Economics Higher Level – Section 1: Microeconomics

Unit 1.5: Theory of the Firm

Unit 1.5.1: Production and Cost

Fixed factor of production – an input that cannot be increased within a given time period

Variable factor of production – an input that can be increased within a given time period

Law of Diminishing Marginal Returns – as more and more units of variable inputs are added to a given amount of a fixed input, there will come a point in time where each additional unit of the variable input will add less to total output than the previous unit of input.

Total product (TP) – sum of all products **Average product (AP)** – TP over quantity of labor **Marginal product (MP)** – change in TP

Production is in three stages:

- Stage of increasing MP
- Stage of diminishing but positive MP
- Stage of negative MP

Relationship between TP and MP – MP is derived from the gradient of the TP curve.

Relationship between TP and AP – AP is given by the slope of the ray from the origin to the relevant points on the TP curve.

Relationship between AP and MP – if AP = MP, the average will not change. If AP < MP, the average will rise. If AP > MP, the average will fall.

Explicit costs – payments made by a firm to outsiders to acquire resources for use in production

Implicit costs – the sacrificed income arising from the use of self-owned resources by a firm

Economic costs – explicit and implicit costs

Accounting profit – total revenue minus explicit cost

Economic profit – total revenue minus economic cost, can be negative, positive or zero

Normal profit – total revenue is equal to total economic costs, and can also be defined as the minimum amount of revenue that a firm must receive so that it will keep the business running as opposed to shutting it down for other ventures.

Supernormal/abnormal profit – total revenue is more than total economic costs Subnormal profit – total revenue is less than total economic costs

Fixed costs – total costs of fixed factors, which do not vary with output **Variable costs** – total costs of variable factors, which vary with output **Total costs** – TFC + TVC

Average costs = total cost/total output Average fixed cost = total fixed cost/total output Average variable cost = total variable cost/total output Marginal cost = change in total cost/change in total output or change in total variable cost/change in total output

MC, AFC, AVC and AC are reflected below.

Relationship between MP & MC and AP & AVC curves

Representation of the Long-run Average Cost Curve

Increasing returns to scale means a proportionate increase in inputs will lead to a more than proportionate increase in output.

Constant returns to scale means a proportionate increase in inputs will lead to a proportionate increase in output.

Decreasing returns to scale means a proportionate increase in inputs will lead to a less than proportionate increase in output.

Economies of scale refer to the reduction in average cost enjoyed from the growth in production scale of the form or the growth of the whole industry.

Internal economies of scale include:

- Specialization and division of labor
- Indivisibilities e.g. machinery
- Container principle i.e. surface area to volume ratio
- Organizational and managerial economies
- Research and development
- Bulk buying
- Marketing
- Financial advantages

Internal diseconomies of scale include:

- Bureaucracy
- Communication problems
- Absence of personal element

Unit 1.5.2: Perfect Competition

Characteristics of PC:

- Infinite numbers of buyers and sellers
- Homogenous product
- Free entry and exit of firms
- Perfect knowledge
- Perfect mobility in factors of production
- Negligible transport cost

Examples of PC include small rice producers in Indonesia and Japan.

Demand curves of the PC industry and PC firm are reflected below.

The revenue curves of the PC firm are reflected below (TR and P=AR=MR=Demand)

Profits of the PC firm are maximized at the output level where MR = MC and MC curve cuts the MR curve from below. This is reflected in the diagram on the next page.

Shutdown conditions of the PC firm in the short run

Case 1: short-run equilibrium when the firm is earning supernormal profit, i.e. TR > TC. The firm earns profits in excess of what is necessary to compel remaining in the industry. This will attract new firms to join in the long run.

Case 2: short-run equilibrium when the firm is earning normal profit, i.e. TR = TC. The firm earns just enough to cover all of its economic costs.

Case 3: short-run equilibrium when the firm is earning subnormal profit, i.e. TR < TC. The firm will attempt to minimize losses by either continuing production or shutting down. The firm has to decide whether to shut down by checking if **revenue covers its variable costs**.

Case 3a: subnormal profit where **TR > TVC or AR > AVC. The firm should continue** production.

Case 3b: subnormal profit where **TR = TVC or AR = AVC**. The firm is indifferent, but it will continue if there is optimism and already has a decent labor force and customer loyalty in addition to maintaining the machines.

Case 3c: subnormal profit where TR < TVC or AR < AVC. The firm should shut down.

Shutdown price – the price that enables a firm to cover its variable costs in the short run. If the shutdown price is not reached, the firm will shut down in the short run.

