INTRODUCTION TO MICROECONOMICS – ECON.201

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A. The Economic Concept

Economics is defined as a social science that aims to study how the society allocates its scarce resources to satisfy the society's unlimited needs and wants in the most efficient way. Since resources are limited (scarce) and the needs and wants are unlimited, therefore, we can say that economics is the study of how people make choices.

- **Labor**: the human resource and their contributions
- **Capital**: physical and human
- **Opportunity Cost**: the gain that could have otherwise been obtained
- **Normative statement**: value-based (vs. positive which are facts/science-based)

B. Production Possibility Frontier (PPF)

The PPF is a curve that represents all possible combinations of total output that could be produced using a fixed amount (full utilization) of resources in an efficient way. It is used to illustrate the constrained choices that a society has to make due to scarcity of resources. This, in turn, explores the opportunity cost of each choice.

- All resources fully employed
- Production over a time period (short-run analysis)
- Technology is stable over this period
- Unemployment corresponds to points inside PPF
- Full employment may be inside PPF due to miss allocation of resources
- Points above PPF cannot be reached
- Points on PPF represent full-employment and production efficiency
- Negatively sloped because of scarcity
- Bowed-shape because of the increasing opportunity cost concept
- The more specialized the resources, the more bowed the PPF is

C. Data and Index

There exists time-series data (one individual or variable, over time), and cross-section data (observations on different individuals or variables at the same time). Longitudinal data tracks one variable of several individuals at multiple time frames.

- An index number is a number that is relative to a given base year number (i.e. 3.7 GPA compared to first year 3.3GPA – Thus, this year's index number is 3.7/3.3 * 100 = 112, there 12% higher relative to first year's GPA.)
- Determine base year
- **Index value** = $\frac{\text{Price i}}{\text{Pricebase}} * 100$ = **NPI**
- **%-Change** = $\frac{\text{Index1}-\text{Index2}}{\text{Index2}} * 100$
- **Real Price Index** = $\frac{\text{NPI}}{\text{CPI}} * 100$ = **CPI**
- **CPI**: most popular price index in the economy.
- **Inflation**: when prices increase
- **Deflation**: when prices decrease

D. Demand, Supply, and the Market

Demand is the amount of a good or service that buyers want and able able to buy at every possible price (Demand is the entire curve). Quantity demanded is the amount purchased at a specific price. A change in price swaps only Qd. Negative slope because more is bought at lower prices.

- Shifts **Right**: if demand increases
- Shifts **Left**: if demand decreases
- Income increases: demand increases (normal good)
- Income increases: demand decreases (inferior good)
- Price of P_1 goes up, demand for P_2 goes up, *complementary* goods
- Price of P_1 goes down, demand for P_2 goes down, *substitute* goods
- *Taste and Preferences*, *Expectations*, *Number of Buyers*, and *Information* are factors that can switch the whole *Demand curve*, and not solely Qd.

Supply is the amount of a good or service that sellers want and are able to sell at every price (Supply is the entire curve). Quantity supplied is the amount supplied at a specific price. A change in price swaps only Qs. Positive slope because more is supplied at higher prices.

- Shifts **Right**: if supply increases
- Shifts **Left**: if supply decreases

- *Input Costs*, *Technology*, *Expectations*, and *Number of Firms,* are factors that can switch the whole *Supply* curve, and not solely Qs. More outputs and reduction $.
- Price of P_1 goes <u>down</u>, supply for P_2 goes <u>down</u>, *complementary* goods
- Price of P_1 goes <u>down</u>, supply for P_2 goes <u>up</u>, *substitute* goods

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- When they are drawn, we assume ceteris paribus – other variables held constant.
- **Equilibrium price**: price where Qd = Qs
- **Excess-Supply**: Qs > Qd at specific price (<u>producers</u> accept *lower* prices)
- **Excess-Demand**: Qs < Qd at specific price (<u>consumers</u> accept *higher* prices)
- To calculate equilibrium, we equate the two curves, Demand and Supply.

Free-Markets and Managed Markets

The government can limit the ability of people to influence by setting up Quotas, Price controls, and Production Subsidies.

- **Quota**: physical restrictions on output. The government thinks that the equilibrium price P_0 is very low and not enough for suppliers. It decides to increase the price by placing a quota (Q_0 to Q_q). Supply is therefore fixed at S_q, and price goes up (P_0 to P_q).
- **Price Controls:**

  - <u>*Price Floors*</u> are a minimum price allowed for a good or service (ex: wage can't be less than 8$/h). On a graph, P_F is higher than P_0. Qd goes down (Q_0 to Q_F). The top triangle represents unemployment.

  - <u>*Price Ceilings*</u> are a maximum price allowed for a good or service (ex: can't sell milk more than 2$/L). Government thinks rent is too high, and places a price ceiling (P_C). The number of apartments offered goes down (Q_0 to Q_C). It is above equilibrium and is ineffective on economy and producers will continue to sell at E_0.
- **Production Subsidy**: the government asks the producers to increase production in return for financial assistant from the govt. They think that the equilibrium quantity Q0 is low and that consumers should get more of the good. It wants producers to increase production (Q_0 to Q_1). Consumers hence pay a lower price (P_0 to P_C) and producers get a higher price that is (P_0 to P_S). On a graph, the supply curve shifts to the right.

E. Elasticity of Demand and Supply

The Price Responsiveness of Demand & Supply

To measure how responsive demand/supply is to a change in price:

$$\text{Price Elasticity of demand} = \frac{\%\Delta Q}{\%\Delta P}$$

1. **Point Elasticity**: consumer responsiveness at one specific point on the D curve.
   - Point $_E d = \frac{\Delta Q}{\Delta P} * \frac{P}{Q}$
2. **Arc Elasticity**: consumer responsiveness over a segment on the D curve.
   - Arc $_E d = \frac{\Delta Q}{\Delta P} * \frac{Pbar}{Qbar}$, where Q_{bar} is $(Q_2+Q_1)/2$
3. **Cross-Price Elasticity**: D responsiveness for good **x** if price of good **y** changes
   - C-P $e_d = \frac{\%\Delta Qx}{\%\Delta Py}$
   - Point $_{d(x,y)} = \frac{\Delta Qx}{\Delta Py} * \frac{Py}{Qx}$
   - Arc $_E d = \frac{\Delta Qx}{\Delta Py} * \frac{Pbar-y}{Qbar-x}$, where Q_{bar} is $(Q_2+Q_1)/2$

Demand/Supply elasticity rule:

- Elastic when **e > 1**
- Inelastic when **e < 1**
- Unit elastic when **e = 1**

Short-run is inelastic demand because people are not able to switch to another product in a short period of time, they need to re-adjust. **Long-term**, however, is more of an elastic demand because people are able to make the switch and they have time for adjustment.

- When the Demand curve touches the y-axis, elasticity reaches it maximum range, that is, *infinite*.
- At the midpoint of any Demand curve, elasticity is equal to **-1**, thus is unit elastic.
- When the Demand curve touches the x-axis, elasticity reaches its minimum range, that is, *zero*.
- The slope of the Demand curve usually gives us a clue about elasticity.
- The **greater** the slope, the more inelastic demand is, whereas the **smaller** the slope, the more elastic it is.
- **Total expenditure**: total amount of money that buyers in the market pay for X.
- **Total Revenue**: total amount of money that sellers in the market get for X.

- In order to **maximize** the possible Revenue (**TR**) from the sale of a good or service, it should be priced where the demand is <u>unit-elastic</u>.
- For **Cross-Price elasticity**, if:
  1. P_1 goes up & Q_2 goes up, they are <u>substitute</u> goods, with an elasticity of demand > 0 **(+)**
  2. P_1 goes up, Q2 goes down, they are <u>complementary</u> goods, with an elasticity of demand < 0 **(-)**

Elasticity and Taxes

Two forms of Taxes for goods and services.

