Economics 2
Fall 2024

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LECTURE 8

Monopoly and Market Power

I. Introduction to Market Failures

Overview

- So far we have been talking about well-functioning markets (rationality, competition, no external effects).
  - In this case, the market outcome maximizes the total surplus (=efficiency)
- Now we are going to think about **market failures** (when markets don't function well).
  - Will show that market outcomes in these cases do not maximize the total surplus.
  - Government intervention can make things better (reduce the deadweight loss).

Markets function well under key assumptions

- Economic agents are rational: firms maximize profits, people maximize their own utility

- Perfect competition: firms and consumers are price takers

- No externalities: economic activity does not create external harm

Markets function well under key assumptions

- Economic agents are rational: firms maximize profits, people maximize utility

- Perfect competition: firms and consumers are price takers

Monopoly: perfect competition assumption fails

- No externalities: economic activity does not create external harm

Monopoly

- There is only one producer of a good
- Most goods are specific to a brand/company where monopoly reasoning applies:
  - Only Apple makes and sells I-phones or Macbooks
  - Monopoly power stronger when there are no close substitutes
- The monopoly chooses the price to maximize profits and taking into account that demand falls with the price

Natural monopoly

- A natural monopoly is a situation in which one single producer can supply the whole market at a lower average cost than multiple firms
- Marginal cost pretty low so efficient to price low; fixed costs high so efficient pricing cannot recoup fix costs. Examples:
  - utility companies like PG&E (gas and electricity)
  - Railways
  - Software, digital books/news/music (zero marginal cost)
- Facebook, rideshare (UBER/Lyft) also natural monopolies as value increases with larger customer base.

Barriers to Entry

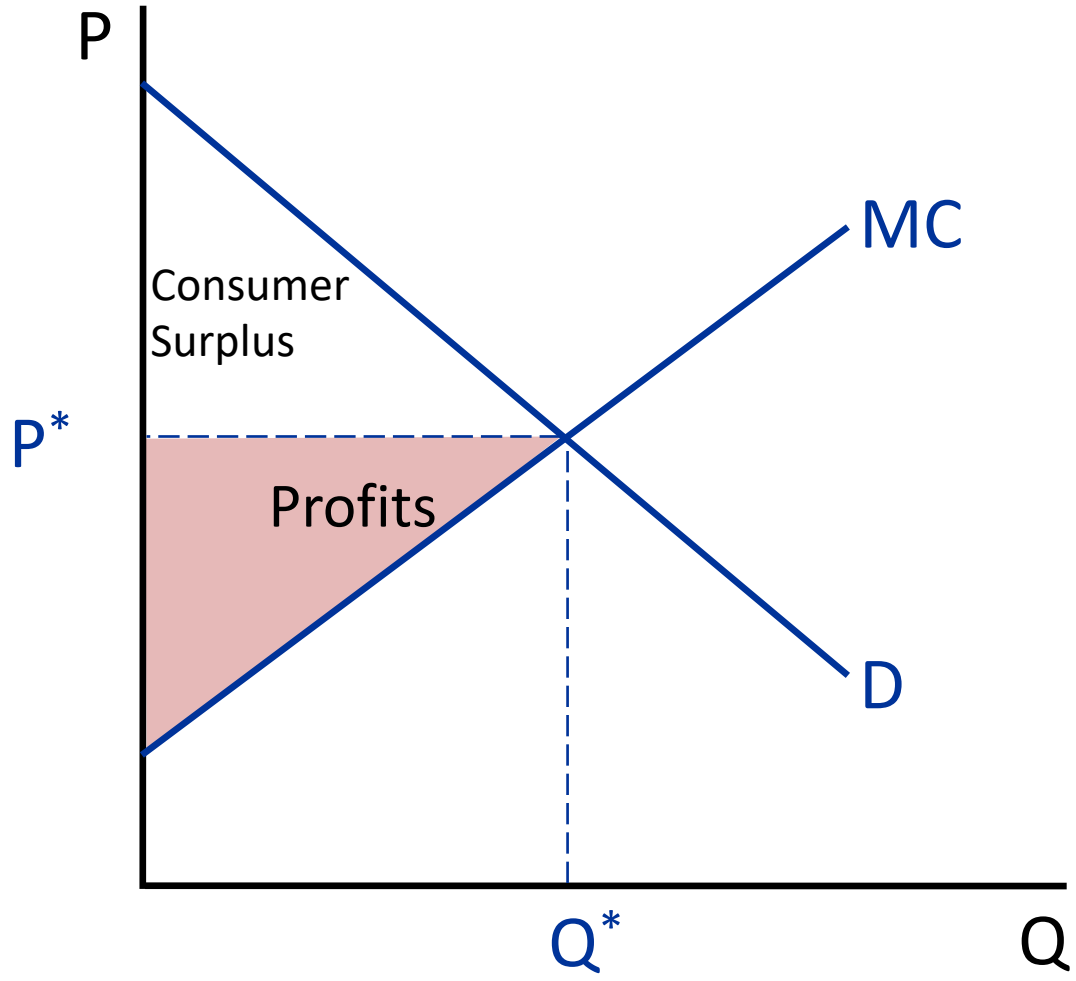
- A barrier to entry is any force that prevents firms from entering a market.
- Main types of barriers to entry:
  - High fixed costs (railway construction)
  - Patents and other legal protections (medical drugs)
  - Anti-competitive practices (sink/buy competitors)

