International Organizational Analysis

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Lecture 1: Introduction and microeconomics refresher

Chapter 2 (exc. 2.4) and 3 (exc. 3.4 and 3.5)

Exercise:	Questions:	Type:
Shale oil at $75	c, e	Done in class
Polysilicon	6	Individual
Vanilla	3, 4	Done in class
Vanilla	5, 6	Individual
Potash	3	Individual
Palm oil	5	Done in class
Norwegian in Argentina	b	Individual
Cannabis	3	Individual
Maple syrup	4	Individual
Diapers	b, d	Individual
Single serve coffee	b	Individual
Container shipping	c, e	Individual

Consumer preferences and demand

Consumers have preferences, and this gives a demand function. How much they want to buy of a certain product as a function of a variety of factors, including price.

Consumer tastes

A consumer's preferences can be described by a ranking over all possible combinations (**BUNDLES**) of A and B.

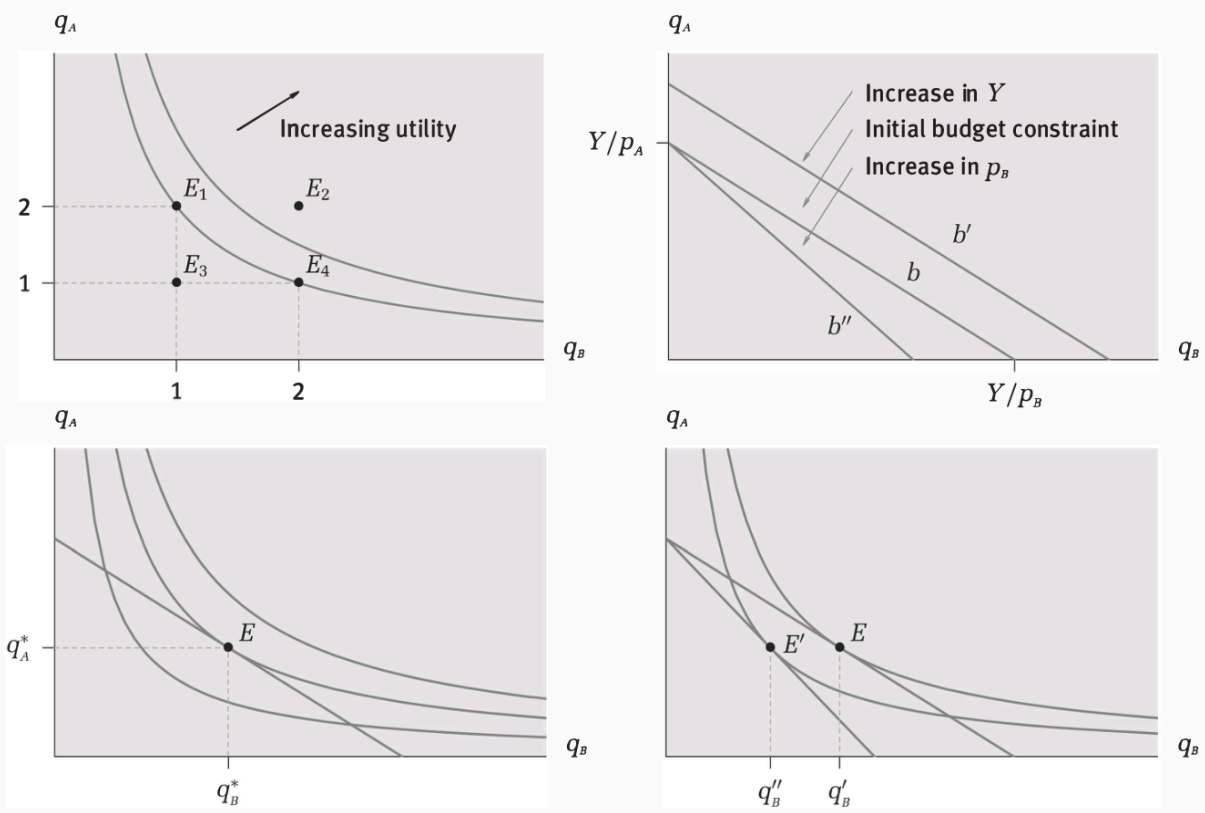


FIGURE 2.1
From consumer preferences to consumer demand

The consumer's preference orderings can be drawn by **INDIFFERENCE CURVES**. Generally, indifference curves are downward sloping, since we need more of a product to compensate us for less of the other. This is the "no satiation" principle, which means that "more is better". Indifference curves, that are highest, are representing the highest utility.

Consumer budgets

With two products, the budget might be expressed by the inequality:

$$p_A q_A + p_B q_B \leq Y$$

The budget set corresponds to the area belon the following downward sloping line:

$$q_A = \frac{Y}{p_A} - \frac{p_B}{p_A} q_B$$

This represents line b on the top right panel in Figure 2.1. If you increase income, there will be a shift out, which results in line b'. The intercepts are at:

$$Y/P_A \text{ and } Y/p_B$$

Demand

The consumer's best choice is at the point where the highest indifference curve has a common point with the budget line to maximize utility. This is the bottom left panel in Figure 2.1. The demand curve can then be written as:

$$q_i(p_i, z)$$

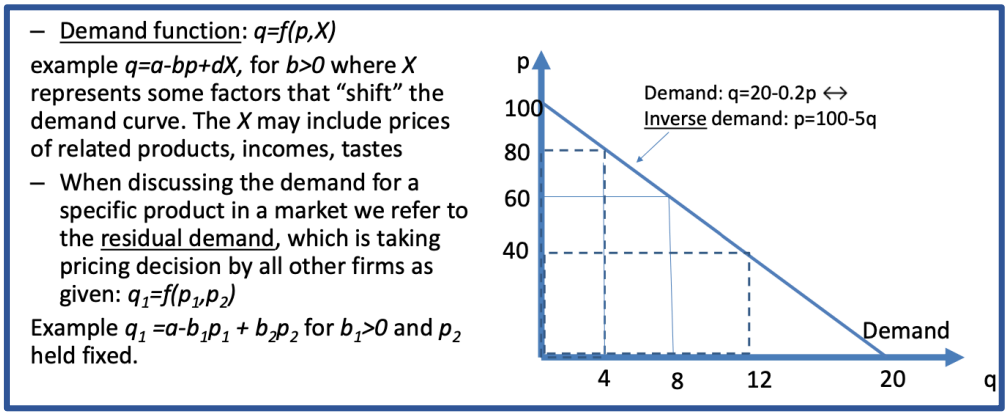
Where the quantity is q_i, the price of the good is p_i, and the given value of other variables is z.

The demand curve gives the quantity demanded of a given good as a function of its price and of other factors; it can be derived from consumer preferences.

The inverse demand function:

$$p_i(q_i, z)$$

If the price changes, the quantity demanded changes as we move *along* the demand curve. If other variables change, then the quantity demanded changes because of a *shift* of the demand curve.



When discussing the demand for a specific product in a market, we refer to the **RESIDUAL DEMAND** which is taking pricing decision by all other firms as given.

Consumer surplus

Willingness to pay is the maximum price at which a consumer would still pay for a good.

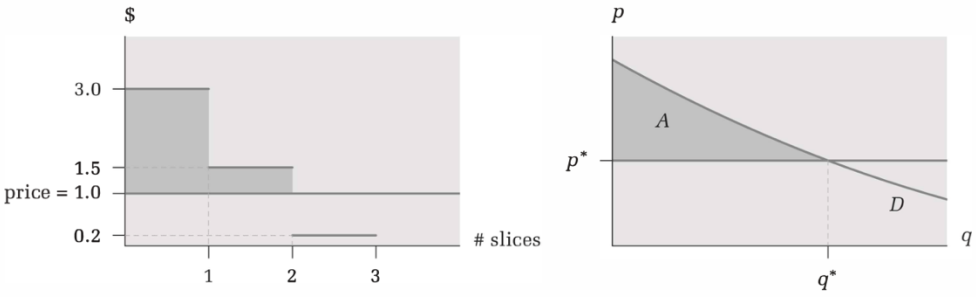


FIGURE 2.2
Consumer surplus: (a) demand for pizza slices and (b) general case.

The consumer surplus is the difference between willingness to pay and price. It is the area under the demand curve and above the price paid by the consumer.