1) Specific Tax (a fixed dollar amount)
2) Ad Valorem Tax (percentage of the price of the good added to the price of good)

Taxes are a burden on both buyers and sellers. Who pays more/less depends on how elastic the demand and supply curves are.
If the **demand curve is more elastic** than the supply curve, then the seller pays more of the tax. This is because an increase in price will cause demand to fall significantly and the supplier will have to pay more of the tax in order to prevent demand from falling too much. If the **supply curve is more elastic** (demand inelastic) than the demand curve, then buyers pay more of it, because an increase in *P* will not cause demand to fall enough, so suppliers will not have to prevent demand from falling and will pass the tax on to consumers. The more inelastic party ends up paying more of the tax.

F. Welfare Economics

In today's globalized markets, both the private and govt choose what how and for whom to produce goods and services. Welfare looks at how well the economy is using its resources and how they are used to increase <u>Efficiency</u> & <u>Equity</u>.

Consumer Surplus (CS): the difference between what the consumers are willing to (Upper triangle) pay for a good and the actual market price of that good
Producer Surplus (CS): the difference between what the producers are willing to (Lower Triangle) sell a good for and the actual market price of the good.

Efficient Market: a market where goods and services are being sold to people that are willing to pay for them.

- Tax Wedge is the amount that govt. receives as tax in the form of goods and services or income tax. It is the difference between $P_{consumer}$ and $P_{producer}$ and the result is what they get.

Market Failures – Negative Externalities

- **Externalities**: when a 3rd-party is affected positively or negatively, by the trading of a buyer and seller.
  - **i.** Negative Externality is an externality that negatively affects (costs) the 3rd-party, which commonly is society
- Externalities are not always included in the price that was agreed-on.
- **Cost** is higher socially than privately (in terms of damages)
  - **i.** Private Cost is the cost paid by those involved in the activity
  - **ii.** Social Cost is the cost that everyone in the society pays, even those not involved the activity (damages, pollution, etc)
- This is why the govt. usually interferes to make sure that $P_{cost} = S_{cost}$ and it usually intends to tax producers.
- Quantity Q_0 should be reduced to Q_1 (Equilibrium E1) and the triangle between the two S curves is the benefit of society after adjustments.
- A market will no longer be efficient (no free-trade) if govt decides to close, say, factories, and CS and PS will be lost.

Market Failures – Negative Externalities

  - **i.** Positive Externality is one that benefits society. It enables people to get a "free-ride" on the efforts of others.
- The govt. can give a subsidy to companies so that they be compensated properly for the full benefit they offer society, motivating them to produce more of that thing, or patent laws.
  - **ii.** Supply curve shifts to the right (S_0 to S_1)
  - **iii.** Price goes down (P_0 to P_1)
  - **iv.** Output goes up (Q_0 to Q_1)

Equity, Justice, and Efficiency

There are two types of Equities:

- **i.** Horizontal Equity people who are equal should be treated equally
- **ii.** Vertical Equity people that aren't equal should get differentiation

- By increasing the tax rate for people who earn more, gap between rich and poor is diminished. This type of distribution of earnings influences demand in many of the economy's markets.
- Govt imposes a tax, salaries go down, Govt revenue goes up; DWL goes up.
- It increases the Govt. revenue and they can re-distribute it to the poor through financial assistance. Hence, equity goes up, however efficiency goes up; market becomes inefficient because of the DWL.

G. Consumer Choice & Demand Decisions

People are always trying to maximize their satisfaction from goods or services. Buying more of a good or service will increase your utility. Thus, the additional or marginal utility (MU) seen when adding each good is positive.

- **Utility**: the satisfaction that you gain from a good or a service
- **Cardinal Utility**: the measurable satisfaction
- **Total Utility**: increases at a diminishing rate, and maximum is reached when the marginal utility of consuming the good (MU) reaches zero.
- **Marginal Utility**: decreases until it reaches the zero point, reflecting people's diminishing marginal utility concept.
  - **i.** Marginal Utility = $\frac{\Delta \text{Total Utility}}{\Delta \text{Qty}}$
  - **ii.** Marginal Utility Per Dollar ($) = $\frac{\text{Marginal Utility (MU)}}{\text{Price}}$
- When someone spends a budget in a way that gives maximum utility, it is the consumer equilibrium.
- **Consumer Equilibrium**: The buyer reaches maximum utility with his budget and he gets the same utility per dollar for the last unit of each product.
  - $E_C = \frac{\text{MUa}}{\text{Price a}} = \frac{\text{MUb}}{\text{Price b}}$

Utility and Demand

Marginal utility slopes downward. As consumption increases, one places less value (satisfaction) on every next consumption. As it increases, one's willingness to pay a higher price vanishes (toward a lower one.) This is why the Demand is bow-curved.

Indifference Analysis

Stands for the fact that we are trying to find different combinations of tow goods that give people the same amount of total satisfaction. For instance, buying 2 watches and 1 ring, whereas to buy 4 watches and 2 rings, will yield same total

utility. Hence, one is indifferent (no preference) between any of the two combinations. Now comes the matter of *Ordinal Utility*.

- **Ordinal Utility**: means that people can't measure their utility, they can only say if one collection of goods or services gives them more satisfaction than another combination. It must be accounted that one knows which:
    - **i.** bundles of goods or services will give them the same satisfaction.
    - **ii.** bundles of goods and services will give them more satisfaction.

- **Indifference Curve**: the curve that brings together all the different combinations of products that give you the same satisfaction. The following are characteristics of that curve:
    - **i.** Indifference curves that are further from the origin (y=0,x=0) reflect higher levels of satisfaction
    - **ii.** Indifference curves are negatively slopped (need to give up some of good "A" to get more of good "B", and etc, to remain indifferent.
    - **iii.** Indifference curves cannot intersect (If two curves intersect at a given point, then we would have two different levels of satisfaction for the same bundle. This is not possible.
    - **iv.** Indifference curves are convex when viewed from the origin due to diminishing marginal rate of substitution (MRS)
    - **v.** MRS: the slope of the indifference curve (give 8 y for 1 more x)

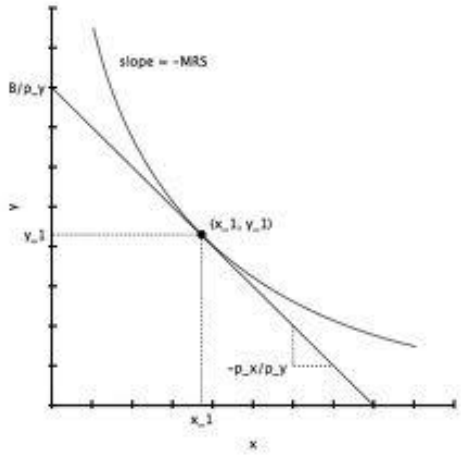
- **Diminishing Marginal Rate of Substitution (MRS)**: this concept illustrates that the more of product A we have in our basket, the less each additional unit of product A is worth to us.

The Budget Constraint

People have different budgets based on their wealth.

- **BCL**: shows all bundles of goods that the consumer can afford with Income(I)
- **Income (I)** = $P_A Q_A + P_B Q_B$
- **X-intercept** = $\frac{I}{Px}$ and **y-intercept** = $\frac{I}{Py}$
- **Slope of BCL**: $\frac{\Delta y}{\Delta x}$ or $\frac{Px}{Py}$
- If income (I) rises and that price remain constant, one can afford to buy more of both products and this change is shown by a parallel outward shift of the budget constraint line (BCL).
- Highest satisfaction can be achieved if a consumer moves to a bundle that is on a higher indifference curve. Having a budget constraint, one must choose a bundle where the BCL touches the IF curve of this bundle at the **tangent**.