II. Profit Maximization for a Monopolist

Monopoly Profit Maximization

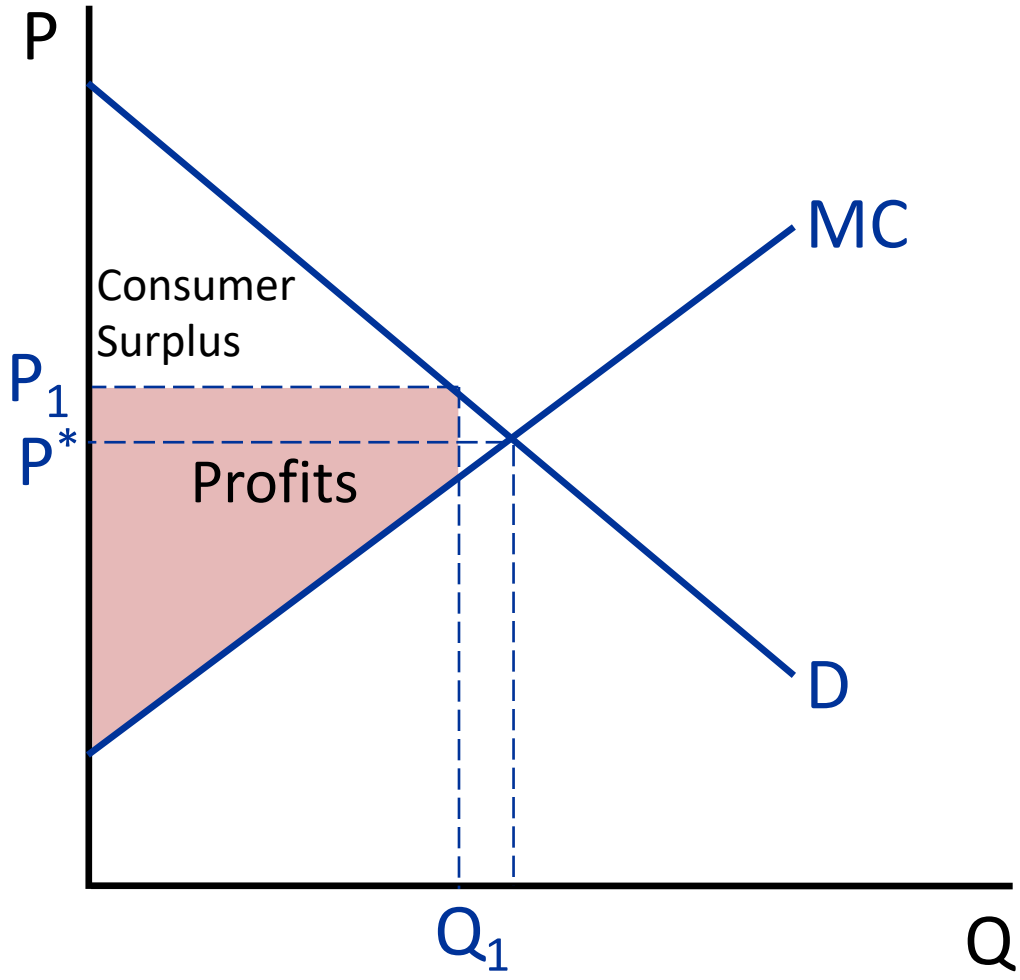
- Monopoly is the only producer of the good (e.g. Apple I-Phone)
- Monopoly faces a demand curve D(P) that decreases with P (from consumers' choices)
- Monopoly has a curve of marginal cost of production MC
- Monopoly chooses the price P that maximizes its profits: Profits = $P \times Q - C(Q)$ with $Q=D(P)$

Profit Maximization for a Monopolist



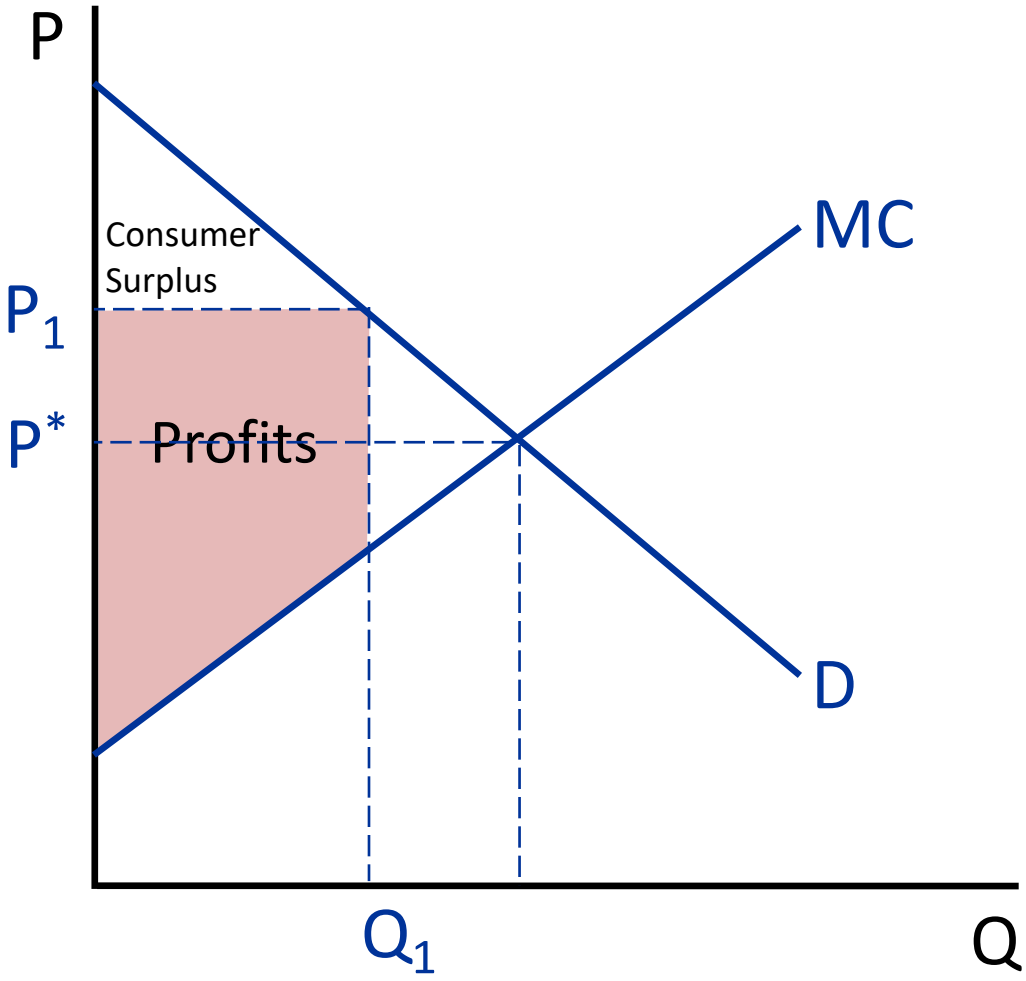
P*,Q* is the competitive efficient equilibrium but monopolist can choose any point along demand curve