Demand elasticity

Price elasticity of demand

We assume that the demand for a product increase if we lower its price. The sensitivity of demand to changes in price is the **PRICE ELASTICITY OF DEMAND**:

$$\epsilon = \frac{dq}{dp}\frac{p}{q} \rightarrow \text{slope} \cdot \frac{p}{q}$$

Another way of calculating the price elasticity is by using the mid-point formula:

$$\epsilon = -\frac{(q^{new} - q^{old}) / \frac{q^{new} + q^{old}}{2}}{(p^{new} - p^{old}) / \frac{p^{new} + p^{old}}{2}}$$

Elasticities are generally negative, wince the quantity demanded declines when price increases. If the elasticity is bigger than 1, then it is elastic, meaning the quantity demanded is very sensitive to price. If the elasticity is between 0 and 1, the elasticity is small and therefore inelastic. The closer the elasticity is to zero, the less sensitive demand is to price. Generally speaking, the value varies along a demand curve.

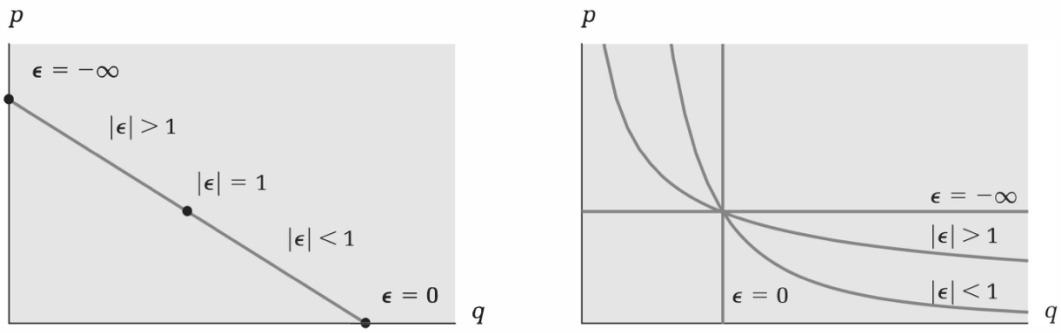


FIGURE 2.3
Demand elasticity

$$\epsilon = \frac{d \log q}{d \log p}$$

Example of calculating the elasticity (price increases from $10 to $11, and the demand decreases from 6.31 to 5.63):

$$\epsilon = \left(\frac{5.63 - 6.31}{11 - 10}\right)\left(\frac{10}{6.31}\right) = -1.08$$
$$\epsilon = \left(\frac{\log 5.63 - \log 6.31}{\log 11 - \log 10}\right) = -\frac{0.1140}{0.0953} = -1.20$$

The logarithm approach delivers a more precise result. To increase revenue in markets with elastic demand, you need to lower the price, not raise it.

The percent change in revenue following a price change is:

$$(1 + \epsilon) \cdot (\%\ \text{change in price})$$

Cross-price elasticity

The price of one good can influence the demand of another good, and this is called **CROSS PRICE ELASTICITY**.

$$\epsilon_{12} = \frac{\frac{dq_1}{q_1}}{\frac{dp_2}{p_2}}$$

If the cross-price elasticity is positive, the products are substitutes. If the cross-price elasticity is negative, the products are complements.

Income elasticity

Higher income generally means greater demand for all products. The income elasticity is:

$$\epsilon_Y = \frac{\frac{dq}{q}}{\frac{dy}{y}}$$

INFERIOR GOODS have negative income elasticities. **NORMAL GOODS** have positive income elasticities. Elasticities between 0 and 1 are referred to as **NECESSITIES**, and those with elasticities greater than one is **LUXURIES**.

Estimating the demand curve

The **IDENTIFICATION PROBLEM** is when it is hard to identify whether it was the supply or demand curve that shifted.

Elasticities are higher on luxurious goods than necessities. Elasticities are higher for specific products than for a category as a whole. Elasticities are lower in the short run than in the long run.

The firm's production, cost, and supply functions

A firm is a process of transforming inputs into outputs. The firm's **PRODUCTION FUNCTION** is the mapping that tells us for a given set of inputs, how much output a firm is able to produce.

$$f(x_1, \dots x_n)$$

ISOQUANT curves look like indifference curves. Inputs are **PERFECT COMPLEMENTS** if the functions look like:

$$f(x_1, x_2) = \min(\mathrm{x}_1, x_2)$$

The opposite is perfect substitutes as shown to the right.

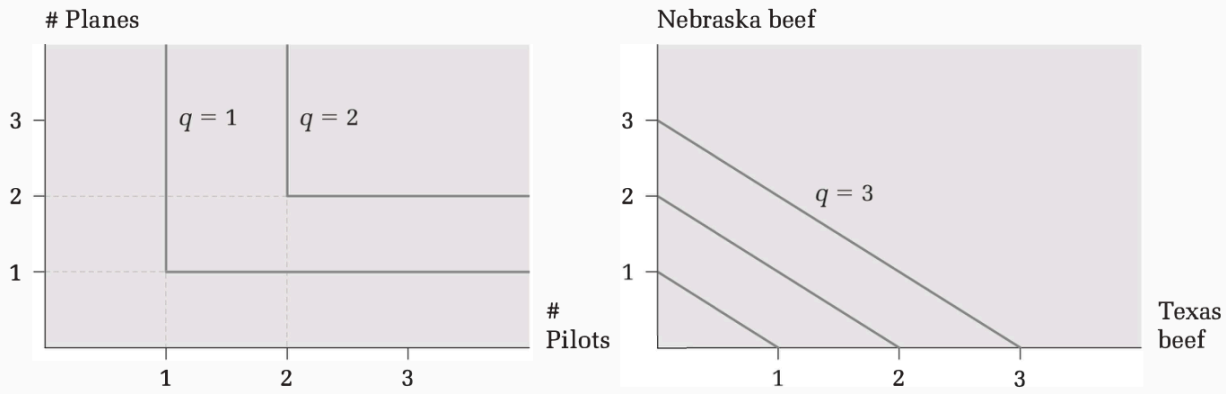


FIGURE 3.1
Production functions: two extreme cases

If capital and labor are the two main inputs in the production process, then the **COBB-DOUGLAS PRODUCTION FUNCTION** is given by:

$$q = K^{\alpha}L^{\beta}$$

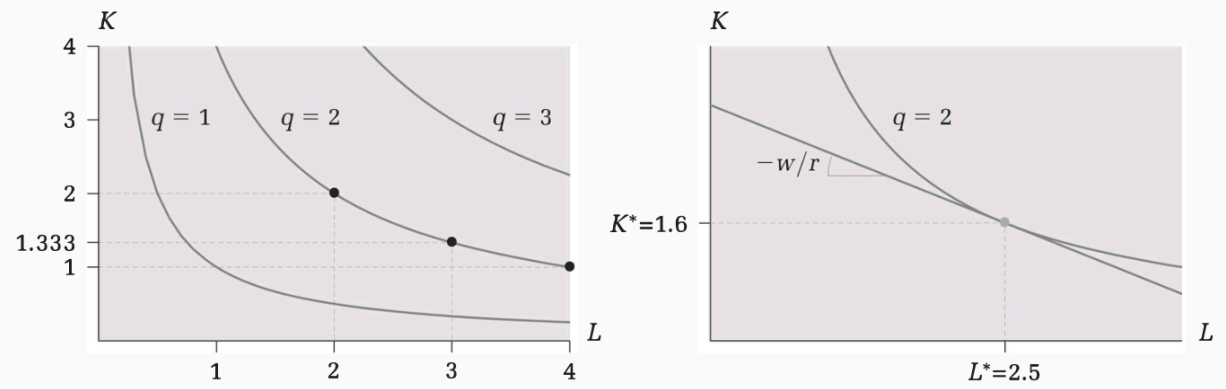


FIGURE 3.2
Isoquants and cost minimization

Reflecting decreasing marginal returns, isoquants are convex curves; the closer complements two inputs are, the more convex the corresponding isoquants are.

Productivity

Average labor productivity is given by:

$$qp/L$$

TOTAL FACTOR PRODUCTIVITY is a measure that is better at showing productivity than average labor productivity. A profit maximizing firm chooses input levels such that the ratio

between input costs and total revenue is equal to the respective coefficient in a Cobb-Douglas function:

$$\alpha = \frac{rK}{pq}$$
$$\beta = \frac{wL}{pq}$$

Cost minimization

A firm wants to minimize costs. Firms seek the lowest cost consistent with a certain output level. The optimal solution corresponds to a point where the isoquant is tangent to a line with slope equal to -1 times the ratio of the two inputs' prices.

Cost function

The cost function is typically denoted as:

$$C(q) = F + VC(q)$$

It shows the least total cost of inputs the firm needs to pay in order to produce output.

