

ECON-C5100 Digital Markets

Iivo Vehviläinen

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Aalto University

iivo.vehvilainen@aalto.fi

Lecture 3: Competition

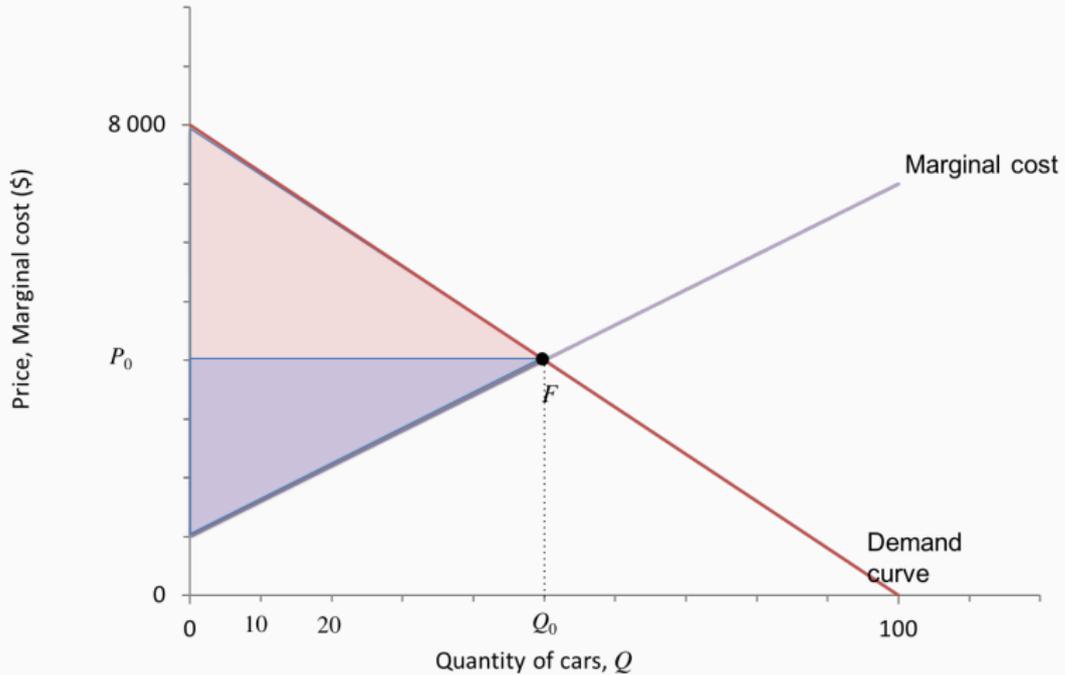
Last week

- Efficiency in the marketplaces
- Role of preferences and data online

This week

- Industry structure and competition
- Auction theory

Reminder: Competitive equilibrium



Source: CORE, The Economy.

Perfect competition

- Several conditions required, including:
 - Well-defined property rights.
 - Perfect information available to all players.
 - Participants act as price takers.
- Efficiency of the allocation requires also that there are no transaction costs, taxes or other distortions that prevent a trade from happening.
- In practice: frictions always present.

Ignoring other frictions and distortions, the industry structure affects competition:

- Perfect competition
 - All participants act as price takers
- Monopoly
 - Only a single supplier that can set prices to maximize its profit
- Oligopoly
 - Limited number of market participants who engage in strategic behavior to maximize their profits

Impact of a monopoly setting the price in the market

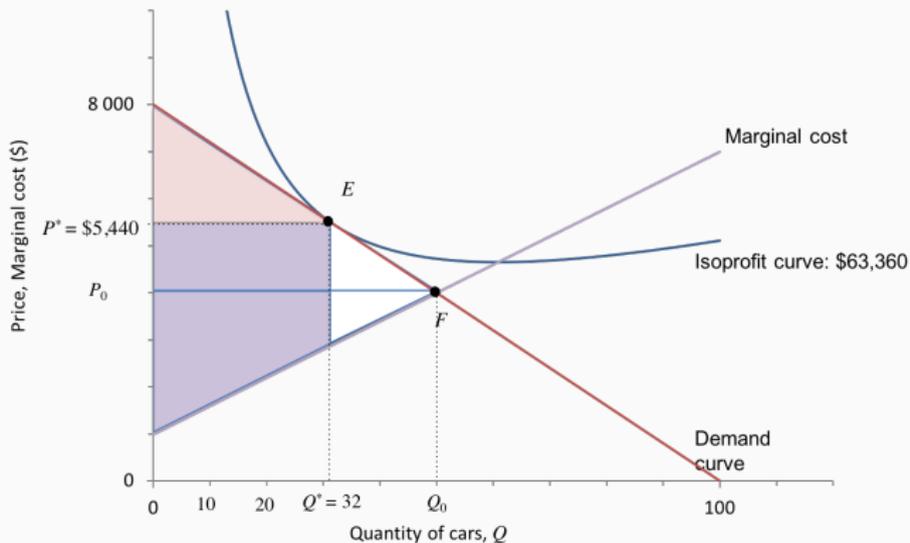


Figure. If a monopoly can charge only one price (P^* here), then the allocation is not efficient.