Profit Maximization for a Monopolist



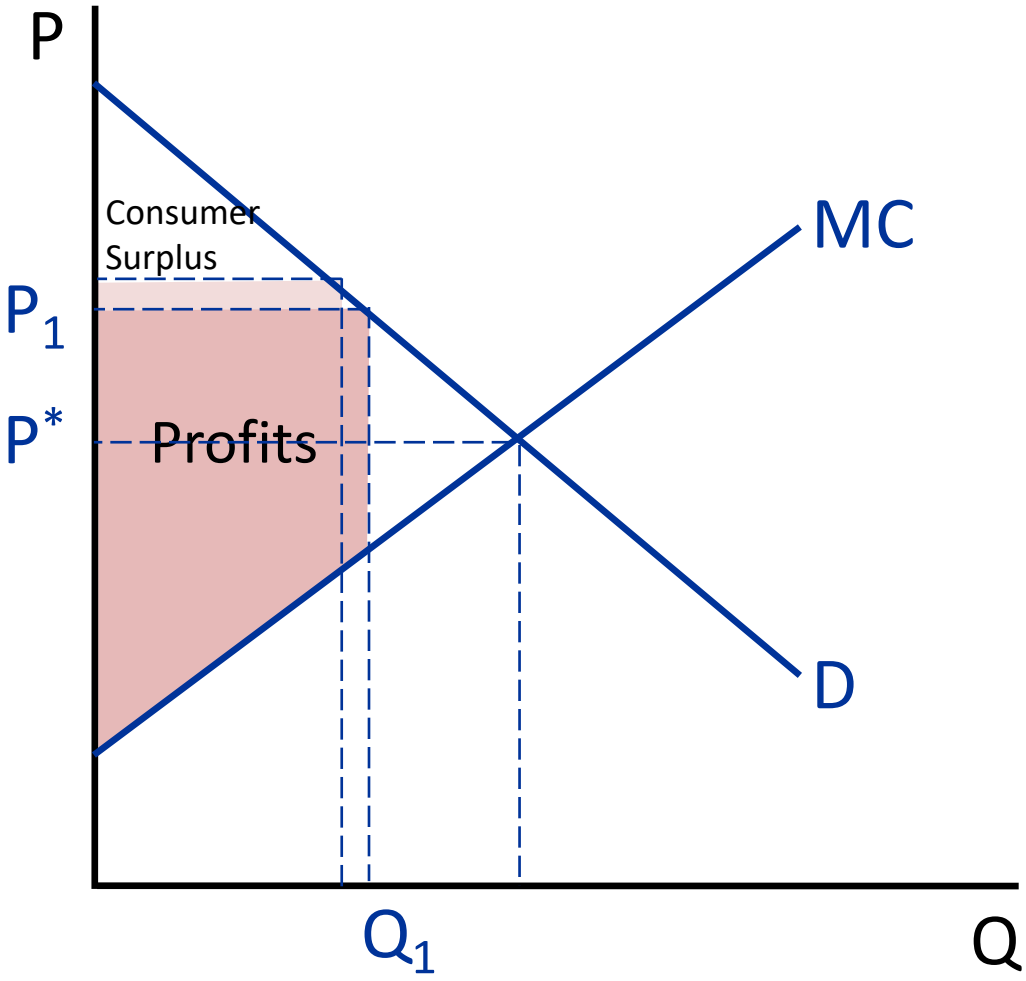
Increasing P above P* increases monopoly's profit

Profit Maximization for a Monopolist



Increasing P above P* increases monopoly's profit **until red area is maximized**