FIXED COSTS (FC) is the cost that does not depend on the output level.
VARIABLE COST (VC) is the cost which would be zero if the output level were zero. They vary with the quantity produced.
TOTAL COST (TC) is the sum of fixed cost and variable cost.
AVERAGE COST (AC) total cost divided by output level.
MARGINAL COST (MC) is the cost of adding one unit.

Marginal cost is the appropriate cost concept to decide how much to produce, whereas average cost is the appropriate cost concept to decide whether to produce at all.

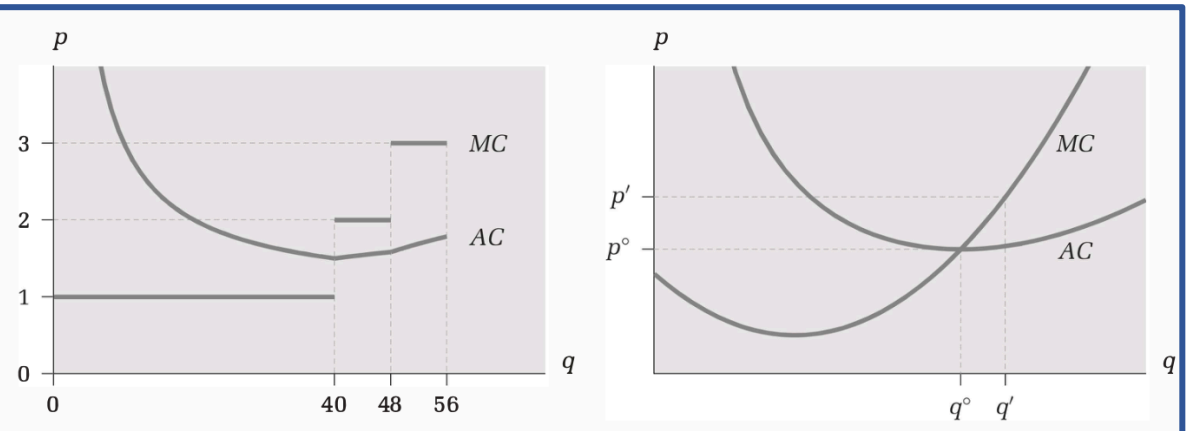


FIGURE 3.3
Marginal cost and average cost: T-shirt factory example (left) and general case (right)

Pricing

Firms can be price-takers, but in most cases, firms have *some* control over the price they set.

Optimal pricing: the intuition

The seller wants to choose a price and quantity that maximizes profit. **INCREMENTAL REVENUE** is the revenue gained from the previous quantity to the new quantity. The incremental revenue can help determine whether to sell none or one unit and so forth.

Optimal pricing: the calculus approach

Revenue is described as:

$$R(q) = P(q)q$$

Marginal revenue is given by:

$$MR(q) = \frac{dR(q)}{dq} = p + P'(q)q$$

$$MR(q) = p + P'(q)q < p$$

The extra revenue a seller gets from increasing output level is less than the price at which the seller sells such additional output.

Revenue and marginal revenue are given by:

$$\pi(q) = R(q) - C(q)$$
$$\frac{d\pi(q)}{dq} = MR(q) - MC(q) = 0$$
$$MR(q) = MC(q)$$

The optimal price level is (where c is marginal cost):

$$p = \frac{a + bc}{2b}$$

Elasticity rules

The elasticity rule of optimal pricing:

$$\frac{p - MC}{p} = \frac{1}{\epsilon}$$

The Lerner index is a measure of market power. More market power has a steeper demand. Demand is steeper when substitutes are more distant. The Lerner index is defined as:

$$m = \frac{p - MC}{p}$$

Firms should operate at a positive margin, and it should be:

$$m = \frac{1}{-\epsilon}$$

The elasticity rule states that the lower the price elasticity of demand (in absolute value) the higher the price-cost margin should be set. If the margin is lower than the inverse of the elasticity (in absolute value), then an increase in price leads to an increase in profits. Whenever the elasticity is between -1 and 0, it is optimal for the seller to increase price.

Margin and markup

The price markup is given by:

$$k = \frac{p - MC}{MC}$$

The elasticity rule can then be written as:

$$\frac{k}{1+k} = \frac{1}{-\epsilon}$$
$$k = \frac{1}{-\epsilon - 1}$$

Do firms maximize profits?

An assumption is: **Firms aim at maximizing "economic profits".** Economic profit is the difference between the economic benefits (typically revenue) and (all) economic costs.

SUNK COSTS are unavoidable and irreversible. They are costs that have already been incurred or committed and cannot be recovered; they are not economically relevant costs.

OPPORTUNITY COSTS are associated with opportunities that are foregone y not putting a resource to its best alternative use. These are economically relevant costs.

In perfect competition price should always be when marginal revenue and marginal cost are equal.

In a monopoly the price should be higher than marginal revenue, which is equal to marginal cost.

In an oligopoly the price should be higher or equal to the marginal revenue, which is equal to marginal cost.

Lecture 2: Competitive markets

Chapter 4 (exc. 4.3 and 4.4)

Exercise:	Questions:	Type:
Shale oil at $75	a, b, d	Individual
Polysilicon	1, 2, 3, 4, 5, 7	Done in class
Vanilla	1, 2, 8	Individual
Potash	1, 2	Individual
Norwegian in Argentina	a	Individual
Airlines	1	Individual
Maple syrup	1, 2, 3, 7, 8	Individual
Singe serve coffee	a	Individual
Container shipping	a, b, d, i	Done in class
Container shipping	h	Individual
Energy drinks	2	Individual
Plant based meat	4	Individual

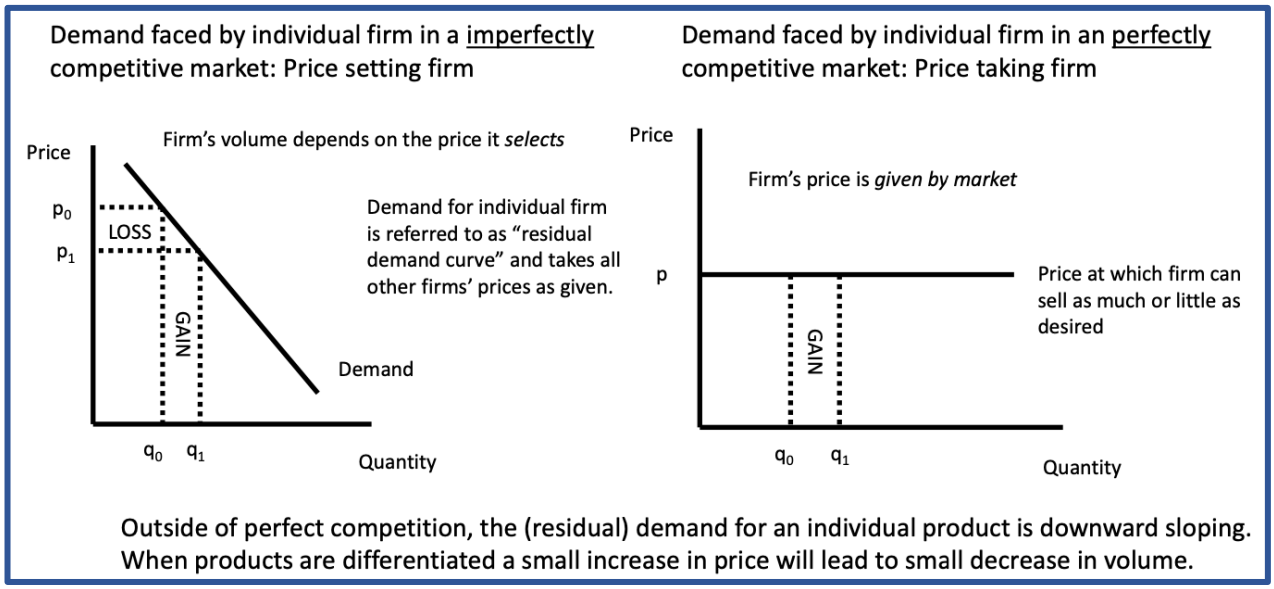
Perfect competition

The perfectly competitive industry is an industry with no barriers to compete. The main features of a competitive industry include:

- Atomistic firms: many competitors, all small relative to the market, and unable to affect the market price through their actions
- Homogenous products
- Perfect information
- Free entry

Even though few markets satisfy all the assumptions for perfect competition, there are many markets that for practical purposes can be analyzed. Non-scientific rules of thumb are:

1) **Homogenous product:** if the main products is standardized such that industry observers refer to some specific price in their discussions than that suggest that product differentiation is of limited importance.
2) **Price transparency:** there is some preference price (or index) that is publicly observable.
3) **Many independent buyers and sellers:** if no one on the buyer or seller side has more than 10-15 percent share acting independently or as part of a concerted group, it is unlikely that anyone can move the market price significantly.
4) **Free entry in the long run:** the entry cost should be small compared to the size of the market measured by the expected industry turnover over the investment's life. A firm that wishes to enter should not be at a disadvantage relative to an existing firm that wishes to expand capacity.