Source: CORE.

Monopoly

- Use of monopoly power increases the profits of the monopoly firm compared to the competitive equilibrium
- In practice, monopoly can raise its selling price or withhold supply compared to what it would do in a competitive market situation
- This leads to:
 1. Change in distribution of surplus: higher profit to the monopoly firm, higher cost to consumers
 2. Efficiency loss: the reduction of consumption and the associated surplus
- This result hold in the case if the firm is only able to offer *uniform pricing*, the same price for everyone

Price discrimination, good or bad?

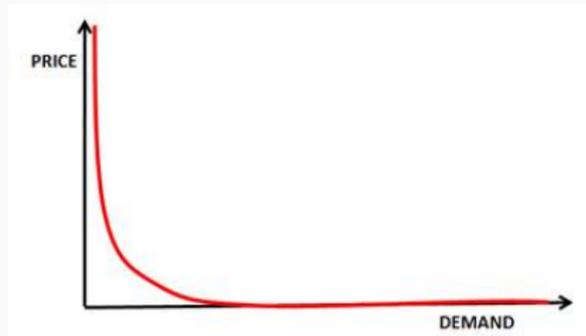
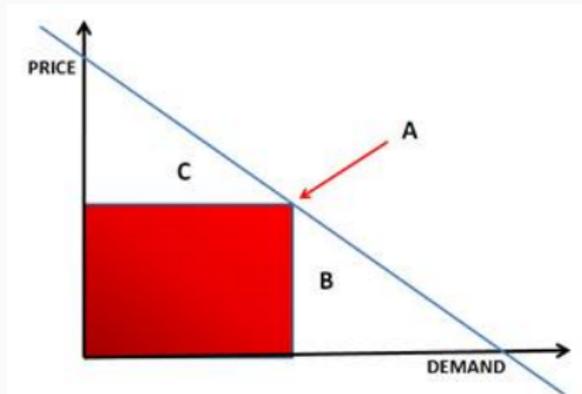


Figure. Linear demand (left). Model for demand in a free-to-play game (right).

- Setting one fixed price at A leads to buyers that could have paid more (C) and consumers that do not buy the game and thus do not pay anything (B)
- Empirically, it seems that some people are willing to pay huge sums of money within the games (like in the demand curve on the right). Free access and in-game purchases provide a way for price discrimination and monopoly rents
- High-paying customers or *whales* are similar to high-rollers in casinos

Figure: Lovell, 2011.

Price discrimination

- Consider x_i goods sold to markets $(1, \dots, n)$.
- Let c be the equal marginal cost of production.
- Compare change in welfare ΔW in cases
 - Goods are sold for a uniform price p_0 .
 - Price discrimination: goods sold for prices (p_1, \dots, p_n) .
- The following inequalities hold:

$$(p_0 - c) \sum_{i=1}^n \Delta x_i \geq \Delta W \geq \sum_{i=1}^n (p_i - c) \Delta x_i$$

- First inequality tells that output must increase for the total welfare to increase.
- Second inequality tells that if price discrimination is profitable, total welfare must increase.

Price discrimination

- If the firm has monopoly position, can set prices freely and knows all data, then:
 - The firm will set a different price for each customer.
 - The price will be exactly set to customers valuation.
 - All customers with valuation higher than cost will get the item.
 - Consumer surplus will be zero, monopoly extracts all the rents.
- But the allocation will be efficient: total welfare increases!
 - In a monopolistic market situation price discrimination may restore market efficiency compared to uniform pricing.
 - But the all the benefits from efficiency will be pocketed by the monopoly; typically this is considered to be problematic.

Discussion: What about zero prices?

Is Google search a monopoly?

Take the poll in Presemo presemo.aalto.fi/digimar.

Use the chat to discuss.

