Group: YSU Economics & Supply Chain

I AM NOT TIRED

ECONOMICS TOPIC 6

Lecturer: Sam W
Email: 275287a@curtin.edu.au

WeChat group: YSU Economics & Supply Chain
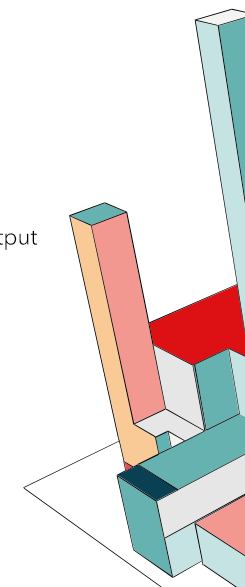
TOPIC 6: REVENUE AND PROFIT

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1.1 REVENUE: TOTAL, AVERAGE AND MARGINAL

Total revenue (TR)

The total earnings from selling a specific good. If all consumers are charged the same price P and Q units are sold, then:

$$TR = P \times Q$$

Average revenue (AR)

The amount earned for each unit of a good sold.

$$AR = TR / Q$$

If all consumers are charged the same price P, then $AR = P$.

Marginal revenue (MR)

The change in total revenue obtained by selling one more unit of the good.

$$MR = \Delta TR / \Delta Q$$

which is equivalent to the derivative of TR: ie
$$MR = dTR / dQ$$

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1.2 REVENUE CURVES WHEN PRICE IS NOT AFFECTED BY THE FIRM'S OUTPUT

Revenue depends on price. But not every firms is able to set their own price.

A **price taker** is a firm (or individual) that accepts the market price determined by the interaction of supply and demand. Price takers are usually too small or lack the market share to be able to influence the market price

In a *perfectly* competitive market, all participants (firms, producers, and consumers) are price takers.

A consumer shopping for an airplane ticket cannot negotiate airfare.

Individual investor trading small volumes of stock at prevailing market prices

1.2 REVENUE CURVES WHEN PRICE IS NOT AFFECTED BY THE FIRM'S OUTPUT

As a **price taker**,
- the firm can sell (at the market equilibrium price) as much as it can produce
- if it increases the price, it would lose all its sales to competitors.
- lower the price would not be rational as it can sell at the higher price
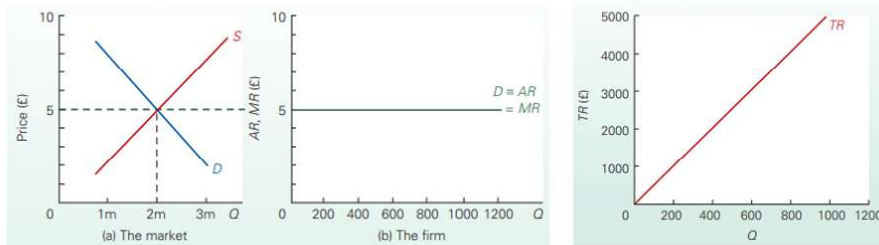
- They have a **constant AR and MR**, both **equal to the equilibrium market price**
- The demand (D), AR and MR curves are all the same horizontal line, at the market price.
- As AR is fixed, TR for price rises at a constant rate as more is sold.

1.3 REVENUE CURVES WHEN PRICE VARIES WITH OUTPUT

Rather than accepting the market price, firms would generally prefer to be a **price maker.**

> A **price maker** is a firm that has the ability to influence the price charged for its good or service. Most price-maker firms are generally able to sell more units if they reduce their price (and vice versa), so they face a downward-sloping demand (and AR) curve.