The Optimal Satisfaction



- The tangent point is the optimal point where a consumer reaches his highest satisfaction since this is where his BCL is tangent to the indifference curve IF. We are in fact combining the consumer's ability (BLC) and the consumer's objective to maximize utility (preference), represented by the IC.
- At this point (x, y):

i. $\text{MRS} = \frac{\text{Price B}}{\text{Price A}}$

ii. $\frac{\text{MUa}}{\text{Price A}} = \frac{\text{MUb}}{\text{Price b}}$ and $\frac{\text{MUa}}{\text{MUb}} = \frac{\text{Price a}}{\text{Price b}}$

iii. The optimal bundle should satisfy the BCL equation

H. Uncertainty and Attitudes Towards Risk

Probability is the likelihood that a given outcome will occur.

The more money we have, the less we will value additional money (less MU) and the less money we have, the more we will value additional money (more MU). This is the reason why risk-averse people spent a lot of money on reducing risk.

By splitting up the income with someone, the probability of making some money is increased. Check at utility gains or loss for worst-off or better-off.

- Find the *expected value* $\mathbf{E_{(x)}} = P_1X_1 + P_2X_2 + \ldots + P_NX_N$
  - **Uncertainty**: when an event has a number of states of the world that may occur and we do not know which one will arise.
  - **Risk**: exists when we can estimate the probability of occurrence of each state of the world for this event.
  - **Fair Gamble**: a gamble that has a zero expected value.
  - Three (3) types of Attitudes towards Risk:

1) Risk Averse: accepts a gamble only if the expected value exceeds its certainty equivalence. A risk averse person always refuses a fair gamble. The more risk averse the individual is, the more favorable the gamble should (higher $E_{(x)}$) in order to accept it. A person whose utility of the expected value of a gamble is greater than his/her expected utility from the gamble itself
2) Risk Neutral: is indifferent between accepting and not accepting a fair gamble. He/she will only accept a favorable gamble (its expected value is higher than its certainty equivalence) and refuse an unfavorable gamble. A person whose utility of the expected value of a gamble is the same as his/her expected utility from the gamble itself.

3) Risk Lover: will accept a fair gamble any may even accept an unfavorable gamble. A person whose utility of the expected value of a gamble is less than his/her expected utility from the gamble itself.

I. Firms, Investors, and Capital Markets

Businesses can take shape in several different ownership forms:

1) Sole proprietorship: solely responsible
2) Partnership: share profit and jointly responsible
3) Corporation: shareholders are responsible

- **Limited Liability**: shareholders don't have to pay for the company's debts to others.
- **Dividends**: payments made from after-tax profits to shareholders. Per share-basis.
- **Capital Gain**: difference between the price of a stock sold and the price paid initially
- **Retained Earnings**: profits kept from a company to reinvest later on.
- **Principal**: a person that hires an agent to take decisions for him; company's mngrs.
- **Agent**: a person who is hired by the principal to make decisions (CEO, president).
- **Principal-Agent Problem**: agent doesn't act in the best principle of his boss.
- **Risky**: outcomes (make 100$, lose 5000$) spread (lose 3000$ or make 3000$)
- **Dispersion**: the difference between two possible outcomes; d(200 and -200 is 400)
- **Risk Pooling**: act of combining independent risks to increase avg. utility (income)
- **Risk Spreading**: spread risk over many people and reduce stake of risk of each guy
- **Nominal Return**: the rate of return achieved before inflation is taken into account
- **Inflation**: is the rate of increase in prices
- **Real Return**: equals roughly the nominal return – the rate of inflation
- **Capital Market**: all financial institutions – link between investors and firms
- **Portfolio**: a mix of assets including the shares investor own. Reduce risk through:

- **Diversification**: when an investor invests in many different assets whose returns are independent upon one another

J. Production and Costs

It is about measuring the production performance of a company and the costs of production. Companies in general try to produce goods and services efficiently and economically in order to minimize costs while keeping the customer happy.

- **Efficient Production**: when the company produces goods with minimal waste of resources (labour, machines, money, time, space)
- **Production Function**: the relationship which specifies how much output can be produced with specific amounts of inputs in production.

Production efficiency types (2)

i. Technological Efficiency: the *maximum output* is produced **given any set of input**s. It does NOT mean that the process includes technologically advanced equipment. To avoid waste: to be tech-efficient.
ii. Economic Efficiency: when the production method produces the exact output required at the **least cost**. It doesn't matter what kind of inputs.

Time Frame Categories (3)

i. Short-Run: period of time where at least one factor of production is fixed, unattainable for a certain period of months, hence creating the short-run.
ii. Long-Run: period of time where all factors of production are variable.
iii. Very Long-Run: the period of time it takes for new technology to appear.

A) Production in the Short-Run (SR)

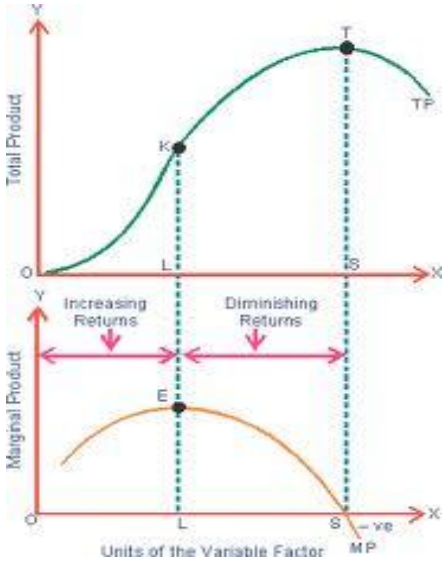
Since companies cannot install additional machine and equipment in the SR, most production involve a fixed amount of equipment while the number of workers changes.

- **Total Product** (TP) of labour: the total output produced with a given number of labour in a facility of fixed size.
- **Average Product** (AP) of labour: the amount of output produced, on average, by workers at different employment levels.

➢ $\text{AP} = \frac{\text{Quantity (TP)}}{\text{Labour}} = \frac{\text{Q}}{\text{L}}$

- **Marginal Product** (MP) of labour: the additional output produced by each additional worker (the relative sum).
  - $\text{MP} = \frac{\Delta\text{Quantity (TP)}}{\Delta\text{Labour}} = \frac{\Delta Q}{\Delta L}$

- **Law of Diminishing Returns**: as more and more workers are hired, each additional worker won't be as productive as the previous one. Then, marginal product <u>MP will start to decrease</u>. TP increases at a <u>diminishing rate</u>.



- As soon as MP goes below AP, AP <u>starts</u> declining
- At AP_{MAX} : TP increases at diminishing rate
- At MP_{MAX} : TP is at max and inefficient (++labour)
- Before MP_{MAX} : <u>increase</u> returns
- Between MP_{MAX} and TP_{MAX} : <u>diminishing</u> returns
- MP leads the AP
- If MP > AP, then AP **increases**
- If MP < AP, then AP **decreases**
- Marginal Product is the *leader indicator*

B) Costs in the Short-Run (SR)

The cost of production in the SR mainly consists of four concepts (4):

i. <u>Fixed-Costs</u> (FC): costs that don't change as the level of output changes.
ii. <u>Variables Costs</u> (VC): costs that do change as the level of output changes.
iii. <u>Total Cost</u> (TC): the sum of fixed cost and variable cost, *TC = FC +VC*
iv. <u>Sunk Cost</u>: is a fixed cost that has already been incurred and cannot be eliminated by producing zero output. For instance a machine bought, cannot be re-exchanged for money by producing zero output, it was paid.