Breakeven price – the price that enables a firm to make normal profit in the long run and cover its total costs. If the breakeven price is not reached, the firm will shut down for good.

Due to the absence of barriers to entry, the free exit and entry of firms is what results in PC firms making only normal profit in the long run.

Case 1: if existing firms are making supernormal profits, this will attract potential firms to enter the industry and increase supply, causing the market price to fall. The supernormal profits are competed away.

Case 2: if existing firms are making subnormal profits, this will cause some firms to leave the industry. Supply will decrease and the market price will rise, causing the smaller number of firms to earn normal profits.

Case 3: Ultimate long-run equilibrium of the PC industry is reflected below. Productive efficiency occurs at the level of output where the LRAC is minimum and allocative efficiency occurs where P = MC. At E, both are achieved.

Evaluation of PC

Good	Bad
Productive efficiency (minimum AC) – the firm is using the minimum amount of resources from society's viewpoint to produce. It is operating at full capacity and cost inefficient firms cannot stay in business in the long run. There is also no need for advertisement due to homogenous product.	Unable to reap economies of scale – a PC firm is unable to enjoy the cost savings that come with large output. Therefore, PC is untenable for industries such as cars, aircraft, and aluminum.
Allocative efficiency (P = MC) – when P = MC, the consumer values the good as much as it costs to produce that unit. There is no under or over production of the good to meet consumers' needs. Resources are efficiently allocated.	Lacks incentive and funds for R&D – due to perfect knowledge and free entry of firms, any advantage will be competed away very quickly.
Consumer sovereignty and profit motive – firms have no market power and no ability to manipulate prices. Resources are also produced according to consumer needs and wants.	Homogenous products – unable to cater to the varying preferences of consumers in terms of size, quality, design, color and style.

Unit 1.5.3: Monopoly

Defined as a firm that is the sole supplier of an industry.

Characteristics of a Monopoly:

- One seller with many buyers
- Unique product
- Formidable barriers to entry
 - Lack of availability of inputs
 - Administrative and legal barriers e.g. regulations and patents
 - o Branding and image
 - High start-up cost
 - Natural monopoly a firm that has economics of scale so extensive that the single firm can produce for the entire market at a lower AC than two or more. Examples include water, gas, railroads, electricity etc. Competition is wasteful as it leads to duplication of extensive networks.
 - Technical superiority
 - Predatory pricing

Demand = AR and MR curves are reflected in the graph below. The demand curve is also the AR curve, as price = AR. The MR curve is downward sloping and lies below the AR curve.

Price and Output decisions of a Monopolist: he can choose to either lower price or lower output but not both. The monopolist will never produce a quantity that is on the price inelastic portion of the demand curve. **Revenue maximization** will see him produce at **output where MR = o to maximize TR. Profit maximization** will see him produce at **output where MC = MR (and MC cuts MR from below).**

The monopolist in the short run can earn supernormal, normal or subnormal profit. In the long run, the monopolist would rather shut down than suffer subnormal profit, though in rare cases may not at the request of governments. Case 1: Monopolist earning supernormal profits in the short-run (diagram below)

Case 2: Monopolist earning normal profits in the short-run

Case 3: Monopolist incurring subnormal profit in the short-run

Equilibrium positions of **profit** maximization vs. **revenue** maximization reflected in the diagram below:

Price discrimination – when a producer sells the same commodity at different prices, for reasons not associated with differences in the costs of production. It will benefit a firm if it increases total profits.

- Motives of price discrimination:
 - Increase profits
 - Gain access to foreign markets
- Three conditions necessary
 - Market power required
 - Prevention of resale and ability to separate markets
 - PED must be different in the two markets

Evaluation of Monopoly

Good	Bad
Internal economies of scale – monopolies can exploit internal economies of scale and in the case of natural monopolies, are in society's best interests.	Persistence of profit – Barriers to entry makes it possible for the monopolist to earn supernormal profit even in the long term. Accumulation would be objectionable if it was not redirected to R&D.
It may aid innovation – Only monopoly profits can finance enormous projects for R&D programs. Furthermore, profit motive and immunity from competition means that the firm can capitalize on any benefits from cost savings as a result of R&D.	Allocative inefficiency – the monopolist produces below the optimal level of output due to its tremendous market power. The monopolist is able to restrict output and set prices higher than competitive levels.
Greater stability – the firm is better placed to bear a period of business uncertainty due to its ability to fall back on its accumulated profits. It does not	Productive inefficiency – the monopolist is producing under conditions of excess capacity.

need to reduce employment, benefiting	
society.	
Less advertising expenditure – the	Complacency – lack of competition
monopolist does not have to worry	leads to inefficiency and lessens the
about competition.	need to meet the needs of consumers.
	Political domination – powerful
	monopolies can exert power on a
	political party.

