVC.
3. **Long Run:** Firms operate if $p \geq LRAC$; with free entry/exit, equilibrium price = min $LRAC$, yielding $\pi = 0$. The number of firms changes to meet demand at $p = LRAC$. Long run market supply is **perfectly elastic** at $p = LRAC$.
4. **Entry & Exit:** Profit attracts entry; losses trigger exit. Demand shifts change quantity, not long-run price (with identical firms).
5. **Welfare:** Perfect competition maximises $TS = CS + PS$. Any output restriction creates **deadweight loss**.