Profit Maximization for a Monopolist



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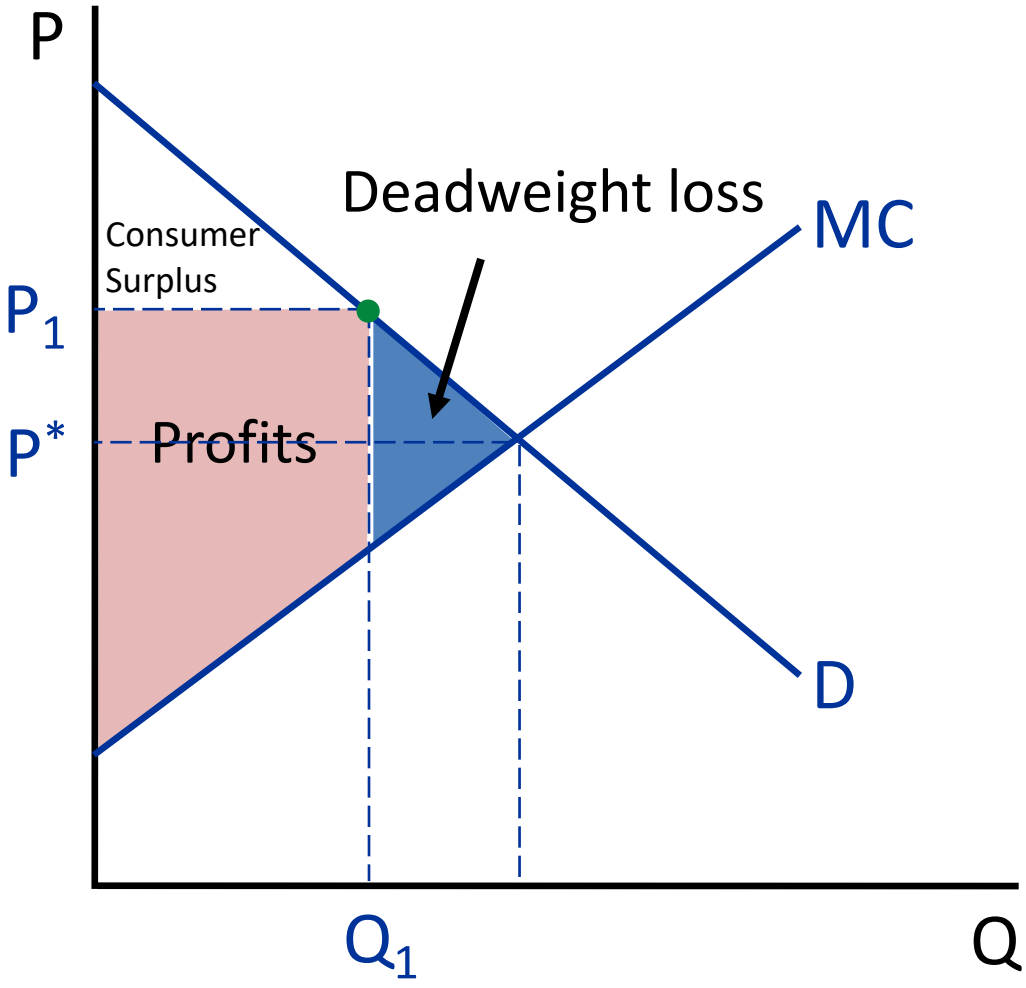
Profit Maximization for a Monopolist



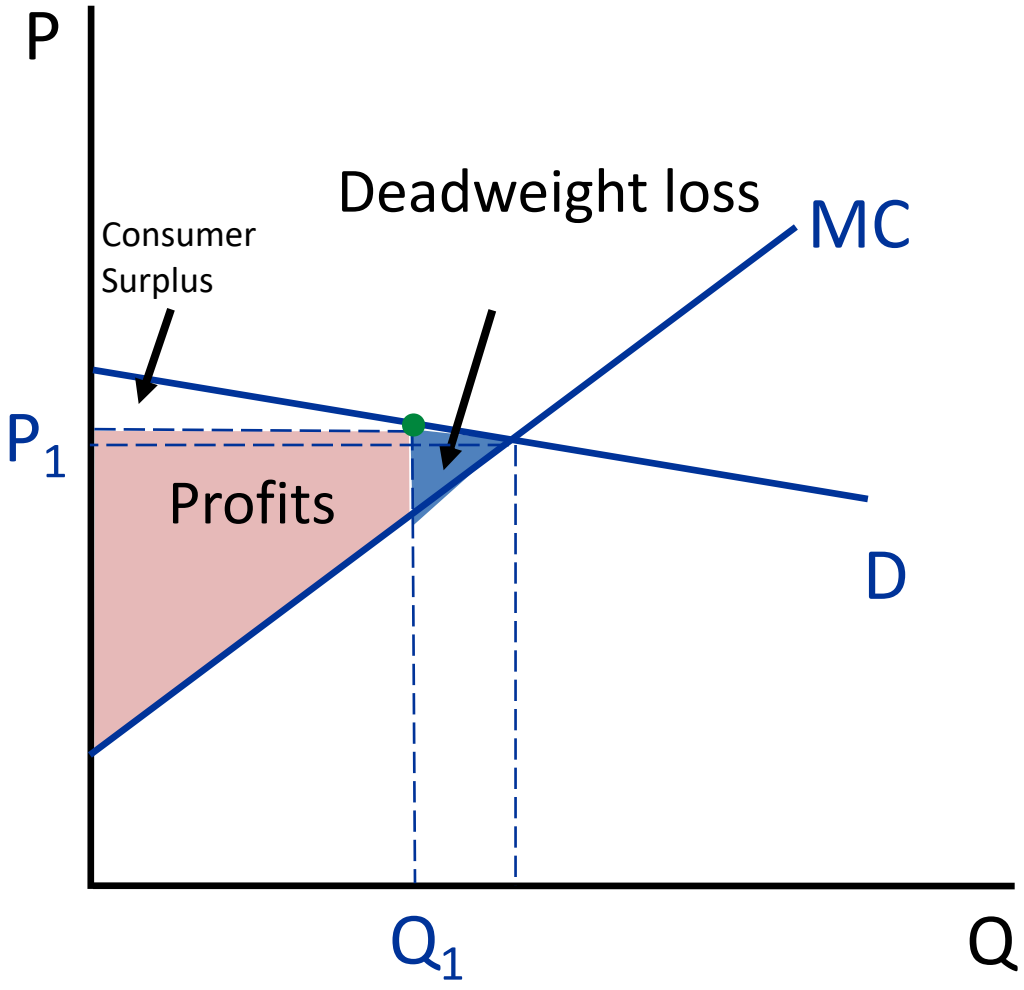
Monopoly squeezes consumer surplus (inequitable) and creates deadweight loss (inefficient)

Quiz:

Question: Why is monopoly bad relative to perfect competition?