Firm supply and market supply in competitive markets

Each firm faces a flat (infinitely elastic) demand curve: it can sell all it wants at the market price and can sell nothing at any higher price. A firm's marginal revenue is simply given by price and is the same as the marginal cost. The **INDUSTRY SUPPLY CURVE** is given by:

$$S(p) = q_1 + \cdots + q_n$$

Market equilibrium

The demand and supply curves intersect at the **MARKET EQUILIBRIUM**.

Comparative statics

When the demand or supply curve shifts, a new equilibrium is established. **COMPARATIVE STATICS** is used to the describe the change in the equilibrium.

The most basic principle of comparative statics is that:

1) a rightward shift of the demand curve leads to an increase in quantity and an increase in price
2) a rightward shift of the supply curve leads to an increase in quantity and a decrease in price

Short run and long run equilibrium

Short run is the period when the number of firms is fixed, and in the long run it is possible for entry and exit. Furthermore, the amount of some input is fixed, and some costs may be sunk. The time it takes until 1 firm can enter/exit.

In the short run, price can be above marginal cost, but this will attract more suppliers, and in the long run this would result in the equilibrium again.

Competitive selection

Productivity

Some firms and plants have superior skills in using inputs, allowing them to produce much higher output levels with the same quantity if inputs and therefore giving them a greater chance of survival.

Entry and exit rates

In any given period, there will be entry or exit.

Size, growth, and survival

Entrants and exiters' average size is much smaller than industry average size.

A model of competitive selection

The assumptions in this section are:

1) firms are price takers
2) the product is homogenous
3) information about prices is perfect
4) firms must pay a sunk cost in order to enter
5) not all firms have access to the same technology

This means that different firms have different productivity levels. Each firm is also uncertain about its own productivity level.

Firms that get a series of bad signals (high production costs) gradually become "pessimistic" about their efficiency level and decrease their output and may exit the industry - and opposite.

Efficient firms are firms with low marginal costs.

Variability of and uncertainty about firm efficiency reconciles the competitive model with empirical observation regarding simultaneous entry and exit and relative size of entrants/exiters vis-à-vis incumbents.

More efficient firms produce higher output levels. Profit will be higher for productive firms.

Lecture 3: Game theory and static oligopoly

Chapter 7 (exc. 7.3 and 7.4) and 8

Exercise:	Questions:	Type:
Potash	4, 5, 6, 7	Individual
Polysilicon	8	Individual
Airlines	2, 3, 5	Individual

Games and strategies

INTERDEPENDENT DECISION MAKING is when a payoff depends on both own and other's decision. In economy this is referred to as a **GAME**. A game is a stylized model that depicts situations of strategic behavior, where the payoff of one agent depends on its own actions as well as the actions of other agents.

Elements of game theory

A game consists of a set of players, a set of rules and actions, and a set of payoff functions.

Simultaneous vs. sequential decisions

A game can happen both simultaneous and sequentially.

Nash equilibrium

Dominant and dominated strategies

A **DOMINANT STRATEGY** yields a player the highest payoff regardless of the other player' choices.

A **DOMINATED STRATEGY** yields a player a payoff which is lower than that of a different strategy, regardless of what the other players do.

In analyzing games, it is not only important whether players are rational: it is also important whether players believe the other players are rational.

Nash equilibrium

A pair of strategies constitutes a Nah Equilibrium if no player can unilaterally change its strategy in a way that improves its payoff.

Best responses

A best response is what the players choose to do, if the other player chooses something.

Multiple equilibria and focal points

There may be focal points on which players coordinate even if they do not communicate, and it is also possible that there can be multiple equilibria.

Sequential games

When players choose on different times, it is a sequential game. Equilibria that are found by going backwards are called **SUBGAME PERFECT EQUILIBRIA**.

The value of credible commitment

A credible commitment may have significant strategic value.

Oligopoly

Most real-world markets fall somewhere between perfect competition and monopoly. When there are few competitors, it is designated by **OLIGOPOLY** and **DUOPOLY** if there are two. In oligopolies there is strategic interdependence among competitors.

The Bertrand model

The Bertrand model consist of two firms in a market for a homogenous product and the assumption that firms simultaneously set prices. The firms also have the same constant marginal cost. The duopolists' products are perfect substitutes, the firm who sets the lowest price with get all demand.

Under price competition with homogenous product and constant, symmetric marginal cost (Bertrand competition), firms price at the level of marginal cost.

Avoiding the Bertrand trap

- Product differentiation
    - If products are different, then it might not follow the Bertrand model
- Dynamic competition
    - The possibility of retaliation is not considered in the Bertrand model
- Asymmetric cost
    - If one firm has a lower marginal cost, it will be the cost leader.

- Capacity constraints
  - If a firm does not have the sufficient capacity to satisfy the whole market, then a higher price will still be sold

Price competition with different costs

When two competitors have different costs, then the cost leader should price just below the other's marginal cost.

Price competition with capacity constraints

Equilibrium prices are such that total demand equals total capacity. If total industry capacity is low in relation to market demand, then equilibrium prices are greater than marginal cost.

The Cournot model

Firms must produce a certain output level, to the extent that firms must first produce a certain amount and then set prices to sell the output previously produced. The Cournot game is when firms choose the output and not the price.

Firm 1's best response is to a quantity chosen by Firm 2 is:

$$q_1^{\circ}(q_2) = \frac{a-c}{2b} - \frac{q_2}{2}$$

Given the assumption that both firms have the same cost function, their best responses are symmetric. The equilibrium is then:

$$\hat{q} = \frac{a-c}{3b}$$

Monopoly, duopoly, and perfect competition

Total output under Cournot is greater than under monopoly and lower than under perfect competition. The duopoly price is lower than the monopoly price and greater than the price under perfect competition.

In the case of n firms, the equilibrium is:

$$q = \frac{a-c}{(n+1)b}$$

$$p = \frac{a+nc}{n+1}$$

This shows that as the number of competitors grows large, the equilibrium price under Cournot competition converges to the competitive price.

Bertrand vs. Cournot

If capacity and output can be adjusted easily, then the Bertrand model describes duopoly competition better. If output can capacity are difficult to adjust, then the Cournot model describes duopoly competition better.

In most real-world industries capacity is difficult to adjust. Therefore, capacity or output decisions are normally the long-run variable, prices being set in the short run, which is the Cournot model.

The models at work: Comparative statics

We use models to run a **COUNTERFACTUAL**, which is to predict how the market changes as a function of changes in various exogenous conditions.

The best responses are given by:

$$\hat{q}_2 = \frac{a - 2c_2 + c_1}{3b}$$
$$\hat{q}_1 = \frac{a - 2c_1 + c_2}{3b}$$

Firm 1's market share is given by:

$$s_1 = \frac{q_1}{q_1 + q_2} = \frac{a - 2c_1 + c_2}{2a - c_1 - c_2}$$

Lecture 4: Collusion

Section 7.3, chapter 9

Exercise:	Questions:	Type:
Potash	8, 9, 10	Individual
Maple syrup	5, 6	Individual
Infant formula	4	Individual

Repeated games

The strategic phenomenon of **RETALIATION** is a situation where a player changes its action in response to a rival's action. A **REPEASTED GAME** is a one-shot game (each player chooses one action only one) which is repeated a number of times. If repetition takes place a finite number of times, it is a finitely repeated game - otherwise it is an infinitely repeated game.

δ is the probability that the game will continue, so the total expected payoff (when the Nash equilibrium induces a payoff of 5):

$$V = 5 + \delta 5 + \delta^2 5 + \cdots = \frac{5}{1-\delta}$$

In order for the proposed set of strategies to be a Nash equilibrium, it must be that $V \geq V'$. If the probability that the game continues on into the next period is sufficiently high, then there exists a Nash equilibrium.

Because players can react to other players past actions, repeated games allow for equilibrium outcomes that would not be an equilibrium in the corresponding one-shot game.