Real world competition

- When there is a limited number of firms, then each of these may have some market power, i.e. they can gain by bidding differently from their marginal cost
- When doing so, they must take into account the actions of the other firms
- Game theory is helpful in understanding how these non-cooperative games can play out
- Outcomes typically between perfect competition and monopolies

When there is a limited number of firms engaging in strategic behavior, several possibilities emerge:

- Bertrand competition
 - Firms can be thought to compete by setting prices.
 - Paradoxically, pure price competition reduces to sales at cost even with only two firms.
- Cournot competition
 - Firms can be thought to compete by setting quantities.
 - Effect to market equilibrium depends on the number of firms (or their market share): from monopoly to perfect competition.
- Collusion
 - Instead of competing, firms can cooperate, or collude, to achieve monopolistic control over the market.

Illustration: Online streaming

Most attention is destined to licensed content:
Demand across direct-to-consumer platforms in Mexico

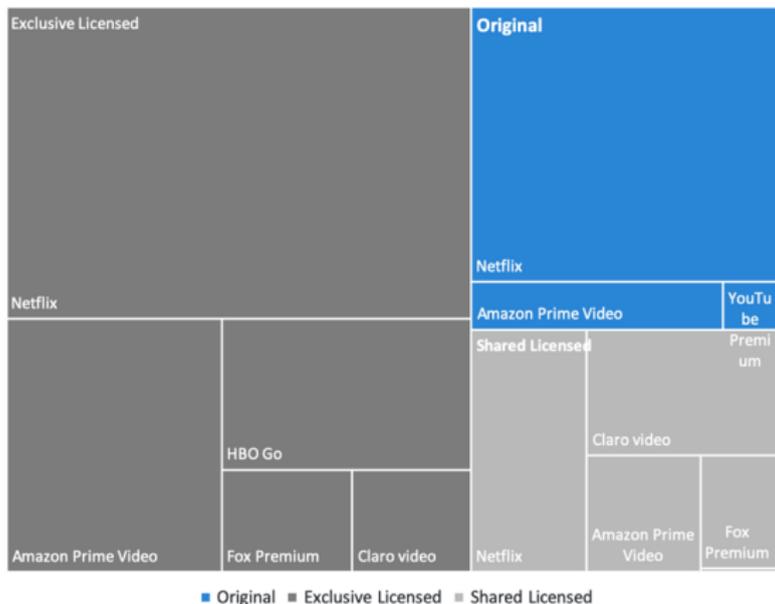


Illustration: Online streaming

- Two firms, i and j , invest to produce original content.
- Firm i has a studio with capacity K , firm j a smaller k .
- Demand is defined by an inverse demand function $p(Q)$.
- Marginal cost of production for both firms is c .
- Payoffs defined with:

$$\pi^i = \pi(K, k) = [p(K + k) - c]K$$

$$\pi^j = \pi(k, K) = [p(K + k) - c]k$$

Illustration: Online streaming

Assume that the payoffs of the firms are

(π^i, π^j)	$k = 0$	$k = 1$
$K = 2$	(45, 0)	(20, 10)
$K = 0$	(0, 0)	(0, 90)

Illustration: Online streaming – Duopoly competition

- In a *Nash equilibrium* both firms provide content:

(π^i, π^j)	$k = 0$	$k = 1$
$K = 2$	(45, 0)	(20, 10)
$K = 0$	(0, 0)	(0, 90)

- Cost for consumers is $20 + 10 = 30$.
- If the firms could coordinate their actions:
 - they would limit the production,
 - increase prices, and
 - increase their joint profits ($90 > 30$).

- Reminder: Market institutions are crucial
 - Efficient marketplaces with free entry improve competition
- Protection against the misuse of market power is one of the key regulatory concerns
 - Competition law (=anti-trust in the U.S.) is covered later
- Network externalities will impact the nature of competition
 - Will be tricky, we cover as much as we can later

Takeaways from today

- Market structure matters for the equilibrium outcomes
- Lack of competition leads to lower output and higher prices
 - Lower output is a social loss, market is no longer efficient
 - High prices have distributional effects, consumer pay too much
- If competition is insufficient there is a need for regulation

Materials for this week

Online resources (for Lecture 3):

- **Perfect competition.** www.core-econ.org 8.5 and 8.8.
- **Monopolies.** Here MRU section on Monopolies mru.org: [Monopoly](#) is better suited for the course than www.core-econ.org 7.5.1.
- **Oligopolies.** MRU on Cournot mru.org: [Cournot](#).

