ECON1001: Introductory Microeconomics

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1. Key concepts and gains from trade

What is economics?

- A social science that studies the ***production, distribution and consumption*** of goods and services
- Economics is the study of ***how people make choices under conditions of scarcity***
- AND the study of the results of those choices on society.
- **Microeconomics** is the study of the individual consumer, firm and market behaviour
- **Macroeconomics** on the other hand, is the study of the aggregate economy

Issues to be addressed

- What to produce?
- How to produce?
- Who should get what is made?

1.1 Key economic concepts

- **Correlation and causation**
  - ***Correlation*** - the degree to which two or more securities move in relation to each other
  - ***Causation*** - a change in one variable brings about a change in another variable

  Economic theory allows us to distinguish between the two
- **Opportunity cost**
  - Economic problem/scarcity - limited resources, unlimited wants → **trade-offs**
  - Opportunity cost is the value of the next best alternative to taking a particular action
    - ***Explicit cost*** - direct cost in undertaking an action (eg. going to university, paying fees)
    - ***Implicit cost*** - indirect cost; value of the next best forgone alternative (eg. working at a construction site and earn $80k over the year RATHER than uni)

*Does not include unrecoverable or **sunk costs** (money spent in the past)*

- (eg. if a business spent $100m on an advertising campaign last year, it cannot get that money (or the effort spent) now by making a different decision)

> 📌 *slope of the line or gradient = opportunity cost = sacrifice/gain*

- **Marginal analysis**
  - ***Marginal benefit*** (for a extra unit consumed for an individual)
  - ***Marginal cost*** (additional cost of buying one more unit)
  - If MB>MC, then agent is better off doing that activity
  - If MC>MB, then agent is worse off doing that activity
- **Ceteris paribus**
  - Latin phrase - *"all other things being equal* (i.e. constant)*"*

> 📌 ***Economic costs*** is just another term for opportunity costs (ie. explicit and implicit costs). ***Accounting costs*** refers to explicit costs only.

1.2 Trade and the production possibility frontier (PPF)

1.2.1 Gains from exchange

> 📌 *Trade can only occur if the seller's valuation of the item (v_s) does not exceed the buyer's valuation (v_b) . Given trade is voluntary, seller will not accept price (p), lower than their valuation and buyer will not agree to a price higher than their valuation.*
>
> $$v_s \leq p \leq v_b$$
>
> where,
> v_s is the seller's valuation
> v_b is the buyer's valuation
>
> Because no party will consent to a transaction that makes him or her worse off, *trade will always make people better off.*

1.2.2 Gains from specialisation

The Production Possibility Frontier (PPF)

PPF traces out combinations of the quantity of two goods (X and Y) that can be produced if all resources are used

Downwards slope of PPF → ***scarcity principle*** (having more of one good = less of another)

Relationship between MC, ATC, AVC

📌 MC curve passes through minimum of ATC and AVC

- When MC of a unit of output > ATC → effect will be an increase of ATC
  - so, if MC curve is *above* ATC curve, it will pull that curve upwards
- When MC of a unit of output < ATC → effect will be a decrease of ATC
  - so, if MC curve is *below* ATC curve, it will pull that curve downwards

📌 ATC is decreasing when MC is below it, and increasing when MC is above it, ***ATC must be at its minimum when it is intersected by MC.*** *For the same reasons,* ***MC intersects AVC at its minimum.***

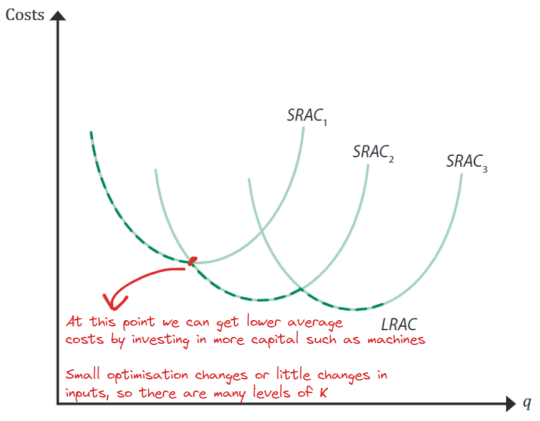
3.4 Long-run costs

3.4.1 Long-run marginal cost

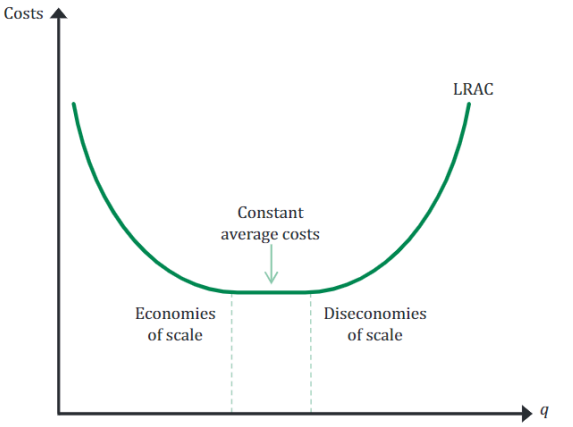
- In long run: *inputs* are variable means *costs* are variable
- The MC of increasing output by one unit must take into account the cost of all variable inputs
- For the *same level of output*, long-run MC ≤ short-run MC

3.4.2 Long-run average cost

- Long-run average costs ≤ short-run average costs



The LRAC curve is the lower part of the SRAC curves. As more SRAC curves are drawn in, the LRAC curve will become smoother.