Many agreements in a variety of social situations are based not on formal contract but rather on the trust that stems from repeated relationships.

Collusion and price wars

Drop in profits from monopoly profit to oligopoly profits, in equilibrium, is results from the **EXTERNALITY** inherent to the process of imperfect competition.

CARTEL agreements are a particular institutional form of **COLLUSION**. Collusion results from secret agreements, because they are illegal. Collusion can also result from **TACIT AGREEMENTS** which are attained for some historical reason or because they are natural focal points.

Stability of collusive agreements

If the discount factor is sufficiently high, then there exists a Nash equilibrium of the repeated game whereby firms set monopoly price in every period under the "threat" that, if any firm ever deviated from this price level, then both firms revert to pricing at marginal cost level forever.

The discount factor

The discount factor measures how much \$1 one period into the future is worth compared to \$1 now. Given one period of time, an investor might use \$1 to gain $\$(1+r)$ next period, where r is the interest rate per period:

$$\delta = \frac{1}{1+r}$$

The relevant rate is the rate corresponding to the period between successive decisions. Suppose that r is the annual rate and that the frequency with which firms change their prices is given by f (times per year):

$$\delta = \frac{1}{1+r/f}$$

Let h be the probability (hazard rate) that the industry will cease to "exist" one period later:

$$\delta = \frac{1-h}{1+r/f}$$

The opposite effect is that the industry grows. The demand is growing at a rate g:

$$\delta = \frac{(1+g)(1-h)}{1+r/f}$$

δ is increasing in f, g; and decreasing in h, r.

Collusion is normally easier to maintain when firms interact frequently and when the probability of industry continuation and growth is high.

Collusion does not happen often, because cartel agreements are illegal.

Price wars

Secret price cuts

Even if an industry has price agreements, it can be tempting to cut prices for customers, and these cheats is not easily findable. When a firm is receiving low demand, could it be because

other firms have set lower prices than agreed upon? They will punish each other with lower prices but then have a price war back till the collusive level. If price cuts are difficult to observe, then occasional price wars may be necessary to discipline collusive agreements.

Demand fluctuations

The gain from cheating on a collusive agreement is greater when demand is higher. If price is lower, the gains from cheating are also lower.

Firm heterogeneity

Price wars can be initiated by one single firm, and it can be by the weaker firm, but the stronger player cuts the prices first.

Factors that facilitate collusion

Market structure and collusion

Normally, there are more than two firms with asymmetrically distributed market shares. Collusion is more likely in concentrated industries than in fragmented ones. It is easier to establish a collusive agreement when there are few competitors. The temptation to cut prices is relatively greater when there are more competitors, and collusion is more difficult to sustain. It is easier to maintain collusion among similar firms than among asymmetric ones.

Collusion is normally easier to maintain among few and similar firms.

Multimarket contact

Collusion is normally easier to maintain when firms compete in more than one market.

Public policy

Policymakers typically place a greater weight on consumer welfare than on total welfare. Price fixing is illegal in most countries of the world.

Collusion in economic theory

Competition implies and externality, because each firm maximizes own profit, not joint profit. In a collusion firms come together and agree on sales price, allocate quotas among firms, divide markets etc.

Explicit collusion is when firms talk to each other and coordinate decisions, which is typically illegal.

Implicit collusion is when firms have a mutual understanding, which is obtained without talking to each other, because it is in joint interest to limit competition, which is typically not illegal.

Sustainability of collusion

In symmetric Bertrand duopoly, profit of a deviating firm is bigger than corporation profits, which is bigger than the Nash corporation profits, which is bigger than the non-deviating firms.

Collusion cannot be enforced by legally binding contracts. **Deviation** and **punishment** must exist for a collusion to arise.

Firms play collusive as long as other firm plays collusive, but deviation from the collusive agreement by one firm leads to competition (punishment phase). We would deviate in the last period, but when we do not know when the last period is, then they can continue.

A one period deviation is not worth it, if the volume of collusion is bigger than or equal to the volume of deviation. **Any profit level between zero and monopoly profit can be achieved if the discount factor is bigger than 0.5**. But it only holds for the symmetric Bertrand duopoly.

General infinite horizon game

We stick to collusion, if the long-term loss from deviating is larger than the short-term game.

Factors that facilitate collusion

Collusion is more likely:

- the lower the profit from deviating
- the lower the expected profits it would make once the punishment starts
- the more weight firms attach to the future

Collusion is more likely in concentrated industries than in fragmented ones:

- easier to establish a collusive agreement
- easier to maintain a collusive agreement
- low number of firms

Merging makes collusion easier, and they can then raise the price. Firms that do not merge, they can set same prices.

Price transparency and exchange of information

Exchange of information on past or current prices and quantities is legal, but not with future prices.

Lecture 5: Applications & Product differentiation I

Chapter 14 (exc. 14.3)

Exercise:	Questions:	Type:
Vanilla	7a	Done in class
Hearing aids	1, 7, 8, 9	Individual
Norwegian in Argentina	c, d	Individual
Cannabis	1, 2, 6	Individual
Designer milk	2, 8	Individual
Diapers	a, c, e, f, h, k	Individual
Palm oil	6	Individual
Polysilicon	8a	Done in class
Infant formula	1	Individual
Single serve coffee	g	Individual
Pet foods	1, 2	Individual
Energy drinks	1, 3	Individual
Plant based meat	1, 2, 3, 5	Individual
Potash	4, 5, 6, 7, 8, 9, 10	Debrief
Container shipping	h	Debrief
Polysilicon	8b	Debrief

Demand for differentiated products

Characteristics approach is an approach to product demand that estimate the demand for each characteristic. The implicit prices of each characteristic are referred to as **hedonic prices**. Product differentiation gives firms market power and allows them to set prices above marginal costs.

The more distant the substitutes are the steeper is the residual demand, and the more market power the firm has. More substitutes tend to make residual demands less steep.

Competition with differentiated products

Vertical product differentiation corresponds to the case when consumers unanimously prefer more of a given characteristic (even if the intensity of such preference varies). Everyone would choose the same product, if the price was the same.

Horizontal differentiation refers to the case when different buyers' preferences for a given characteristic have different signs: some think it is good, and some think it is bad. People would choose different products even if the products were the same price.

Vertical product differentiation

It is a price-setting scene as Bertrand, but a small change in price does not imply a big change in demand. It is not sufficient for one firm to price lower than its rival for the firm to capture all market demand.

When two firms are setting prices, and one firm has a higher quality than the other, it might price higher. Higher-valuation consumers purchase the higher-quality product. The model's analytical solution suggests that Firm 1's profit decreases as its quality level increases.

The **direct effect** of an increase in quality corresponds to the change in profit that takes place if prices remain constant, and the **strategic effect** corresponds to the effect of the equilibrium price adjustments following an increase in quality. The closer the qualities are, the more competitive pricing will be.

Horizontal product differentiation

The **hoteling model** is similar to the Bertrand model, because firms simultaneously set prices, and consumers choose which firm they want to buy from, and firms produce and supply the amount demanded. Each consumer chooses the best of three options when price, address, distance, and transportation is accounted for.

Firm 1's demand:

$$q_1 = \frac{1}{2} + \frac{p_1 + p_2}{2t}$$

Firm 1's best response mapping is:

$$p_1 = \frac{1}{2}(c_1 + t + p_2)$$

If marginal costs are equal, then:

$$p = c + t$$

The greater degree of product differentiation, the greater the degree of market power. Therefore, vertical product differentiation can solve the Bertrand trap.

If price competition is very intense, then firms tend to locate far apart (high degree of differentiation). If competition is not very intense, then firms tend to locate closer to each other (low degree of differentiation).

Strategic trade policy

When oligopoly competitors belong to different countries, import tariffs to foreign competitors or subsidies to domestic competitors may have the effect of increasing the domestic firm's profits at the expense of the foreign firms.

Consumer behavior and firm strategy

Visiting a store to find out the price of a good is a **search cost**.

Price dispersion is caused by heterogeneity of consumer search costs (being a shopper and a non-shopper).

Obfuscation practices are when firms purposefully make selling terms unclear (added shipping and handling fee).

Add-on pricing or shrouded attributes features a product or of the sales contract that are hidden from a consumer until after purchase takes place (minibar, wi-fi access etc.)

Switching costs is when there are added costs to switching from one product to another.

When consumers are less than fully rational or perfectly informed, firms may have an opportunity to increase market power.