The following can be computed (4)

i. **Average Fixed Cost** (AFC): is the total fixed cost per unit of output
   $\text{AFC} = \frac{\text{FC}}{\text{Q(TP)}}$
ii. **Average Variable Cost** (AVC): is the total variable cost per unit of output
   $\text{AVC} = \frac{\text{FC}}{\text{Q(TP)}}$

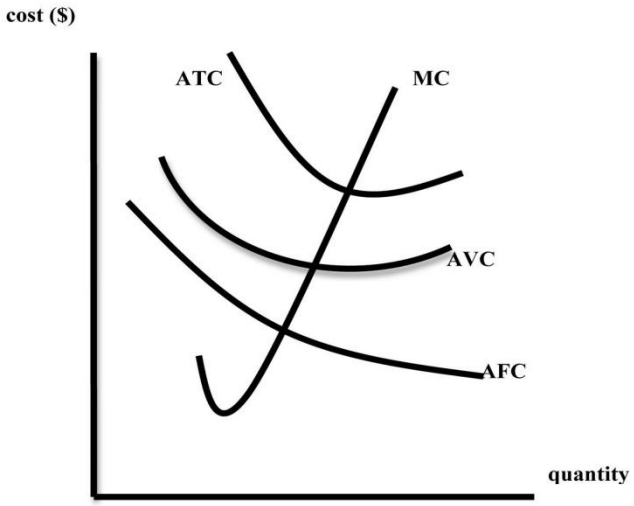
iii. **Average Total Cost** (ATC): is the sum of all costs per unit of output

$$\text{ATC} = \frac{\text{TC}}{\text{Q(TP)}}$$

iv. **Marginal Cost** (MC): is the cost of every additional unit produced

$$\text{MC} = \frac{\Delta\text{TC}}{\Delta\text{Q}} \text{ (or salary / MP)}$$

- AVC goes <u>down</u>, when AP goes <u>up</u>
- AVC goes <u>up</u>, when AP goes <u>down</u>
- At AVC_{MIN} , it is AP_{MAX}
- MC <u>outruns</u> AVC & ATC, they <u>rise</u>
- MC goes <u>down</u>, when MP goes <u>up</u>
- MC goes <u>up</u>, when MP goes <u>down</u>
- At MC_{MIN} , it is MP_{MAX}
- If MC < AVC, then AVC does <u>down</u>
- If MC > AVC, then AVC goes <u>up</u>
- If MC < ATC, then ATC goes <u>down</u>
- If MC > ATC, then ATC goes <u>up</u>
- MC is the *leader indicator*



Business Survival

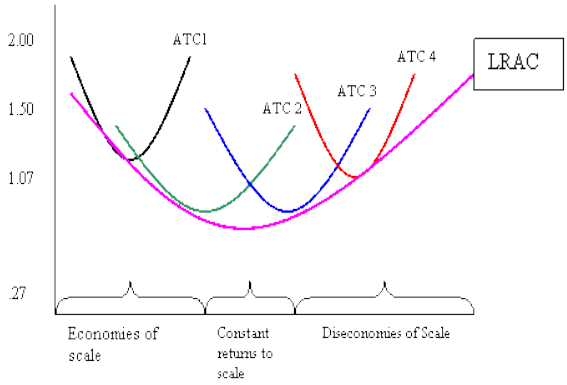
If a company can cover its variable costs, even though it cannot make substantial profit, it should not shutdown. All other costs are sunk costs ("they're history") and are not to be taken into consideration since they will forever exist.

That said, if Price < AVC, in the <u>short-run</u> (SR) the business should shutdown.

C) Production in the Long-Run (LR)

Production costs almost always go down when the size of production initially increases.

- **Economies of Scale**: the cost advantages that a business gets when they expand. Their ATC decreases as they increase their output.
- **Diseconomies of Scale**: the forces that cause a firm to produce at higher average costs because it becomes too large.



- **Constants Return to Scale**: when all inputs are increased by a given proportion, output increases equally proportionally and ATC remains *constant*.
- **Increasing Returns to Scale**: when all inputs are increased by a given proportion, output increases more than the proportionally. ATC goes down.
- **Decreasing Returns to Scale**: when all inputs are increased by a given proportion, output increases less than proportionally.
- **Long-Run Average Total Cost** (LRATC): represents the average cost of product in the long-run (where all economies of scale are achievable). This is basically the combination of all the short-term ATC curves at their respective lowest ATC's which is indicated in.
- The range of output on the LRATC where it begins to flatten out is called the range of minimum efficient scale.
- **Minimum Efficient Scale**: when the firm has expanded enough to take advantage of all available economies of scale.

Technological Change and Economies of Scope

- **Technological Change**: represents innovation that can reduce the cost of production or bring new products to the market. It can cause a downward shift to the entire cost structure.
- **Economies of Scope**: are the cost benefits from producing several products in the same product line instead of just one product, hence spreading the costs across several products instead of one.

K. Perfect Competition

This chapter talks about industries that are perfectly competitive and how an industry, as well as each firm within that industry, behaves in the SR and LR.

An **Industry** consists of all the firms that produce the same product.

$S_{INDUSTRY} = S_{FIRM\ A} + S_{FIRM\ B} + S_{FIRM\ C}$

The Perfectly Competitive Marketplace

Perfectly Competitive Industry is one in where:

i. **There are many firms**: each firm is a small and powerless – price taker
ii. **The product is standard**: each firm produces the exact same product with same quality, same functions, etc
iii. **Buyers have full information**: about the product features and its price
iv. **There are many buyers**: there are many buyers for the product produced
v. **There is free entry and exit of firms**: people can open and close a business in the industry easily (no barriers to enter)

A Firm's Supply Decision

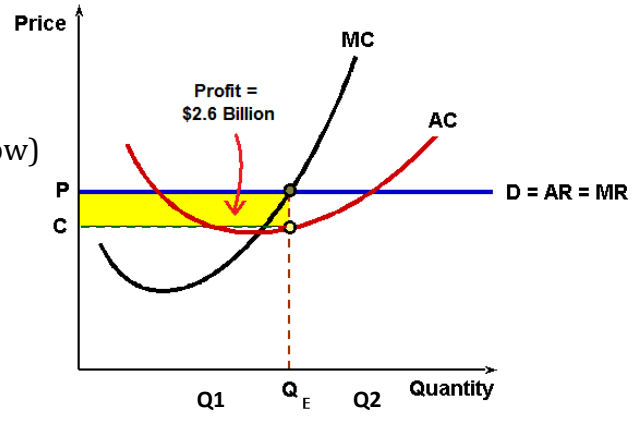
This section talks about how each firm within an industry determines its output.

The number of firms in the industry and their size are considered:

i. Fixed in the SR
ii. Variable in the LR

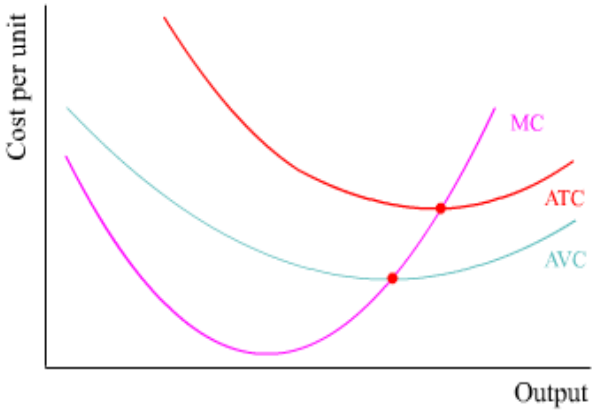
- **Marginal Revenue** (MR): the additional revenue received from selling one added unit
- Each firm in a perfect competition is a *price-taker*, the price is constant and each additional unit sold brings in the same additional revenue: MR = Price
- **Marginal Cost** (MC): the additional cost incurred from producing one added unit
- Firms maximize their profit (TR-TC) when MR = MC.