Apple
Known for setting their own price without much regard for competitors

CHANEL
Luxury brands set their own prices based on brand prestige

Pfizer
Pharmaceutical companies hold patents on life-saving medications

## 1.3 REVENUE CURVES WHEN PRICE VARIES WITH OUTPUT

As a **price** maker,
- it is able to sell more units if they reduce their price (and vice versa)
- they face a downward-sloping demand (and AR) curve
- the MR curve is also downward-sloping but more steeply than the AR = D curve as
  MR = additional revenue earned from selling last unit alone
  - revenue lost by selling existing output at a lower price
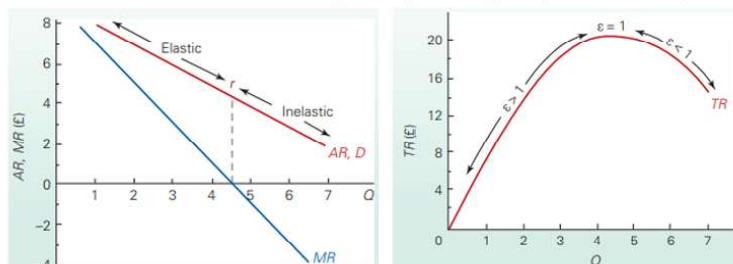
1.3 REVENUE CURVES WHEN PRICE VARIES WITH OUTPUT
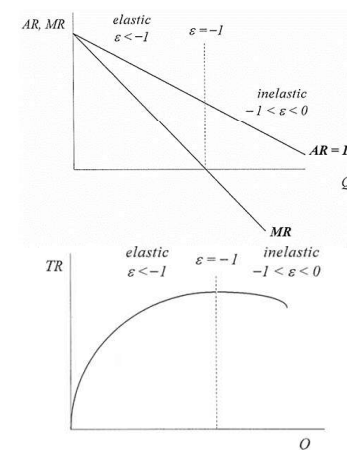
Price-elastic: ↓ in price leads to **larger** % ↑ in Q
Therefore, TR ↑ and **MR > 0**.

Price-inelastic: ↓ in price leads to **smaller** % ↑ in Q
Therefore, TR ↓ and **MR < 0**.

Unit elastic: P and Q change by the same %
Therefore, TR is unchanged and **MR = 0**.

2 PROFIT MAXIMISATION

At what output will a firm maximise its profit?
How much profit will it make at the output?

A firm's total profit (TΠ) is defined as its total revenue minus its total costs of production, where profit is denoted by the Greek letter Pi, Π.

$$TΠ = TR - TC$$

2 ways of determining the level of output at which a firm will maximise profits
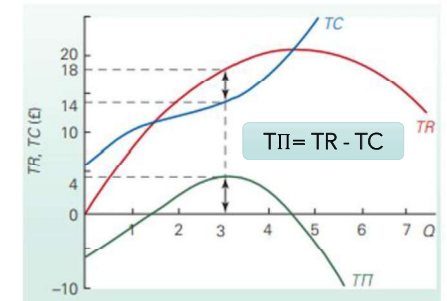
Using total curves

Using average and marginal curves

2.1 PROFIT MAXIMISATION: USING TOTAL CURVES

Consider the case of short-run production where one or more factors are fixed in supply, and the firm has a downward-sloping demand curve: i.e. a price maker.

Q (units)	TR ($)	TC ($)	TΠ($)
0	0	6	-6
1	8	10	-2
2	14	12	2
3	18	14	4
4	20	18	2
5	20	25	-5
6	18	36	-18
7	14	56	-42

TΠ= TR - TC

The profit-maximising output level occurs where <u>TR exceeds TC by the greatest amount</u>.

2.2 USING AVERAGE AND MARGINAL CURVES

Q (units)	AR (P)	TR (PxQ)	TC	TΠ (TR-TC)	AC (TC/Q)	AΠ (AR-AC)	MC (ΔTC/ΔQ)	MR (ΔTR/ΔQ)
0	9	0	6	-6	-	-		
							4	8
1	8	8	10	-2	10	-2		
							2	6
2	7	14	12	2	6	1		
							2	4
3	6	18	14	4	4.67	1.33		
							4	2
4	5	20	18	2	4.5	0.5		
							7	0
5	4	20	25	-5	5	-1		
							11	-2
6	3	18	36	-18	6	-3		
							20	-4
7	2	14	56	-42	8	-6		

Profit is maximised where **MR = MC**.

2.2 USING AVERAGE AND MARGINAL CURVES

Exercise: Plot the AR, AC, MR, and MC curves, mark the profit maximising output (Q), and label the corresponding AR and AC at that point.

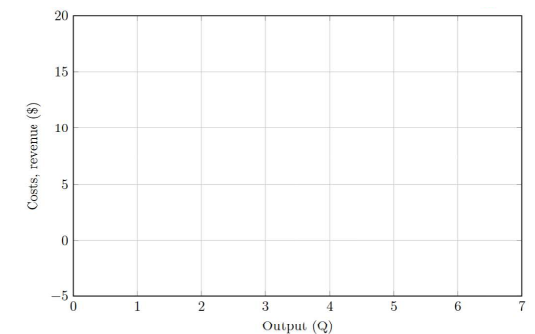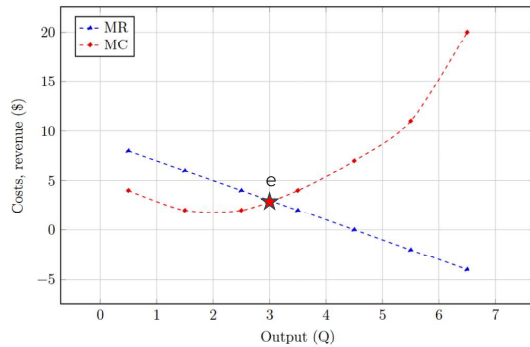| Q	AR	TR	TC	TΠ	AC	AΠ	MC	MR
0	9	0	6	-6	-	-		
1	8	8	10	-2	10	-2	4	8
2	7	14	12	2	6	1	2	6
3	6	18	14	4	4.67	1.33	2	4
4	5	20	18	2	4.5	0.5	4	2
5	4	20	25	-5	5	-1	7	0
6	3	18	36	-18	6	-3	11	-2
7	2	14	56	-42	8	-6	20	-4