Legislation and regulation to reduce monopoly power

- Protecting competition (anti-trust)
- Legislation to regulate mergers
- **Marginal cost pricing** forcing the firm to price their products at MC for allocative efficiency
- Average cost pricing forcing the firm to price their products at AC, allowing the firm to make normal profit while being more efficient than market solutions, though it may discourage R&D investment
- **Nationalization** defined as the transfer in ownership of a firm from private sector to government ownership.
- Trade liberalization reducing barriers to trade e.g. tariffs and quotas

Unit 1.5.4: Monopolistic Competition

Defined as a situation where there are numerous firms competing but each firm does have their own degree of market power.

Characteristics of Monopolistic Competition:

- Large number of firms
- **Slightly differentiated products** may result in non-price competition e.g. promotions
 - Physical differences
 - \circ Location
 - Differences in service
 - Consumer loyalty
- Free entry and exit

Output and price determination in monopolistic competition

Case 1: Supernormal profit in the short-run

Case 2: Normal profit in the short-run (breakeven; AR = AC or TR = TC)

Case 3: Subnormal profit in the short-run – if this is the case; AR must at least cover AVC to continue production.

Long-run equilibrium under monopolistic competition – when existing firms earn supernormal profits in the short run, new firms will be attracted. This will result in:

- Each firm having a smaller market share and lower demand for its product
- Demand curve of the firm will shift leftward and slope is gentler due to the existence of substitutes
- AR will shift to where it is tangent to the AC curve: AR = AC
- No more firms will enter.

When existing firms are making losses, firms will leave. This will result in:

- Each firm having a larger market share and higher demand for its product
- Demand curve of the firm will shift rightward and the slope will be steeper due to decreased substitutes
- AR will shift rightward until AR curve is tangent to the AC curve, making normal profit
- No more firms will exit.

Evaluation of Monopolistic Competition

Good	Bad
Product variety – there is a large	Allocative inefficiency – the consumer
number of firms that differentiates itself	values an additional unit of the good
from its competitors.	more than it costs society to produce it,
	this not enough is produced.
Income distribution – the firms will earn	Incentive and funds for development
normal profit in the long run and thus	are limited – supernormal can only be
will not lead to greater income	earned in the short-run and firms are
inequality.	usually small and lack R&D funds due to
	the free entry and exit of firms.
	Higher price and lower output than in

PC under same cost conditions –
however, there is a larger variety.
Productive inefficiency – excess
capacity: empty tables, lack of queues,
etc. Some argue that this is
compensated by the proliferation of
product differentiation.

Unit 1.5.5: Oligopoly

It is a market dominated by a few sellers who between them share a large proportion of the market.

Characteristics of an oligopoly include:

- A few dominant firms (concentration ratio: total value of output of the n largest firms divided by total output value of the industry)
- Standardized or differentiated product
- Substantial barriers to entry
- Mutual interdependence of firms
- Price rigidity

Behavior of Oligopolistic Firms:

Case 1: A **collusive oligopoly** – in an attempt to maximize industry profits, they agree to restrict competition among them and maximize their combined profits. They form a **cartel** – a formal collusive agreement and behave like a monopoly. The graph is illustrated below. Cartels usually fail due to **the incentive to cheat, cost differences, different demand curves, possibility of a price war, recessions and lack of barriers to entry.**

Case 2: A competitive oligopoly – firms compete to gain a larger share of industry profit for themselves. The Kinked Demand Theory is illustrated below to explain price rigidity. If price is increased above the kink, the sales revenue declines. If price is decreased below the kink, the sales revenue declines as well. The discontinuous MR also results in price rigidity, as despite changes in MC, there is still no change in price and output.

Role of Non-Price Competition

Due to the risks associated with price competition, this is the alternative. This is favorable as oligopolies have considerable financial resources to devote to such endeavors and the development of new products gives them a competitive edge. Product differentiation also increases a firm's profit position without risk of immediate retaliation.

Unit 1.5.6: Objectives of Firms

Profit Maximization – the difference between TR and TC. To reach this, a firm must produce at **MC = MR**.

Cost plus Pricing – many firms add their profit margin to the AC. **P = AC + markup**.

Sales revenue maximization – high revenues can enable an easier time obtaining loans from banks. To reach this, a firm must produce at where **MR** = **o** as **TR will be** at its peak then.

Growth maximization – to maximize sales volume as opposed to other objectives to increase the size of the firm

Profit satisficing – aiming for a moderate profit level to keep all stakeholders happy