- At P_0, the optimal Q to supply is $Q_{E/0}$ where MR=MC
- When Q_1 is supplied, MR > MC, giving up profit (yellow)
- When Q2 is supplied, MR < MC, having loss
- In fact, MC = Supply Curve



The Average Costs of a single firm:

- Any point below ATC_{MIN} there is not profit because they sell at a Price < ATC. Called the Break-Even Price.
- At point P= ATC, normal profits are made.
- Any point below AVC_{MIN} the firm isn't covering its average variable costs (AVC). Should shutdown because is constantly loosing $. Shutdown Price.
- The firm's SR-supply is MC above AVC_{MIN}.

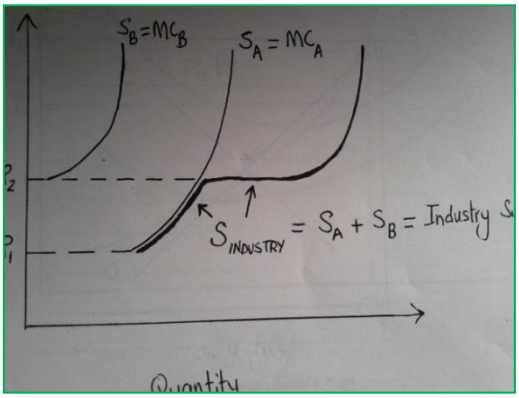


Short-Run Industry Supply

This section shows how short-run industry supply is determined.

The following figure represents the supply curve of Firm A, Firm B, and the entire industry in the Short-Run.

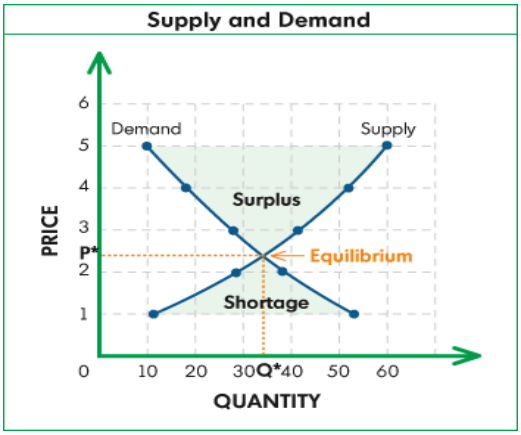
- The MC of Firm A is lower than the MC of Firm B due to the economies of scale (A is larger than B)
- The $S_{INDUSTRY}$, represents the industry supply curve which equals the total supply of both Firm A and B added horizontally.



Industry Dynamics: Entry and Exit of Firms

- **Normal Profits**: profits that producers require to stay in the business. These profits cover opportunity costs also. There if a business owner can instead make more money working somewhere else, he/she will not stay in the business.

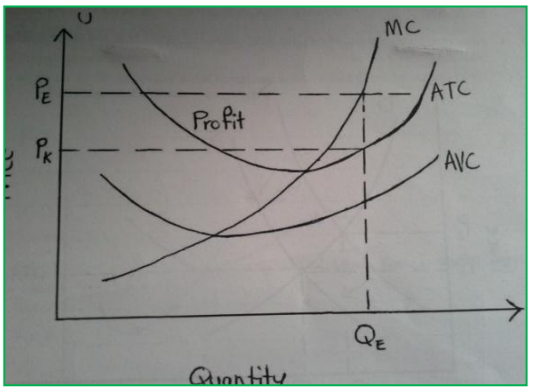
- The demand curve for the entire industry is not fixed at one price as the demand curve for each firm is
- The industry as a whole is not a price taker, only each firm in the industry is a price taker.



- **Supernormal Profits**: are all profits above normal profits

At Q_E:

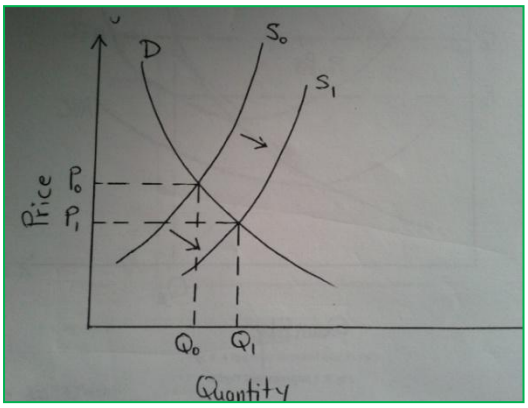
- Market Price = P_E
- Average Total Cost (ATC) = P_K
- Profit Per Unit = P_E - P_K
- Total (supernormal) profit = Area "Profit" which is computed as follows: (BH) = Q_E (P_E – P_K)
- When Price > ATC, supernormal profits arise.



- **Free Entry & Exit**: firms will enter the industry when supernormal profits exist. When more firms enter the industry, the supply curve <u>shifts to the right</u> and the equilibrium <u>price then falls down</u>.

How far does the price fall? How many newcomers for the profitable industry?

- New firms will keep entering the industry and pushing the price downwards until supernormal profits are gone. Thus, the price will fall to the ATC_{MIN}
- Then, the LR industry equilibrium price equals the minimum point of a firm's ATC curve. At this point, only normal profits exist and there is no incentive for firms to enter or exit.
- When firms cannot cover their ATC in the LR, they will shutdown. As firms exit the industry, the supply curve shifts to the left and the price hence goes up.



Long-Run Industry Supply

Some firms will not be able to survive in the LR because:

i. Some firms are making supernormal profits; new firms will enter the industry; price goes down to ATC_{MIN} of those firms that are operating with the lowest cost plant size.

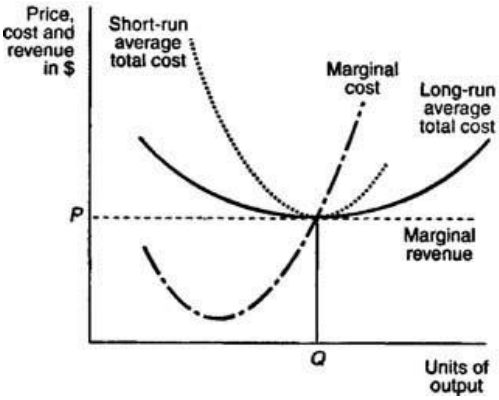
ii. Firms that do not operate at this lowest cost will be forced to exit the industry or to adjust to the cost size to survive.

iii. When demand goes up, P goes up, supernormal profits arise, new firms enter the industry, the SR supply curve shifts to the right, prices go back down.

iv. When demand does down, prices go down, losses arise, firms exist the industry, and the SR supply curve shifts to the left; prices go back up.

v. Therefore, this free entry and exit will lead to a long-run industry equilibrium price equal to the minimum point of a firm's ATC curve.

vi. For long-run P = MC = ATC, breaking even.



L. Monopoly

This section regards monopolistic industries, and how they behave in the short-run and in the long-run.

Monopolistic Marketplace

It has the following characteristics:

i. Only one firm: this firm is the only one in the industry and therefore represents the industry.

ii. No substitutes: there are no products in the market that can be used as a substitute to a monopoly's product.

iii. Barriers: there are many barriers to entry of firms

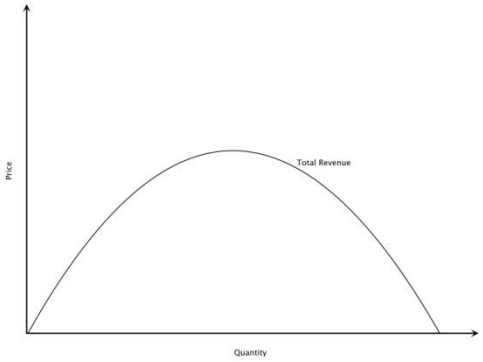
- **Monopolist**: this is a company that has a monopoly over an industry. A monopolist is a price setter/maker- not a price taker.
- **Price Maker**: the monopolist can set the price it wants to sell its product at.