Public policy

Product differentiation leads to an entirely new area of public policy, **consumer protection**. Advertising induces **spurious product differentiation**: identical products are perceived by consumers as different.

Lecture 6: Applications & Product differentiation II

Chapter 14 (exc. 14.3)

Exercise:	Questions:	Type:
Hearing aids	1, 7, 8, 9	Individual
Norwegian in Argentina	c, d	Individual
Cannabis	1, 2, 6	Individual
Designer milk	2, 8	Individual
Diapers	a, c, e, f, h, k	Individual
Palm oil	7	Done in class
Infant formula	2	Individual
Pet foods	3, 4	Individual
Plant based meat	6	Done in class
Potash	8, 9, 10	Debrief
Energy drinks	1, 2, 3	Debrief
Plant based meat	1, 2, 3	Debrief

Product differentiation cannot be in perfect competition, because there is a need for homogenous products in perfect competition.

(Energy drinks exercise) Nash equilibrium will be higher, because both best response functions are outward shifting, because they are responding with a higher price than the other, which yields a higher quantity, which then will potentially not change the profits (combined profits should be lower than before).

Effects of an increase in quality by one firm when firms compete in prices:
Assume that Firm 1 increases its quality, but that the quality of Firm 2 stays the same (quality of Firm 1 is higher than Firm 2).

Product positioning

The **direct effect** is focused on maximizing the volume, which gives an incentive to be near the competitor to gain market share.

The **indirect or strategic effect** is the relax price competition, which gives an incentive to move away from competitor to gain higher margins.

With vertical products differentiation (everybody agrees that product A is better than B). The lower product B will have a lower price, because of else no one will buy it. Those with high WTP will buy product A, and those with low WTP will buy product B.

If the quality of product A increases, then the product differentiation will also increase. Therefor price of product A increases, and the price of product B might increase or decrease.

Quantity of product A increases, and quantity of product 2 decreases. Profit of product A increases and the effect on profit B is ambiguous.

Lecture 7: Market structure and market power

Chapter 10

Exercise:	Questions:	Type:
Hearing aids	11	Done in class
Designer milk	6, 7	Individual
Cannabis	4, 5, 8, 9, 10, 12	Individual
Infant formula	5, 6, 7	Individual
Container shipping	f, g	Individual
Energy drinks	7	Individual
Hearing aids	1, 3	Debrief

Insights

1. As the number of firms increases the aggregate output increases and the price decreases. As the number of firms become very large the price falls to approach marginal cost as in a perfectly competitive market.
2. In a symmetric Cournot model profits per firm decreases in the number of firms, in line with our *priors*.
3. In a symmetric Cournot model industry profits decrease in the number of firms, in line with our *priors*.
4. The Cournot model with many firms approaches the outcome of perfect competition, in line with our *priors*.
5. The market power exercised by firms in an industry decrease in the number of firms if all firms are symmetric.
6. Firms with low marginal cost have high market shares.
7. Firms with large market shared have higher price - cost margins (firm level Lerner index).
8. One reason why some firms are larger than others is that they have lower (marginal) costs.
9. Market that are more concentrated in terms of Herfindahl index have higher market share weighted price cost margins (market share weighted Lerner index)
10. The equilibrium number of firms increases less than proportionally in market size S and decreases in the level of fixed costs F. Stated differently, as the market increases in size it becomes more fragmented.
11. As the size of the market increases, each firm will need a larger customer base. Stated differently, firm size is increasing in market size.

Market structure

If there are constant returns to scale (average cost is constant), then any number and size distribution of firms is possible.

There are industry-specific factors which determine each firm's size. Market size is also an important determinant of market structure.

Measuring market concentration and market power

The generalization of the margin (market power) is the **Lerner index,** which is the weighted average of each firm's margin, with weights given by the firm's market share:

$$L = \sum_{i=1}^{n} s_i \frac{(p - MC_i)}{p}$$

Entry costs and market structure

For a Cournot equilibrium, each firm's profit is given by:

$$\Pi(n) = S\left(\frac{a-c}{n+1}\right)^2 - F$$

A **free-entry equilibrium** is characterized by a set of active firms that does not wish to exit the market, and no inactive firm wish to enter. Equilibrium number of firms is:

$$\hat{n} = \left[(a-c)\sqrt{\frac{S}{F}} - 1\right]$$

This means that it is the whole number, so if it is 32.4, then it is 32 firms that is optimal.

Market size and concentration

The number of firms is an increasing function of market size, and an inverse function of both fixed and variable costs. For high values of number of firms, the relation between the market share and the number of firms is approximately quadratic: in order to double the number of firms, market size must increase four-fold.

Due to increased price competition, the equilibrium number of active firms varies less than proportionally with respect to market size.

Minimum efficient scale and concentration

Increasing returns to scale has decreasing average cost. The MES is the scale of operation that yields the lowest possible unit costs. The concept of **minimum efficient scale** it the minimum scale at which a firm's average cost is, say, within 10% of the minimum:

$$\text{MES} = \frac{F}{c' - c}$$

It is natural to compare MES to market size to get a sense of how many equally efficient firms that can operate in an industry. Industry with a small MES compared to market size tend to have many firms, and industries with a large MES compared to market size ten to have few firms.

Scale economies and concentration

If the ratio between average cost and marginal cost is greater than one, then there are **economies of scale**. If the ratio is less than one, then there are **diseconomies of scale**. An industry is more concentrated if the degree of scale economies is greater:

$$\rho = \frac{AC}{MC} = \frac{\frac{F}{q} + c}{c} = 1 + \frac{F}{cq}$$

History matters

A firm can with time move down the **learning curve** and transform a **first-mover advantage** to a **sustainable competitive advantage**.

History may determine market structure through the effect of **agglomeration economies**. This is that the concentration of technology ventures results from industry agglomeration.

Endogenous vs. exogenous entry costs

Advertising expenditures are a very large fraction of sales, and when advertising is an important part of a firm's strategy, entry costs are endogenous with respect to market size.

If entry costs are endogenous, then the number of firms is less sensitive to changes in market size.

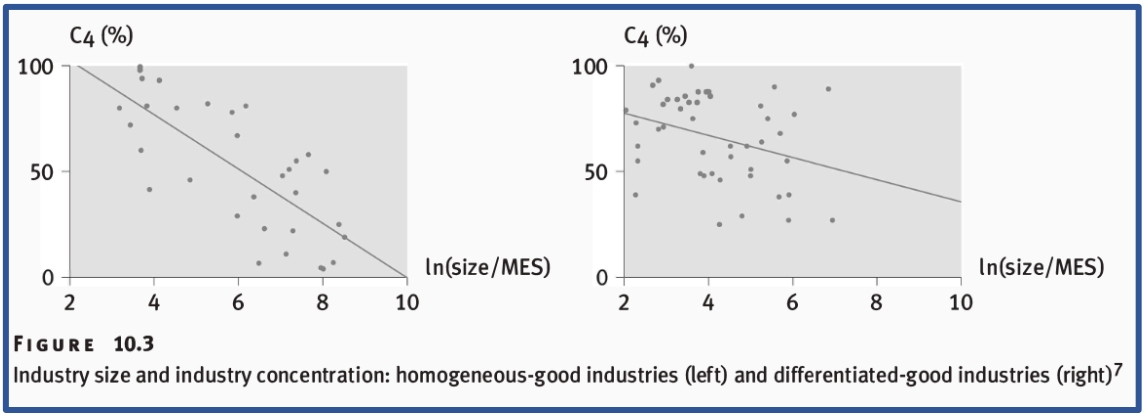


FIGURE 10.3
Industry size and industry concentration: homogeneous-good industries (left) and differentiated-good industries (right)[7]

In exogenous sunk cost markets, a firm that wishes to enter will need to spend an entry cost, that becomes sunk after being incurred. After paying the entry costs there is competition between the firms that have entered. An example is the oil tanker market.

In endogenous sunk cost markets, a firm that wished to enter will need to spend an entry cost, that becomes sunk after being incurred. After paying the entry cost, the firm has the possibility to make additional investments in "product quality" that has also become sunk after having been incurred. After paying the entry cost and making the investment there is competition between the firms that have entered. An example is competition among cruise lines.

Intensity of competition, market structure, and market power

The intensity of competition influences market structure. If competition is close to Bertrand, then the tendency is for the number of competitors to decrease. If competitions are close to monopoly, then the tendency is for the number of competitors to increase.

If market price is lower than monopoly price, total variable profits is increasing. The more competitive the industry is, the lower the equilibrium number of firms.

The greater concentration is, the greater the degree of market power.