Represents the LRAC curve, resulting from multiple SRAC curves.

- ***Economies of scale*** is cost advantages a firm achieves from increasing output
- ***Constant average costs*** is where LRAC are constant as output expands
- ***Diseconomies of scale*** is if LRAC are increasing with output

Total revenue, total cost and economic profit

- ***Total revenue***
  - $TR = P \times Q$
- ***Economic profit*** (π)

$$\epsilon = \frac{\Delta y/y}{\Delta x/x} = \frac{\Delta y}{\Delta x} \cdot \frac{x}{y} = \frac{dy}{dx} \cdot \frac{x}{y}$$

Midpoint (or arc) method

*Sometimes we are interesting in elasticity when moving from one point to another - we use **midpoint method***

- Suppose price of a good changes from P_1 to P_2, which causes quantity demanded to change from Q_1 to Q_2. Here we are moving from one point $(Q_1,\ P_1)$ to another $(Q_2,\ P_2)$

$$\epsilon = \frac{\Delta Q}{\Delta P} \cdot \frac{P_1 + P_2}{Q_1 + Q_2}$$

$$\epsilon = \frac{(\Delta y)/y^m}{(\Delta x)/x^m} = \frac{\Delta y}{\Delta x} \cdot \frac{x^m}{y^m}$$

where $x^m = \frac{x_1+x_2}{2}$ and $y^m = \frac{y_1+y_2}{2}$

6.2 Applications

6.2.1 Elasticity of demand

Measures how sensitive the quantity demanded of a good (Q_d) is to changes in price (P) - that is, proportional change in Q_d, given a 1% change in P

Midpoint method

$$\epsilon_d = \frac{\Delta Q_d}{\Delta P} \cdot \frac{P^m}{Q_d^m}$$

Point method

$$\epsilon_d = \frac{dQ_d}{dP} \cdot \frac{P}{Q_d}$$

Elasticity of demand is typically negative due to the law of demand.

What do values of ϵ_d mean?

- If $\epsilon_d = 0$, demand is ***perfectly inelastic*** - *vertical line*
  - for a 1% change in P, there is no change in Q_d (i.e. Q_d is not at all responsive to changes in P)
- If $\epsilon_d < 0$, demand is ***inelastic***
  - for a 1% change in P, $\Delta Q_d < 1\%$ (i.e. Q_d is not very responsive to changes in P)
- If $\epsilon_d = -1$, demand is ***unit elastic***
  - for a 1% change in P, $\Delta Q_d = \%\Delta P$ (i.e. Q_d changes by the same proportion as P)
- If $\epsilon_d < -1$, demand is ***elastic***
  - for a 1% change in P, $\Delta Q_d > 1\%$ (i.e. Q_d is very responsive to changes in P
- If $\epsilon_d = -\infty$, demand is ***perfectly elastic*** - *horizontal line*
  - for a small increase in P, $Q_d = 0$ (i.e. if a firm raises its prices at all, its customers will go elsewhere to buy the product)

Is ϵ_d constant at any point on a curve?

*Even when the demand curve is straight, **elasticity of demand changes as we move along a curve***

- Slope of the demand curve is ***constant*** → i.e. unchanged & no effect to elasticity
- Proportion (P/Q) ***changes*** as we move along the curve

Elasticity and revenue

Differentiate with respect to P to determine ***how TR changes in response to a small increase in price***