- A. Because it reduces quantity produced
- B. Because it creates deadweight loss
- C. Because it increases profits at the expense of consumers
- D. Because of all A, B, C.

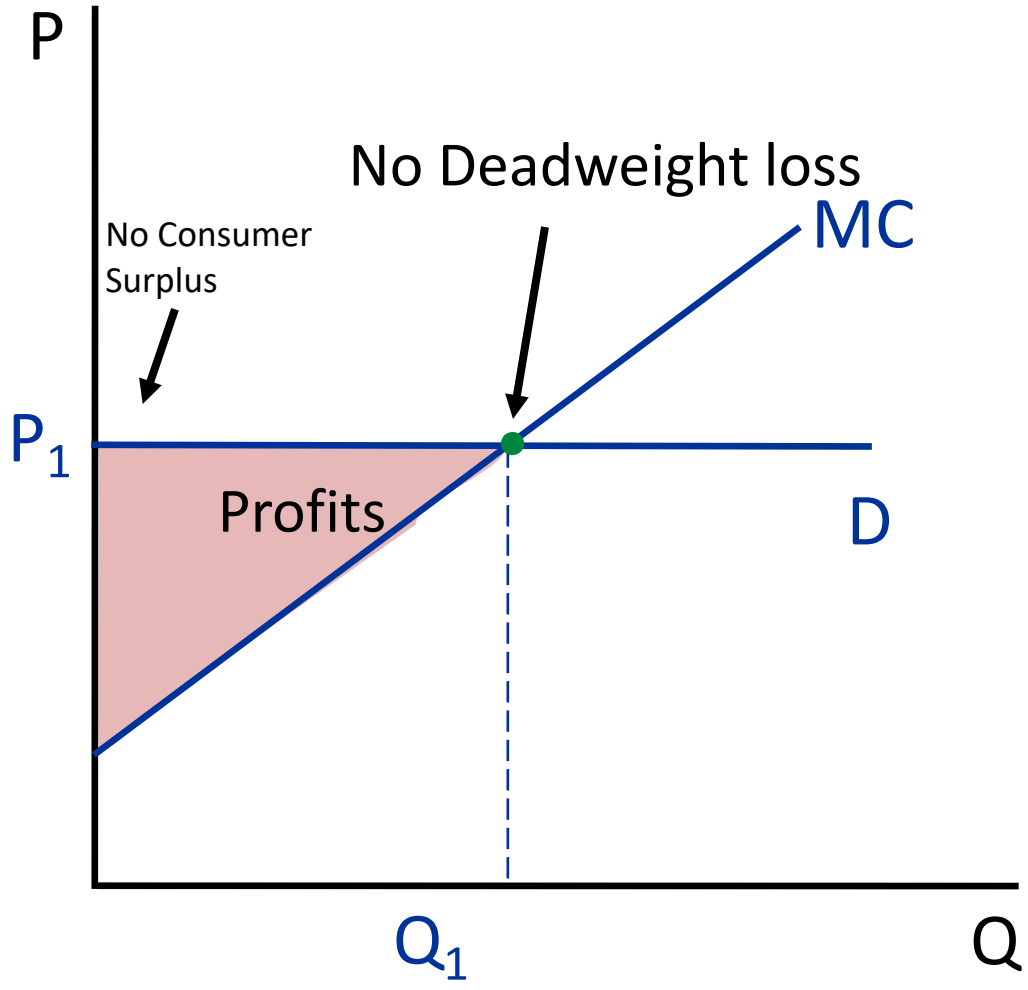
Monopolist with elastic demand



Monopoly distortion is small when demand is very elastic

When demand is perfectly elastic, we are back to competitive model

With infinitely elastic demand: Monopoly is equivalent to perfect competition



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Implications of Monopoly

- A monopoly doesn't take the price as given.
  - However, monopoly is constrained by demand curve.
- A monopoly produces below where MC = P.
  - This reduces consumer surplus and increases profits (inequitable)
  - This also creates deadweight loss (inefficient)
- If demand is inelastic, monopoly distortion is large
  - Monopoly with close substitutes (where demand is very elastic) is not as bad (e.g. Android vs. I-phone)

Mathematics of Monopoly

- Monopolist chooses P to maximize:
  Profits = $P \times D(P) - C(D(P))$
- Profits are maximized when derivative of profits with respect to P is zero:

$$D(P) + P \times D'(P) - C'(D(P)) \times D'(P) = 0$$

$$D(P) + (P - MC) \times D'(P) = 0 \text{ with } MC = C'(D(P))$$

$$1 = -D'(P)/D(P) \times (P - MC) > 0 \Rightarrow P > MC$$

$$1 = -\varepsilon_D \times (P - MC)/P \Rightarrow P > MC$$

Example of Monopoly Maximization

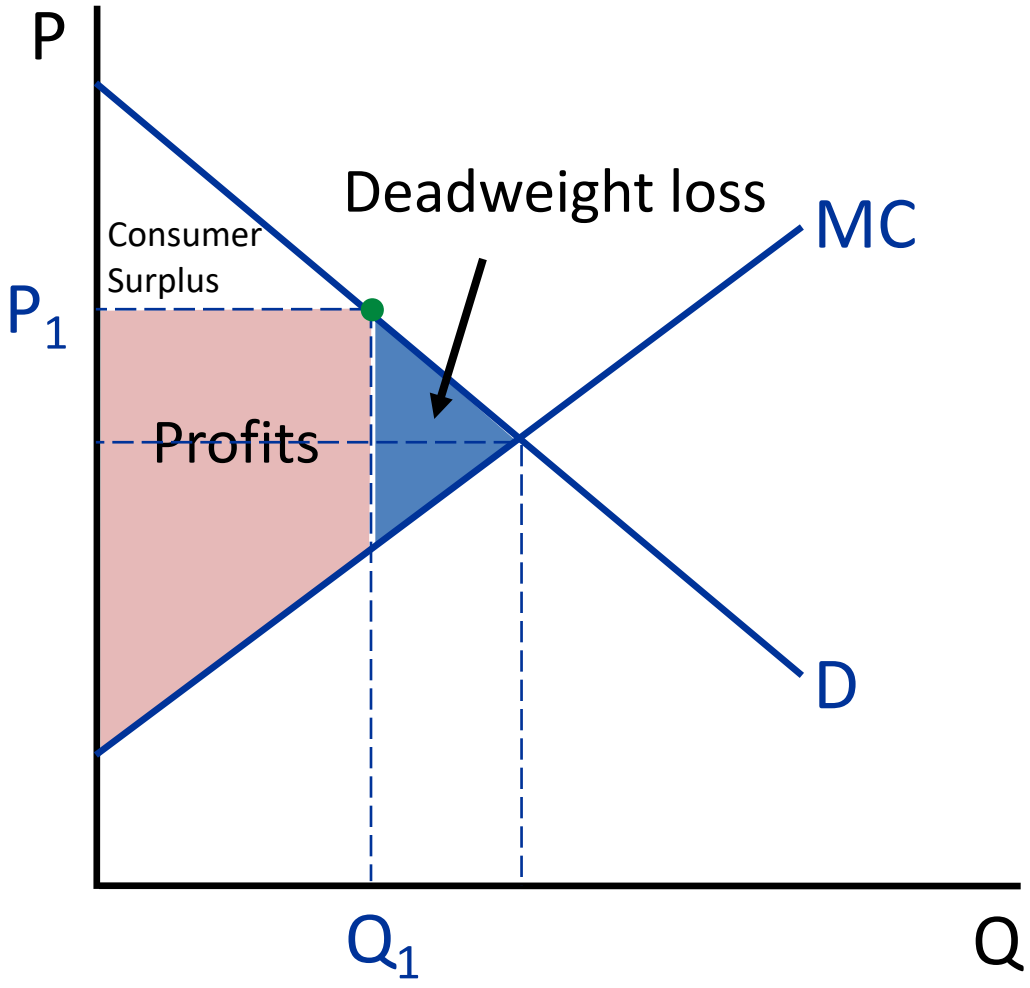
- $D(P)=a - b \times P$ [and $D(P)=0$ if $P>=a/b$]
- $C(Q)=d \times Q \Rightarrow MC=d$
- Profits $= P \times D(P)-C(D(P))=P \times(a-b \times P)-d \times(a-b \times P)$
  $=-d \times a+(a+d \times b) \times P-b \times P^2$
- Profits maximized when $dProfits/dP=0 \Rightarrow$

  $a+d \times b-2b \times P=0$

  $P = (a+d \times b)/(2b) =a/(2b)+d/2$
- Note that $P<a/b$ implies that $P<d=MC$

V. Long-Run Profit Maximization for a Monopolist

Profit Maximization for a Monopolist



Red area represents profits before the fixed costs of production are paid. Final profits = red area - fixed cost of production

How Does a Monopolist Respond to Profits?

- Graphical analysis ignored fixed costs. Fixed costs need to be deducted from red profit area in figure (but don't change price choice analysis)
- If fixed costs higher than profits red area: monopolist makes negative profits and the monopolist will want to leave the industry.
- If fixed costs smaller than red area profits, the monopolist makes positive economic profits in the long run, and positive profits are sustainable [as no competitors can enter by definition]

Barriers to entry

- The monopolist can make positive profit, but unlike the perfectly competitive case with identical firms it can sustain them in the long run
- This is because of the barriers to entry
- In the competitive industry, profits attracts new entrants
  - This expands industry supply and so drives down the price and the profit of producers