Reading assignment 2 (for Lecture 4):

- Easley, David and Jon Kleinberg (2010), Chapter 9 from “Networks, Crowds, and Markets: Reasoning about a Highly Connected World”. Advanced material (9.7) not obligatory.
- Einav, Linar, Chiara Farronato, Jonathan Levin and Neel Sundaresan (2018) “Auctions versus Posted Prices in Online Markets”. Very selective reading expected: Introduction, with the exception of the literature review in the end, and Section II.

Auction theory

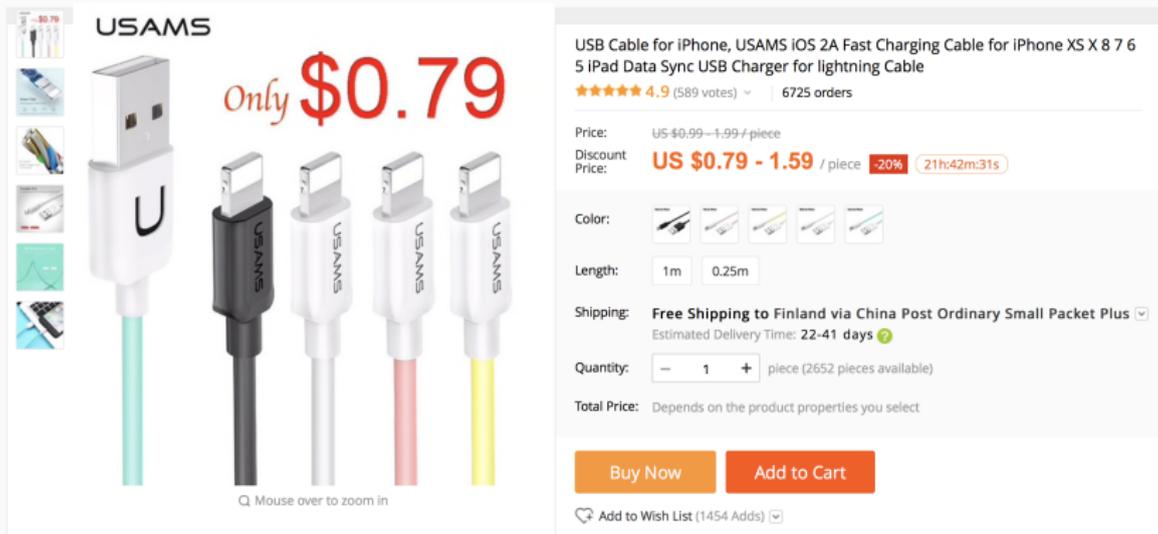
- Why auctions (price discovery, competition)
- Auction methods
- Private vs. common value auctions

Appendix

Perfect competition

- Equilibrium allocation in the perfect competition model is Pareto efficient:
 - All buyers whose valuation is higher than the market price purchase the good. All buyers whose valuation is lower than the market price do not.
 - All sellers whose cost is lower than the market price sell the good. All sellers whose cost is higher do not.
- The allocation also maximizes welfare, i.e. the sum of
 - *Consumer surplus*: Gain to buyers who pay less than they would have been willing to.
 - *Producer surplus*: Gain to sellers who sell for a higher price than their cost.

Example: Is consumer electronics a competitive market?



The image shows a product listing for a USB cable on Aliexpress. The product is a "USB Cable for iPhone, USAMS IOS 2A Fast Charging Cable for iPhone XS X 8 7 6 5 iPad Data Sync USB Charger for lightning Cable". The price is listed as "Only \$0.79". The product is shown in various colors: white, black, white, red, and yellow. The page also displays the price range "US \$0.99 - 1.99 / piece", a discount of "20%", and a shipping time of "21h:42m:31s". The quantity is set to 1, and the total price depends on the product properties selected. There are buttons for "Buy Now", "Add to Cart", and "Add to Wish List (1454 Adds)".

USAMS

Only **\$0.79**

USB Cable for iPhone, USAMS IOS 2A Fast Charging Cable for iPhone XS X 8 7 6 5 iPad Data Sync USB Charger for lightning Cable

★★★★★ 4.9 (589 votes) | 6725 orders

Price: US \$0.99 - 1.99 / piece

Discount Price: **US \$0.79 - 1.59** / piece **-20%** (21h:42m:31s)

Color: 

Length:

Shipping: **Free Shipping to Finland via China Post Ordinary Small Packet Plus** Estimated Delivery Time: **22-41 days** 

Quantity:

Total Price: Depends on the product properties you select

[Buy Now](#) [Add to Cart](#)

 [Add to Wish List \(1454 Adds\)](#)

Figure: Aliexpress.com.