∴ The profit-maximizing output is Q = 3, where MR = MC.

2.2 USING AVERAGE AND MARGINAL CURVES

Profit is maximised where **MR = MC**.

- At output level below point e, MR > MC, producing more units will result in bigger addition to revenue than to cost.

∴ Total profit will increase as long as MR > MC.

- At output level above point e, MR < MC, producing more units will result in bigger addition to cost than to revenue.

∴ Total profit will decrease if MR < MC.

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2.2 USING AVERAGE AND MARGINAL CURVES

Exercise (continue): On the same graph, shade the area that represents the total profit at the profit-maximising level of output.
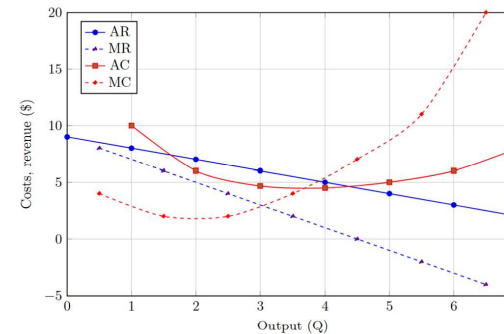
Once the profit-maximising output has been discovered at MR = MC, we now use the average curves to measure the amount of profit at the maximum.

Average profit (AΠ) is calculated by

$$A\Pi = AR - AC$$

Total profit (TΠ) is calculated by

$$T\Pi = A\Pi \times Q$$

Calculate TΠ at Q = 3 yields maximum TΠ of 4, which is represented by the shaded area.

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Q	AR	TR	TC	TΠ	AC	AΠ	MC	MR
3	6	18	14	4	4.67	1.33	2	4

2.3 LOSS MINIMISING

- It may be that there is no output at which the firm can make a profit. This is when AC curve is above the AR curve at all level of output.

- In this case, the output where MR = MC will be the loss-minimising output, where
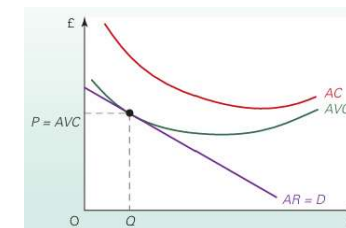
Min Loss = (AC – AR) x Q
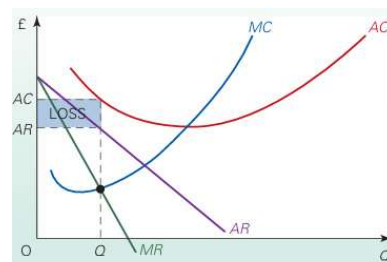
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2.4 WHETHER OR NOT TO PRODUCE AT ALL

- In the <u>short run</u>, fixed costs have to be paid even if the firm is producing nothing.

  Rents, salaries, insurance, taxes, depreciation, interest expenses, utilities, …

- The firm will <u>shut down</u> if it cannot cover its variable costs (costs from continue producing), i.e.
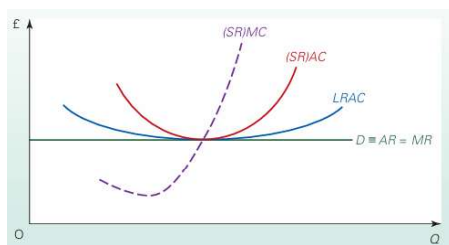
AR ≤ AVC

- The **short-run shut-down point** is where AR curve is tangential to the AVC curve (AR = AVC). The firm can only just cover its variable costs.

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2.4 **WHETHER OR NOT TO PRODUCE AT ALL**

- In the <u>long run</u>, all costs are variable.

- The firm will <u>shut down</u> if it cannot cover its long-run average costs (LRAC), i.e.

$$AR \leq LRAC$$

- The **long-run shut-down point** is where AR curve is tangential to the LRAC curve (AR = LRAC). The firm can just make normal profit.