$$\frac{dTR}{dP} = Q + P \cdot \frac{dQ}{dP}$$

Rearranging this equation, we can see how ΔTR depends upon ϵ_d

$$\frac{dTR}{dP} = Q(1 + \frac{P}{Q} \cdot \frac{dQ}{dP}) = Q(1 + \epsilon_d)$$

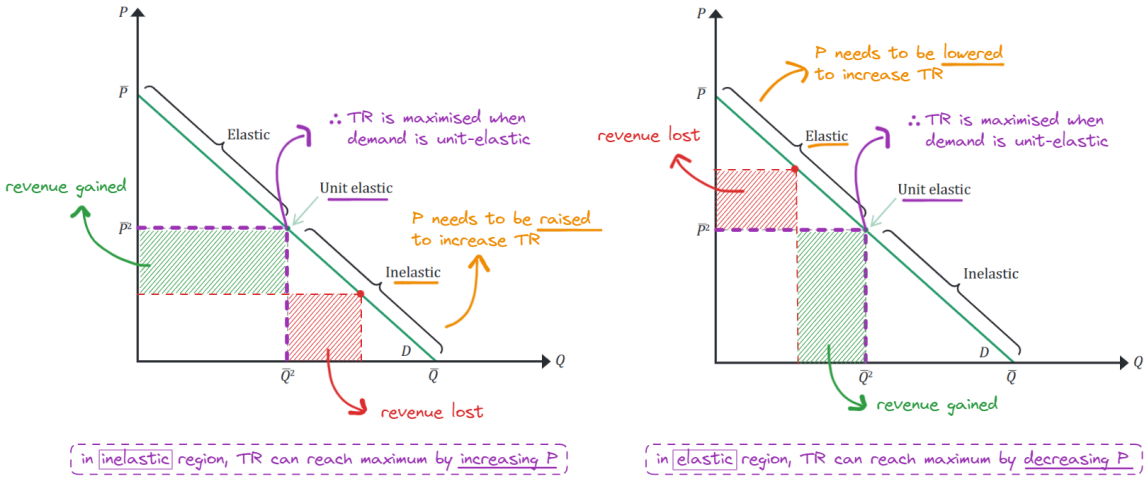
This shows the direct link between price elasticity of demand and the change in total revenue.

How TR responds with price changes?

- With first derivative we know if positive $(f(x) > 0)$ it is increasing and if negative $(f(x) < 0)$ it is decreasing.
- Assume $Q > 0$ as no negative quantity can be demanded

Then,

- TR ***increases*** if price increases, when $\frac{dTR}{dP} > 0$, which means demand must be inelastic $(\epsilon_d > -1)$
- TR ***decreases*** if price increases, when $\frac{dTR}{dP} < 0$, which means demand must be elastic $(\epsilon_d < -1)$
- ***TR is maximised when*** $\frac{dTR}{dP} = 0$***, which means demand is unit elastic*** $(\epsilon_d = -1)$



Intuition behind the result:

- If demand is ***elastic***, a 1% increase in price will cause a ***greater*** than 1% fall in Q_d - the increase in P is more than offset by decrease in Q_d, causing ***TR to fall overall.***
- If demand is ***inelastic***, a 1% increase in price will cause Q_d to fall by ***less*** than 1% - the increase in P outweighs the decrease in Q_d, causing ***TR to increase overall.***

6.2.2 Elasticity of supply

Measures how sensitive the quantity supplied of a good (Q_s) is to changes in price (P) - that is, proportional change in Q_s, given a 1% change in P

Midpoint method ***Point method***

$$\epsilon_d = \frac{\Delta Q_s}{\Delta P} \cdot \frac{P^m}{Q_s^m}$$

$$\epsilon_d = \frac{dQ_s}{dP} \cdot \frac{P}{Q_s}$$

Elasticity of supply is typically positive due to the law of supply.

What do values of ϵ_s mean?

- If $\epsilon_s = 0$, supply is ***perfectly inelastic*** - *vertical line*
  - for a 1% change in P, there is no change in Q_s (i.e. Q_s is not at all responsive to changes in P)
- If $0 < \epsilon_s < 1$, supply is i***nelastic***
  - for a 1% change in P, $\Delta Q_s < 1\%$ (i.e. Q_s is not very responsive to changes in P)
- If $\epsilon_s = 1$, supply is ***unit elastic***
  - for a 1% change in P, $\Delta Q_s = \%\Delta P$ (i.e. Q_s changes by the same proportion as P)
- If $\epsilon_s > 1$, supply is ***elastic***
  - for a 1% change in P, $\Delta Q_s > 1\%$ (i.e. Q_s is very responsive to changes in P
- If $\epsilon_s = -\infty$, supply is ***perfectly elastic*** - *horizontal line*
  - for a small decrease in P, $Q_s = 0$ (i.e. if the price of a good falls below a certain price, firms will stop supplying the product)

6.2.3 Cross-price elasticity of demand

Examines the relationship between quantity demanded of one good and the price of another related good. This measures how sensitive the quantity demanded of Good A (Q_A) is to changes in price of Good B (P_B).

Midpoint method

$$\epsilon_{AB} = \frac{\Delta Q_A}{\Delta P_B} \cdot \frac{P_B^m}{Q_A^m}$$

Point method

$$\epsilon_{AB} = \frac{dQ_A}{dP_B} \cdot \frac{P_B}{Q_A}$$

What do values of ϵ_{AB} mean?