Reasons for the Continuous Existence of Monopolies (3)

i. Economies of Scale (Natural Monopolies): one firm in the market is large compared to all other competitors. Its larger scale allows it to produce at lower ATC due to economies of scale. In this case, it can usually supply the entire market at lower prices and other smaller firms cannot compete at these prices to survive.

ii. National Policy: some govt. has a national firm control an industry for macroeconomic and political reasons.

iii. Successful Entry Barriers: monopolies are often successful in preventing new firms from entering industry. They can use patents, predatory pricing (EOS), and lobbying to achieve this goal.



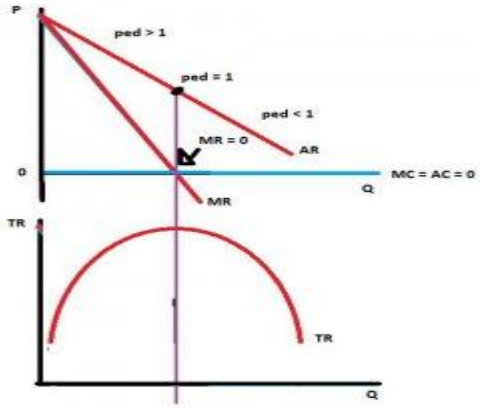
Profit Maximization Rules:

- If MR > MC, increase output
- If MR < MC, reduce output
- If MR = MC, output is optimal

Generalities (I)**:**

- Total Revenue (TR) is maximized at the midpoint of the demand curve (unit elastic). This is also the output (Q) where MR from more sales goes from positive to negative.
- The MR curve is zero at the midpoint of the linear demand curve.

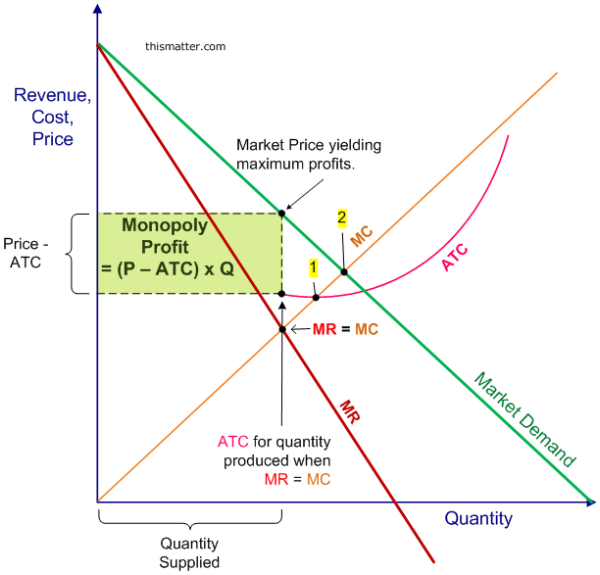
Generalities (II)**:**



- Since the MR intersects the quantity axis at a point halfway to the horizontal intercept of the demand curve, it must have a slope that is twice the slope of the demand curve
- Maximum TR is not the same as maximum profit.
- At unit elasticity, highest revenue is attained.
- When MC = MR, the relative price on the demand curve is the solution for maximum profit (on its elastic segment – to the left, e > 1)

The Demand and Supply Curve of a Monopolist:

- Profit Maximizing Output (optimal Q) is at Q_E when MR = MC
- Profit Maximizing Price is at P_E on Mkt. Demand
- Profit per unit = $(P_E - P_K)\ Q_E$,where P_K is when ATC = Q_E



(1.0)- Monopoly in the Long-Run

In the LR, a monopolist can choose to expand as much as wanted.

If Demand increases and the demand curve shifts to the right, we assume that the monopolist will be able to expand at a constant return to scale.

Therefore, a monopolist's ATC and MC curves are horizontal. By increasing output, profit is earned on each additional unit as long as the MR curve is above the long-run MC curve.

(1.1) - Monopoly and Inefficiencies

The demand curve represents the marginal benefit (MB) as measured by the willingness of buyers to pay increasing amounts

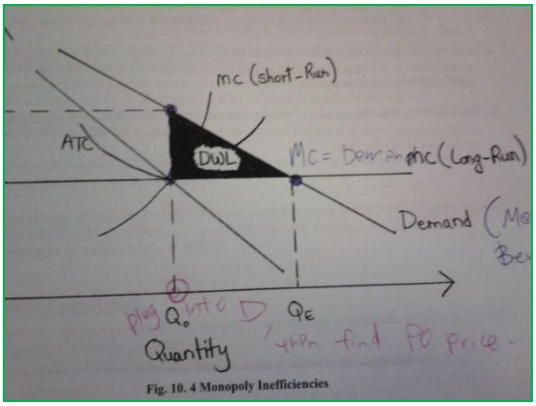


Fig. 10. 4 Monopoly Inefficiencies

Since the marginal revenue (MR) of the monopolist is lower than the demand curve (MB), monopoly equilibrium is not equal to the free market equilibrium. Above the MC (LR) and below Demand curve (MB), the triangle drawn ultimately with P_0 and P_E represents the Dead Weight Loss (DWL). The DWL is not about who gets the profit; it's about the fact that the industry output is so low that society as a whole is sacrificing the possibility of creating additional surplus (inefficient).

(1.2) – Monopoly and Price Discrimination

- Price discrimination: when a firm changes different prices to different consumers in order to increase profit. For it to work:
    1. The seller must be able to divide the market
    2. Resale must be impossible or impractical
- Price discrimination may reduce the DWL associated with a monopoly because the monopolist can sell *at a free market equilibrium quantity* as long as he charges a different price to different consumers.
- Perfect Price Discrimination: when a firm charges a different price to *every single buyer* or *for every unit* sold. It is said perfect because each unit is sold at the different prices that people are willing to pay for.

(1.3) – Cartels

- A cartel is a select group of producers who produce most of a specific product on the market. They co-operatively reduce output to increase profits. Cartels act just like a monopoly and therefore result in a DWL.

- When each firm in the cartel produces at quantity Q_M and price P_M , each firm will make a profit per unit of $P_M - P_K$. All members of the cartel must agree to restrict their output to Q_M or this will not work.
- Since a DWL exists (lost-value), each firm faces the incentive to increase output at discriminatory prices to increase revenue. Firms will stop increasing output once they reach market equilibrium ($Q_D = Q_S$)

M. Imperfect Competition

Perfect Competition and Pure Monopoly are two opposite extreme market structures. In reality, most markets are in between these two extremes and are *imperfectly competitive*.