Herfindahl index:

$$\text{Market power (H)} = \text{market share}^2 + \text{market share}^2$$

A firm's margin can be defined by:

$$m_i = \frac{p - c_i}{p}$$

The **collusion hypothesis** state that concentration implies market power through increased collusion between firms.

The **efficiency hypothesis** state that the increase in market power is mainly associated with an increase in productive efficiency.

Entry and welfare

If there is free entry, then the equilibrium is socially efficient. Free entry can result in excessive entry. **The business stealing effect** refers to a transfer between firms which does not correspond to a benefit to society.

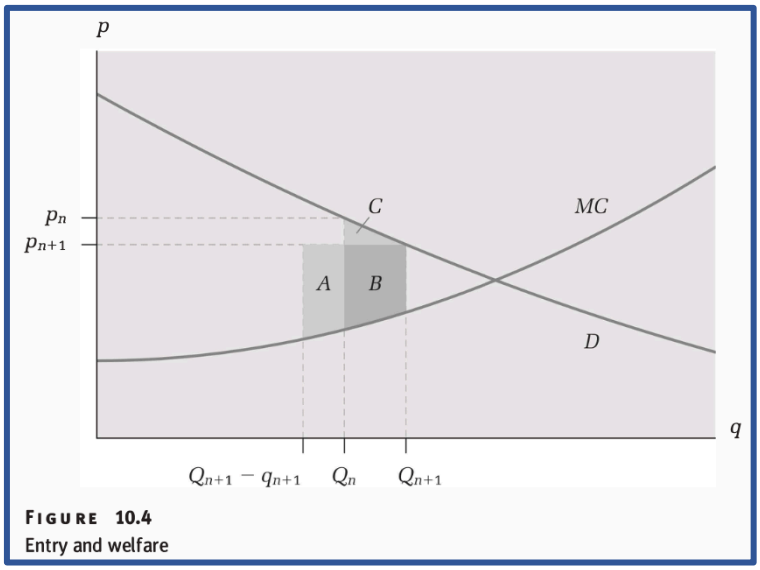


FIGURE 10.4
Entry and welfare

Product differentiation, free entry, and efficiency

If product differentiation is very important, or if competition is very fierce, then free entry implies insufficient entry from a social point of view. Conversely, if product differentiation is unimportant and competition is soft, then the business-stealing effect dominates, whereby the free-entry equilibrium entails excessive entry.

Firm heterogeneity, free entry, and efficiency

Firm entry and exit, as well as the reallocation of capital among incumbents is an important component of industry productivity growth.

Lecture 8: Applications & Horizontal mergers

Chapter 11 (exc. 11.3)

Exercise:	Questions:	Type:
Airlines	(2, 3), 4	Done in class
Pet foods (Long B 2022)	5, 6, 7	Individual
Razors (Long B Retake)	8	Individual
Hearing aids	7, 9	Debrief
Infant formula	1, 2, 4, 5, 6, 7	Debrief
Energy drinks	4, 7	Debrief

Horizontal mergers

The number of competitors and industry structure is also a result of mergers and acquisitions. The reasoning behind this can be both economic and strategic. **Horizontal mergers** are mergers or acquisitions between two firms in the same industry. **Vertical mergers** are mergers between firms at different stages of the value chain.

Firms should see whether 2 ¼-parts of the profit is bigger or smaller than 1/3-part of the profit to decide whether to merge or not. If we lower the number of firms, then the profit will be larger.

Economic effects of horizontal mergers

Total output typically decreases, and price increases as the result of a horizontal merger. Mergers also have an impact on costs, normally referred to as **cost efficiencies**. These cost savings may be divided into two parts: fixed costs and variable costs. A lot of fixed costs can be saved, because there is only need for 1 thing instead of 1 per firms. Non-mergers can benefit from mergers, but it can also be a disadvantage.

Horizontal merger dynamics

Preemptive mergers re when a firm makes an acquisition, so another firm does not.

Merger waves are when mergers occur in waves. Merger waves may result from exogenous events (e.g., industry deregulation) or from endogenous events (e.g., a merger between two large firms).

Merger can also induce a new firm to enter. If barriers to entry are not very high, then mergers tend to be followed by new firms' entry.

Strategic externality and merger paradox

Insight 1(strategic externality): A merger will (typically) lessen the intensity of competition which results in a positive externality on the other firms. In Cournot example the merged firm has an incentive to produce less than constituent parts which increases the residual demands for the others → higher profit for outsiders.

Insight 2 (merger paradox): Even though a merger leads to higher industry profit, the merged firm's profit is less than the sum of constituent parts pre-merger profits such that the merger should not be consummated. This is a paradox since we observe many mergers in real world.

Insight 3: In general, unless the synergies are very substantial it is likely that the profit of the insiders are lower than the outsiders. Therefore, we are typically not resolving the merger paradox by only adding synergies.

Insight 4: It is almost certain that the profit of 2 firms is bigger than 3 firms, so firm that is not participating in merger will have higher profits than before (positive strategic externality).

Merger with product differentiation and price competition

Insight 1: the two-product firm takes into account the spillover on sales of its other product when setting the price. Raising the price of one increase demand for the other.

Insight 2: merger is profitable for insiders. Merger removes price competition between products j and k and results in higher prices for these.

Insight 3: Merger increases profit for outsider. Merger removes price competition between products j and k and results in higher prices for these and outsider responds by also increasing its price. (strategic externality)

Insight 4: market share of outsider has increased, and market share of merged firm is less than the sum of the market share of the constituents.

Insight: proposed mergers profitable for insiders, but even more so for outsider (positive strategic externality). The biggest gains from a reduction in competition following a merger goes to the firm with the largest market share.

Lecture 9: Applications & Strategic behavior

Chapter 12 (exc. 12.4)

Exercise:	Questions:	Type:
Airbus and Boeing	1, 4, 5, 6, 7	Individual
Norwegian in Argentina	e, f	Done in class
Diapers	g, k	Individual
Hearing aids	6	Done in class
Single serve coffee	d, f, h, i	Individual
Energy drinks	4, 5, 6	Individual
Plant based meat	4, 5	Individual
Infant formula	3	Individual
Pet foods (Long B 2022)	1, 2, 3, 4, 5, 6,7	Debrief
Final exam 2022	(Time permitting)	Debrief
Norwegian in Argentina	a, b, c, d	Debrief

Market foreclosure

In industries with a small number of players, entrant must take into account directed retaliation by incumbent firms.

Entry deterrence

Entry accommodation is when entry costs does not influence whether to enter or not.

Entry deterrence is when the entry costs have an influence on whether or not to enter at a given capacity.

Blockaded entry is when the entry costs are higher than any payoff.

An incumbent's optimal capacity choice depends on the level of entry costs. If entry costs are very high, then incumbent should set monopoly capacity and ignore the threat of entry. If entry costs are very low, then the incumbent should choose capacity taking into account the entrant's best response. Finally, if entry costs are intermediate, then the incumbent should choose capacity large enough to induce the entrant not to enter.

If the capacity levels are low compared to total market demand, then it is the optimal choice to use all available capacity. Capacity preemption is a credible strategy only if capacity costs are high and sunk.

To eliminate any opportunity for profitable entry, the incumbent firms can 'fill in' the product space. **Product proliferation** strategy increases variety in both density in the product space

and density in geographical space. By increasing density of product offerings, an incumbent may deter entry even when profit margins are high.

Exclusive contracts, bundling, and foreclosure

When signing a sufficient number of buyers, the incumbent effectively makes entry unprofitable, which is a strategy called **naked exclusion**.

By bundling or tying the sales of two products, a dominant firm may leverage its power in one market to increase dominance in the other market.

Contract exclusivity, selective discounts, and most-favored-nation clauses may be a way of raising rivals' costs and, as such, foreclosing competition.

Predatory pricing

Predatory pricing is pricing below cost with the intent of driving others out of the market.

Predatory pricing may be a successful strategy when (i) the prey is financially constrained, (ii) low prices signal low costs or the predator's toughness, and (iii) capturing a minimum market share early on is crucial for long-term survival. In all these cases, low pricing by the predator is induces the prey to exit the market.

Entry barriers

A broad definition is that anything that allows incumbents to earn supranormal profits without threat of entry. There should be something that created an asymmetry between already established firms and a new firm that would like to enter.

Structural entry barriers are outside firms' control (exogenous): regulations, large MES relative to market size, absolute cost advantages or scarce resources.

Strategic entry barriers are within firms' control or created through the competition (endogenous): R&D, patents, advertising, trademarks, distribution networks etc.