Features of the four market structures

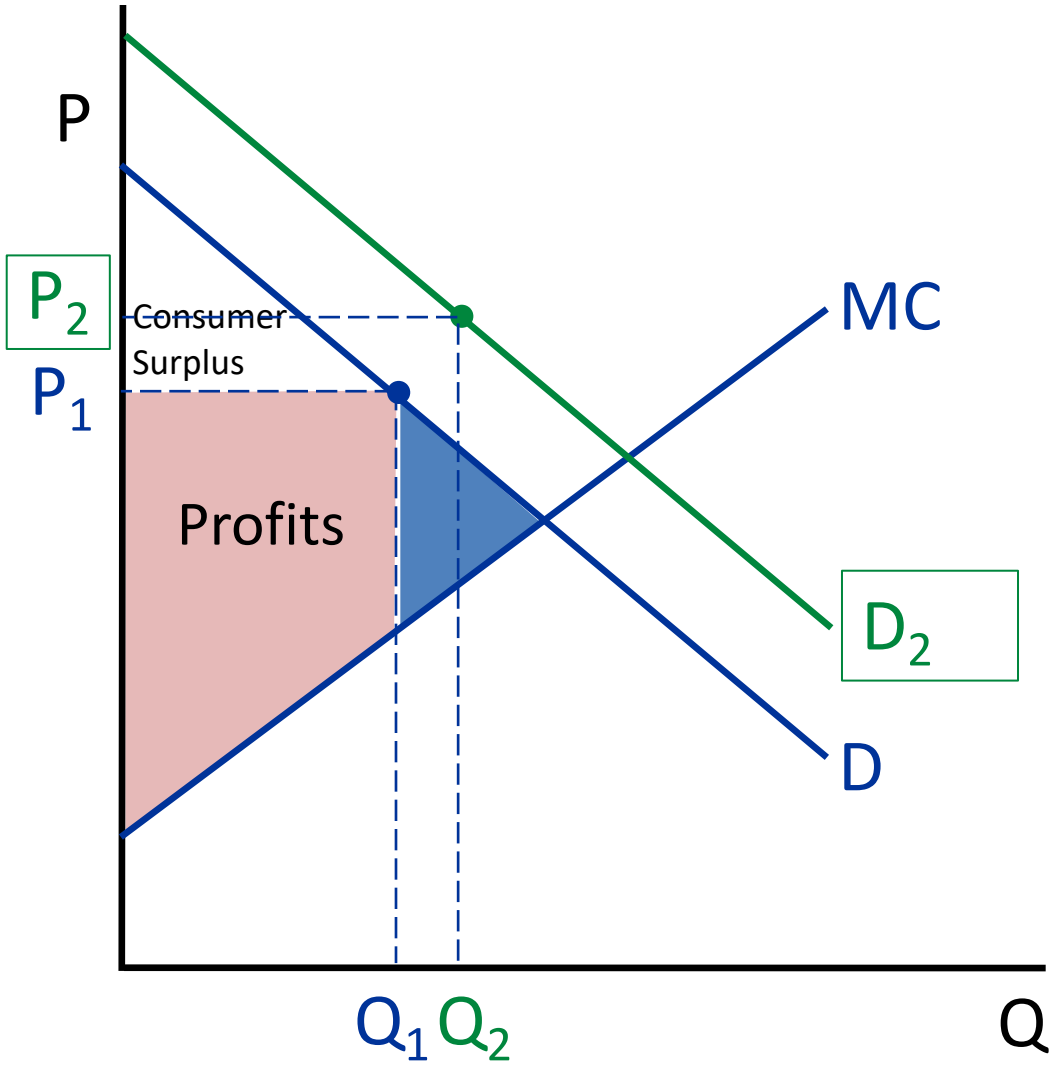
Type of market	Number of firms	Freedom of entry	Nature of product	Examples	Implications for demand curve faced by firm
Perfect competition	Very many	Unrestricted	Homogeneous (undifferentiated)	Cabbages, carrots (approximately)	Horizontal: firm is a price taker
Monopolistic competition	Many / several	Unrestricted	Differentiated	Builders, restaurants	Downward sloping, but relatively elastic
Oligopoly	Few	Restricted	Undifferentiated or differentiated	Cement cars, electrical appliances	Downward sloping. Relatively inelastic (shape depends on reactions of rivals)
Monopoly	One	Restricted or completely blocked	Unique	Local water company, train operators (over particular routes)	Downward sloping: more inelastic than oligopoly. Firm has considerable control over price

Quiz:

Question: Look at the shoes you are wearing. Were they produced and sold in:

- A. Perfect competition
- B. Monopolistic competition
- C. Oligopoly
- D. Monopoly

Effect of Advertisement for a Monopolist



Advertisement to drive up demand only makes sense with monopolistic competition (not perfect competition)

Quiz:

Question: Suppose Apple ads for the new I-Phone 16 shift up the demand curve. This increases Apple profits but also the consumer surplus people get from the new I-phone 16. Is this good for consumers?

- A. Yes, more people learn about how great the new I-phone 16 is
- B. Yes, people feel more special about getting it.
- C. Uncertain, it shifts demand from Samsung to Apple
- D. No, people get manipulated into buying
- E. A, B, C, or D could each be true for different people