Imperfect Competition Categories (2)

i. Monopolistic Competition:

a. There are many firms
b. The products are slightly differentiated
c. There are many buyers (+Demand)
d. There is free entry/exit of firms
e. Ability to affect price because of mixes

ii. Oligopoly:

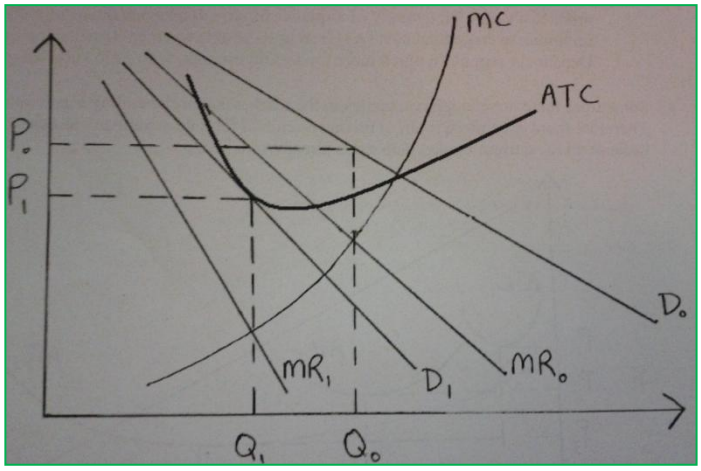
a. There are a few firms
b. The products are differentiated but are close substitutes
c. There are some barriers to entry/exit of firms

Structure	Firms Amount	Ability to Price	Entry Barriers	Example
Perfect Competition	Very Much	None	None	Vegetable Store
Monopolistic Competition	Many	Little	Little	Thai Express
Oligopoly	Few	Medium	Medium	Rogers
Monopoly	One	Large	Many	Hydro-Quebec

- The main reason why there are different market structures in different industries is because they have different costs. Basically, the higher the costs in an industry, the fewest the number of firms.
- Sometimes, there are sufficient companies in the market that are operating at minimum ATC. Thus, there is no more room or no more demand for a new firm to enter the industry because all the market is currently taken/satisfied.
- The **N-Firm Concentration Ratio**: the total market share of the largest N-firms in the industry.
- Lower ATC: more difficult for further competition, so less competitors. (MCP)

I. Monopolistic Competition

- In a monopolistic competition, each firm faces a downward-sloping demand curve due to brand loyalty.
- Monopolistically competitive industries have differentiated products (Restaurants, hairdressers, bars, clothing stores)
- Firms can to some extent influence the price and quantity of products sold.



Rules and Remarks:

- D_0 is the SR demand for each firm
- MR_0 is the SR marginal revenue for each
- Profit max: MR=MC, at P_0 and Q_0
- Since P_0 > ATC, supernormal profits exist
- Ergo, new firms enter the industry
- Hence, D_i for each firm shifts to the left
- Until supernormal profits vanish in LR
- D_1 is the long-run demand for each firm
- MR_1 is the long-run MR of each firm
- Profit max: MR=MC, at a P_1 and Q_1
- P_1 = ATC, therefore supernormal profits are null.

II. Oligopoly & Game Theory

- In an oligopolistic industry, each firm must think about its actions and how competitors will react.
- **Conjecture**: when Firm A thinks that Firm B will have a certain strategic reaction to Firm A's action

- Firms in an oligopoly actions (2)
    a) Collude: they all make an agreement to avoid competition and work together to increase profits, by mainly decreasing quantity supplied to increase the price and profits of the firms. This is technically illegal but it happens all the time.
    b) Compete: don't agree on anything and will compete with each other.

- *Oligopolists* always try to guess what their competitor's next move will be (moves are interdependent upon one another of the firm's)
- Basically, a company will plan their moved based on what they think their competitor will do when they see it.
- **Game**: a situation where a player has to make smart decisions with or against other players.
- The *players* in the game (i.e. firms) try to maximize their own benefits.
- Each firm must choose a *strategy* and try to increase its benefits.
- **Strategy**: a plan that details how a player will act or move in every possible situation.
- **Nash Equilibrium** (NE): when all players reach a sustainable strategy/agreement. Once reached, there will no longer be any benefit for any player to change strategy. No one has incentive to cheat.
- **Dominant Strategy**: is a player's best strategy no matter what the other firms do.

Duopoly & Cournot Games

Duopoly is a met with just two dominant (2) firms.

- Cournot Duopoly Model: each firm tries to maximize its profits based on the output produced by the other firm. It is competitive- not co-operative.

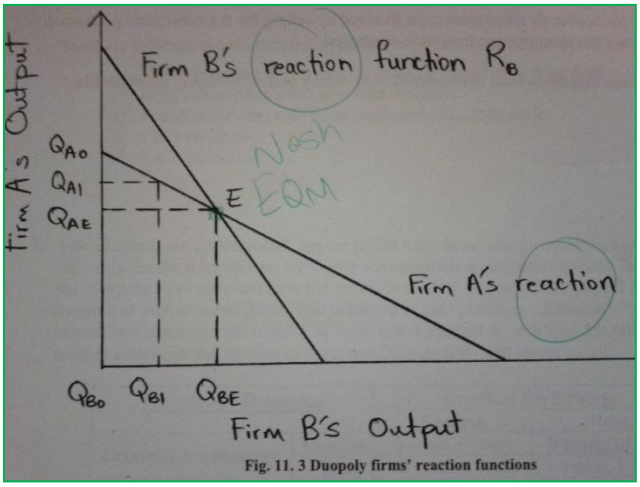


Fig. 11. 3 Duopoly firms' reaction functions

- R_A is the reaction function of **Firm A**; shows how **Firm A** will react to a change in **Firm B**'s output.
- R_B is the reaction function of **Firm B**; shows how **Firm B** will react to a change in **Firm A**'s output.
- $R_A = R_B$ are the two reaction functions and both intersect at point **E**, the Nash Equilibrium (NE)
- If both firms have the same MC curves, they will produce the same output $Q_{AE} = Q_{BE}$ at Eq. point
- If both firms have different MC curves, they will produce different output. The firm with the lowest cost will have a greater market share.

N. International Trade

It takes place when goods or services are exported or imported from one country to another. *Import* is to receive, *export* is to send.

- **Foreign Exchange Rate**: the value of one national currency in terms of another national currency.
- **Intra-Industry Trade**: a two-way international trade of products produced within the same industry.
- **Intra-Firm Trade**: a two-way international trade of products produced within the same firm or corporation.
- **Trade Patterns**:
    - **i.** Service Sector: domain of the economy which produces services as opposed to goods.
    - **ii.** Gross Domestic Product (GDP): the market value of all goods and services made within a country during a year.
- **Trade Issues**:
    - **i.** Raw-Material Prices: less-developed countries (LDCs) say that developed countries exploit them by buying raw materials and primary products at low prices and return manufactured products for sale at much higher prices.
    - **ii.** Agricultural Protection: LDCs also complain that developed countries subsidize (give them funds) their own agricultural producers, which allows them to sell their products at a lower price than normal, which leads to consumers buying less of those products from LDCs. It also forces global prices down and therefore the rich countries stay rich and the poor stay poor.
    - **iii.** Products from LDCs: cheap labour in LDCs is causing many firms to shift their production facilities to LDCs. This is why people in developed countries complain that their jobs are being threatened by cheap foreign labour.
    - **iv.** Globalization: interconnection of economies and trade between countries. Poor countries feel that rich countries dictate the process of global market for their own principle.
    - **v.** Expansion of European Union (EU): members of the EU might not be culturally ready to accept a new member such as Croatia or Turkey because the EU also grants freedom of movement to all its member citizens on top of freedom of trade.

vi. North American Free Trade Agreement (NAFTA): some Canadians feel that Canada should not have signed the NAFTA due to the softwood lumber dispute. This dispute was due to the U.S. charging taxes on lumber imported from Canada.

- Problems such as the ones mentioned above force economists to ponder on questions. Restricting Asian exports will benefit the local producers but will hurt the local consumers since they can't buy cheaper products and vice-versa. In addition, if China decides to close its borders to our exports, that will hurt our companies and endanger the jobs.