Insight: for a strategic move to be effective, it has to be credible in the sense that it should be impossible to reverse. Sunk costs carry commitment value, but fixed costs don't, as the latter are reversible.

Stackelberg model - accommodation

Insight 1: Given that Firm 2 will enter market, Firm 1 behaves strategically and accommodates by choosing a higher quantity and gets higher profits than in the Cournot Nash equilibrium. Firm 2 responds by choosing a lower quantity and gets lower profits than in the Cournot Nash equilibrium. This is a **first mover advantage**.

Insight 2: If the profit of Firm 2 is negative then Firm 2 will not enter the market when Firm 1 is producing its monopoly quantity which implies that entry is blocked.

Insight 3: If Firm 1 can commit to a quantity which will make Firm 2' profit negative, then Firm 2 will stay out of the market. Firm 1 will then be a monopoly and will sell quantity deterrence. This is **entry deterrence**.

If Firm 2 can get a profit, then it will enter and that is **entry accommodation**.

Insight 4: Entry deterrence is costly, and even where it is possible it is far from clear that it is profitable.

Insight 5: Firm 1 needs to be able to commit to a quantity, i.e. its choice should be **irreversible**.

Insight 6: If Firm 1's choice of quantity would be reversible (i.e. without commitment) then the Stackelberg model would be the same as the Cournot model. In a sequential game only, irreversible moves have any strategic effect.

Lecture 10: Applications & Market definition

Exercise:	Questions:	Type:
Hearing aids	2	Done in class
Cannabis	7	Individual
Designer milk	1	Individual
Norwegian in Argentina	a, b, c, d, e, f	Debrief
Airbus and Boeing	1, 4, 5, 6, 7	Debrief
Diapers	a, b, c, d, e, f, g, j, k, m, n	Debrief

Industry vs. market

An industry is e.g. 3711 Passenger cars, 3721 Aircrafts etc. The more digits the more specific an industry is (3111111341 Dry and semi-moist dog food in bags over 25 lbs.).

A market should have the property that the firms within it are in direct competition. Products or services that are "reasonably close" substitutes are in the same market. The cross-price elasticities measure similarity.

Markets cannot be defined by size, color or anything like that. This is coming from the supply size.

SSNIP

Small significant non-transitory increase in price.

First step is diversion, which is identifying the closest competitors. What would people buy instead if the product is not available? Products with large increase in sales are good substitutes and are in the same market.

Start with the smallest plausible market delineation. If the price increases by 5-10 percent would many customers, then switch to other products? Then the market is not big enough.

If the joint profits of all the products are bigger with an increase of 5-10 percent, then the market is identified.

Lecture 11: Applications & Competition policy and regulations

Chapter 5, sections 4.4, 6.5, 9.5, 11.3, and 12.4

Exercise:	Questions:	Type:
Hearing aids	10	Done in class
Norwegian in Argentina	e, f	Individual
Single serve coffee	c, e, f	Done in class
Plant based meat	7	Done in class
Infant formula	4, 6	Individual
Pet foods	7	Done in class
Diapers	a, b, c, d, e, f, g, j, k, m, n	Debrief
Single serve coffee	a, b, d, g, j	Debrief

Externalities and market failure

Splitting the bill between a party as small as four may lead to an increase in the total tab by 40%. This is called the **free riding problem**. One agent does not take into account the cost imposed by the other agents.

Externalities

Externalities are when an agent's actions have an effect on other agents that goes beyond the market transaction.

The **tragedy of the commons** is when a common resource is overused with respect to the socially optimal level.

Congestion results from an externality: when an airline decides to schedule a flight during rush hour, it does not take into account the extra delay it will impose on all flights departing right after.

A positive externality is **public goods** where the public can benefit from something: national defense, health, and education are examples.

Social cost and Pigou taxes

If there is a negative externality, the equilibrium output level is greater than the socially optimal output level. This can be fixed be imposing an output tax (negative externality) or output subsidy (positive externality).

Regulation is also a solution to externality-creating activity. This could be banning smoking in public places. Social norms often play the role of government regulations.

The Coase theorem states that if property rights are properly assigned and negotiations are costless, then all externalities will be "internalized," so that the market solution leads to an efficient solution. It is about efficiency and allocating the resources that maximizes gains from trade (total surplus). Market externalities imply market failure. Pigou taxes and other mechanisms may reestablish equilibrium efficiency.

Imperfect information

Adverse selection may go on and on to the extreme that the market collapses completely. **Asymmetric information** is when not all parties know the same. **Moral hazard** is e.g. when people tend to not care about their phones breaking when they have paid for insurance.

Regulation

A **regulation** is a government intervention in economic activity using commands, controls, and incentives. Categories are:

a) market regulation
b) entry regulation
c) firm regulation
d) social regulation

The main areas of competition policy are price fixing, merger policy, and abuse of dominant position.

A high-power regulation mechanism provides strong incentives for cost reduction but little incentives for quality provision. In addition, it implies a high degree of risk for the regulated firm and requires strong commitment on the part of the regulator.

Competition is the best way of recovering the allocative inefficiency lost under monopoly pricing. Regulation is the best alternative when, due to natural monopoly condition, competition is not feasible.

From a social welfare point of view, foreclosure would seem to decrease consumer welfare (and total welfare), because consumers pay a higher price and have less product variety to choose from.

The **Efficient Component Pricing Rule (ECPR)** states that the wholesale price offered to an independent downstream firm cannot be higher than the difference between the final price set by the integrated firm, and the marginal cost of the integrated firm at the downstream stage. If ECPR is applied, then production efficiency is maximized.

Efficiency

Trade creates surplus and is voluntary. **Allocative efficiency** requires that resources be allocated to their most efficient use. **Productive efficiency** refers to how close the actual production cost is to the lowest cost achievable. **Dynamic efficiency** refers to the improvement over time of products and production techniques.

The fundamental theorem

In a competitive market the equilibrium levels of output and price correspond to the maximum total surplus. As long as the demand curve is above marginal cost curve and increase in output will increase total surplus. Market equilibrium under competitive selection is efficient.

Is price discrimination legal?

Total welfare is greater under price discrimination (some get higher and some get lower prices). Consumer welfare is lower, they pay different prices, and more consumers are served. Consumers like to pay a lower price than others.

Both in the Us and Europe, public policy towards price discrimination is negative. If resale is easy, then price discrimination is difficult.

Collusion and public policy

Firms have a natural incentive to come together and agree on setting high prices, but there is a significant fraction of public policy related to industry competition that is directed precisely towards fighting the tendency for sellers to "conspire" against the consumer.

Price fixing is illegal in most countries. Leniency programs are programs where firms part of a cartel will not be fined, if they are the first to unveil the truth.

Horizontal merger policy

There are three interested parties in a horizontal merger: the merging firms, the non-merging firms, and consumers. In general, consumers lose from the merger, non-merging firms may gain or may lose, and merging firms are expected to gain from the merger.

A merger between two large firms is likely to imply a greater increase in price than a merger between two small firms.

The **unilateral effect** of a merger is essentially a function of the increase in concentration. A merger implies a reduction in the number of purchasing choices available to consumers.

The **collusion effect** depends on the distribution of market shares.

The smaller the size of the merging firms, the more likely the total effect of a merger is positive.

Public policy towards foreclosure

In the US, a crucial step in distinguishing competition from predation is the **Areeda-Turner test**: prices should be regarded as predatory only if they fall below marginal cost.

In general, it is not acceptable for one firm to be in a dominant position.

Lecture 12: Applications & Economics of strategy

Section 3.5

Exercise:	Questions:	Type:
Designer milk	3	Individual
Hearing aids	4, 5	Done in class
Airbus and Boeing	2, 3	Done in class
Cannabis	11, 12	Done in class
Cannabis	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Debrief

Why are firms different?

In the world of business there may be **impediments to imitation** that allow some firms to perform persistently better than others. This could be legal restrictions etc. **Causal ambiguity** is when the things that make a firm great is not written down, but it is a whole. Another firm cannot just get an employee from the competing firm to get all information. **Strategy** is also a determinant for winners.

Quality of management can also make firms different.

Firm performance varies a great deal. Firms are different because of impediments to imitation, causal ambiguity, firm strategy, management quality, or historical events.

Lecture 13: Review and conclusion

Exercise:	Questions:	Type:
Final exam 2020 (Long B)	Adult diapers	Individual
Retake exam 2020	Razors	Individual
Final exam 2021	Wind turbines	Individual