Cross-price elasticity provides some information about the relationship between the two products:

$$\frac{dQ_A}{Q_A} = \epsilon_{AB} \times \frac{dP_B}{P_B}$$

- If $\epsilon_{AB} > 0$, this means Good A and Good B are ***substitutes*** (i.e. goods consumed in place of each other such as tea and coffee)
  - *increase* in price of Good B is *associated* with a *rise* in quantity demanded of Good A
- If $\epsilon_{AB} < 0$, this means Good A and Good B are ***complements*** (i.e. goods that are consumed together such as bacon and eggs)
  - *increase* in price of Good B is *associated* with a *fall* in quantity demanded of Good A
- If $\epsilon_{AB} = 0$, this means Good A and Good B are ***independent goods*** (i.e. the two goods are completely unrelated such as ice cream and chainsaws)
  - *increase* in price of Good B is *not associated* with any change in the quantity demanded of Good A

6.2.4 Income elasticity

Measures how sensitive the quantity demanded of a good (Q) is to changes in income (Y)

Midpoint method

Point method

$$\eta = \frac{\Delta Q}{\Delta Y} \cdot \frac{Y^m}{Q_m} \qquad \eta = \frac{dQ}{dY} \cdot \frac{Y}{Q}$$

What do values of η mean?

- If $\eta < 0$, this is an ***inferior good***
  - when Y *rises*, Q_d for the good *decreases*
  - eg. offal; as income increases, consumers can afford to eat superior cuts of meat
- If $\eta = 0$, this is a ***neutral good***
  - when Y *rises*, Q_d for the good *does not change*
- If $0 < \eta \leq 1$, this is a ***normal good***
  - for a *1% increase* in Y, $\Delta Q_d < 1\%$
  - eg. food; as income increases, consumers will consume more food, but the increase is likely to be proportionally less than the increase in income
- If $\eta > 1$, this is a ***luxury good***
  - for a *1% increase* in Y, $\Delta Q_d > 1\%$
  - eg. caviar; if income increases by 1%, consumption of caviar will likely rise by more than 1%

📌 ***Elasticity depends on various factors such as timeframe***
Elasticities are greater in long run than in short run, as people have time to adapt to the new change.

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7. Types of markets

- ***Perfectly competitive markets***
  - many buyers and sellers, low barriers to entry, all producers sell identical products
  - so, firms do not have the market power to *set prices*
- ***Monopoly markets***
  - only one seller, high barriers to entry
  - so, the single producer does have the power to *set prices*
- ***Monopolistically competitive markets***
  - many firms who differentiate themselves by selling slightly different products, low barriers to entry
  - so, these firms have some scope of power to set their own prices
- ***Oligopoly markets***
  - only a handful of sellers, high barriers to entry, depending on market it may/may not have product differentiation
  - note: the actions of each firm in the market affects other firms, so strategic interaction is critical to the outcome of these markets
  - so, these firms have some power to *set prices,* although choices may be dictated by actions of other firms in the market

7.1 Perfect competition

📌 **To calculate profit,** $\pi = (p - ATC)q^*$
$\pi = p \times q - TC = p \times q - ATC \times q = (p - ATC)q^*$

7.1.1 Supply in the short run

As a firm's FOP is fixed in the short run, there is a fixed cost of production that is incurred regardless of output → this fixed cost is called ***sunk cost*** *(i.e. it cannot be recovered no matter what)*

- To decide the level of output to produce ***in the short run, a firm will ignore its fixed costs***

Firm supply in the short run: the shut-down decision

If a firm chooses not to produce in the short run, we say that the firm is ***shut down***

- In the short run a firm should only take into account variable costs as fixed costs are sunk, so it should ***ignore TFC*** when deciding whether to supply at a given price point

  $\pi = TR - TC = TR - TVC - TFC = p \times q - q \times AVC = (p - AVC)q$

Shut-down condition in the short run if $TR < TVC$ or $TR - TVC < 0$

Divide both sides of this equation by the level of output (q):

$$\frac{TR}{q} < \frac{VC}{q} \implies p < AVC$$

This tells us that ***if price falls below the AVC, a firm will shut down***

However, if a firm is to produce it requires that $p > AVC$ and will choose the level of output in accordance with its supply curve (i.e. MC curve)

1. A firm will ***shut down*** when $\pi < 0$ (i.e. $(p - AVC)q^* < 0$
2. A firm will produce when $\pi > 0$ (i.e. $(p - AVC)q^* > 0$

📌 Remember: the MC curve intersects the AVC curve at its minimum

So, we can rewrite the ***shut-down rule*** (i.e. when firms choose not to produce) for a competitive firm as:

$$p < AVC_{min}$$

and, a firm will produce positive output if $p \geq AVC_{min}$

📌 *A firms short-run supply curve is traced out by the part of its MC curve that lies above* AVC_{min} *because when* $p < AVC$, $\pi < 0$ *and no incentive to produce*