Comparative Advantage

- The Law of Comparative Advantage: countries can specialize in producing goods that they have low relative costs in and *export* them to countries that have a higher relative cost.
- Comparative Advantage arises when the opportunity cost (OC) of producing a product to country A is lower than the OC of producing the same product to B.
- Opportunity Cost: the relative cost of producing different goods.
- The Law of Absolute Advantage: if A uses fewer inputs than B to produce a good or service, then A has an absolute advantage in the product of this good/service.
- Labour is the only input to production, there are constant returns to scale, and goods are sold at established cost.
- In fact, one country is better at making a product, than another country. If what **A** gives up for making 1 computer (x) is less than what **B** gives up for making 1 computer, than **A** should focus on computers, and **B** on the other good/service, since it gives up more of (y) to produce 1 computer.
- Consumption Possibility Frontier (CPF): displays the different combinations of two good and/or services that a certain economy can consume.

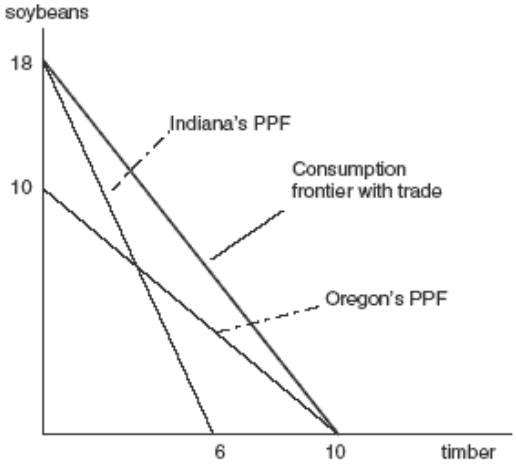


Figure 17.3

Data	Canada	United-States
Wheat	(10) Hours	(8) Hours
Lumber	(30) Hours	(15) Hours
Cost (W/L)	(100/300$CAN)	(80/150$US)

Find Comparative Advantage (if any) with endowment of 400 hours.

CANADA

- Produce 40 units of wheat, or 13.33 units of lumber.
- 40 units of wheat = 13.33 units of lumber

40W = 13.33L

A) 1W = 13.33/40
1W = 0.33L

B) 40/13.33 = 1L
3W = 1L

Therefore, Canada's Opportunity cost of producing:

- 1 unit of wheat = 0.33 units of lumber
- 1 unit of lumber = 3 units of wheat

UNITED-STATES

- Produce 50 units of wheat, or 26.66 units of lumber.
- 50 units of wheat = 26.66 units of lumber

50W = 26.66L

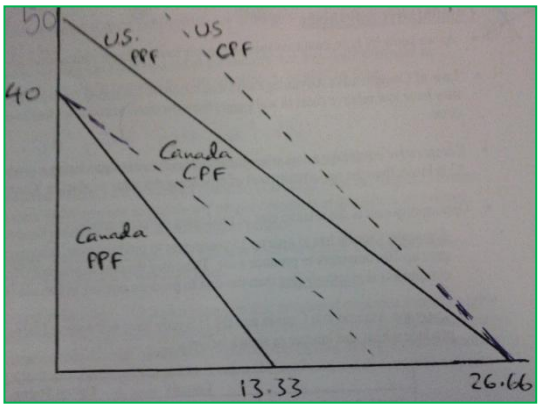
C) 1W = 26.66/50
1W = 0.53L

D) 50/26.66 = 1L
1.86W = 1L

Therefore, United-States' Opportunity cost of producing:

- 1 unit of wheat = 0.53 units of lumber
- 1 unit of lumber = 1.86 units of wheat

Critical Observations:



- Canada's OC of producing wheat (0.33) is less than that of U.S. (0.53), mirroring that Canada has a comparative advantage in producing wheat.
- Canada's OC of producing lumber (3) is more than that of U.S. (1.86), mirroring that U.S. has a comparative advantage in producing lumber.
- In effect, U.S. should specialized exclusively in lumber, while Canada should specialize uniquely in producing wheat and trade lumber for wheat, vice-versa
- If so, the U.S. will produce 26.66 units of lumber and Canada will produce 40 units of wheat (when specialization applies)
- Both Canada's CPF and U.S.' CPF tilt outwards since due to the specialization and trade terms they can now consume more than they can produce on their own.

Who Truly Gain From Trade?

<u>Consumers</u> generally gain/lose from international trade because:

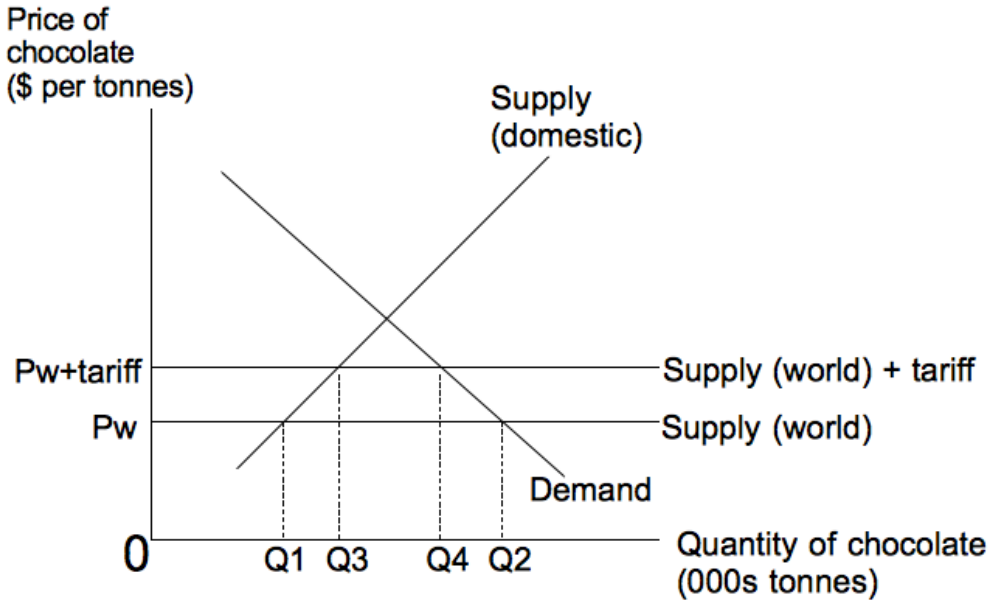
1) Gain: buyers can buy goods at a lower price (as a result of increase competition)
2) Gain: consumers get a wider variety of goods available
3) Lose: Canadians have to pay high local price
4) Lose: U.S. producers because Canadians buy less U.S. products
5) Gain: Canadian producers because Canadians buy more national products

- Local producers who aren't capable of competing on an international level will most likely lose, because huge foreign firms can flood the local market with the same product and therefore push price and margins down
- Overall, the economy gains if those gain would compensate those who lose. However, this is rarely the case.

Protectionism

It arises when a government enforces economic policies that make imports more difficult. This usually takes place when the government thinks that its local producers are not capable of competing properly/efficiently on an international level and that they will eventually be driven out of the market if no solution comes into play.

- **Quota**
  It is a legal limitation on the quantity of import one orders
- **Non-Tariff Barrier**
  Specific restricted product content or Standards (limits and tests)
- **Tariff**
  It is a tax imposed on imports.



Before the Tariff:

- D is the domestic Demand curve
- S is the domestic Supply curve
- P is the world price of the product
- At price P, there will be a domestic quantity supply Q_S and domestic quantity demanded Q_{Di}. The gap between Q_S and Q_D is filled by imports. This is free trade equilibrium.

After the Tariff:

- P_T is the new price that consumers will pay
- As the price increases to P_T, domestic quantity supplied increases from Q_S to Q_{ST}, and domestic quantity demanded decreases from Q_D to Q_{Dt}.
- Consumer Surplus (CS) goes down by areas A, B, C, and D.
- Government tax revenue goes up by area B.
- Producer Surplus (PS – domestic) goes up by area D.
- Net loss to the domestic economy equals the areas A and C.