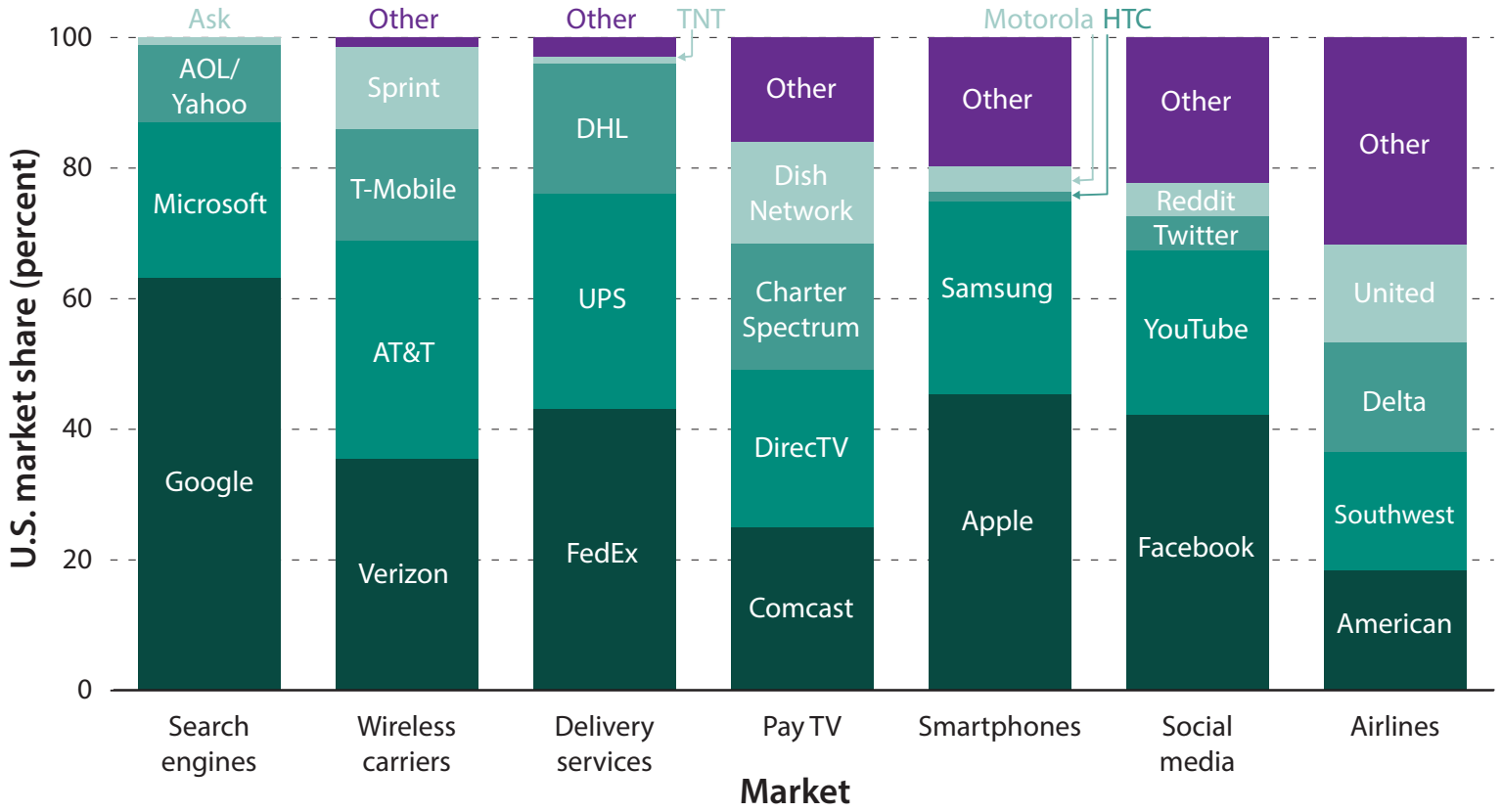
VI. Government Responses to Monopoly

Monopoly in the real world

- With monopoly, consumers lose, producers gain but by less (deadweight loss)
- But bigger producers can sometimes operate at lower costs which may mean win-win for producers and consumers if the cost savings are shared.
- So how do we identify market power?
  - Look at market shares of biggest firms in industry
- What can and should we do about it?

FIGURE 2.

U.S. Market Share by Firm, Selected Markets



Source: comScore 2018a, 2018b (search engines and smartphones); FierceWireless 2018 (wireless carriers); DHL 2018 (delivery services); Informitv 2018 (Pay TV); MarketingCharts 2016 (social media); Bureau of Transportation Statistics 2018a (airlines). All accessed via Statista.com.

Note: Social media shows the share of all visits; smartphones and wireless carriers show the share of subscribers; airlines show the share of domestic revenue passenger miles. Data for social media are for November 2016; data for search engines, wireless carriers, and pay TV are for December 2017; data for delivery services are for 2017 for both North and South America; data for smartphones and airlines are for January 2018. The delivery firm TNT is a subsidiary of FedEx.

THE HAMILTON PROJECT BROOKINGS

Many US industries are heavily concentrated (data from 2017-8)

Policies to Deal with Monopoly

- Antitrust laws – laws designed to promote competition and prevent monopolization:
  - 2024 judgement: Google has an illegal monopoly on search
  - 2024 lawsuit: VISA stifled competition in debit cards
- Regulations that range from pricing regulations (US local utilities for water, electricity, gas) all the way to nationalization (government owns and controls monopoly: US postal service)
- Limits on patents and other legal protections.

Trade-off innovation vs. competition

- Innovating and inventing new products is costly. High fixed costs of invention and low marginal costs of production (e.g. drug industry)
- Innovation costs are recouped by future profits when invention is successful
- Future profits are eroded by competition if new product can be replicated/reverse engineered by competitors
- Most countries protect innovations by granting time limited monopoly power through intellectual property: patents for inventions, copyrights for authors, trademarks for brands

AbbVie's blockbuster drug Humira finally loses its 20-year, $200 billion monopoly

January 31, 2023 · 6:00 AM ET

LESLIE WALKER | DAN GORENSTEIN

Drug Humira provides treatment against pain from arthritis.
Pfizer Covid vaccine surpassed Humira in 2022 for profits.

Patents and Innovation

- Considerable amount of innovation happens outside patent system (secret innovations in firms, publicly funded research)
- Difficult to evaluate empirically if more generous patent protections fosters innovation
- Easier to find examples where firms strategically use patent protections (e.g., patent more when protections become more generous)
- Some evidence that patents hinder follow-on innovation (Williams 2003)
- In the long-run, growth driven by innovations that are in the public domain for anybody to use

Sequencing of Human Genome: Private vs. Public

TABLE 1

INNOVATION OUTCOMES FOR CELERA AND NON-CELERA GENES SEQUENCED IN 2001

	Celera Mean (1)	Non-Celera Mean (2)	Difference [(1) − (2)] (3)	p-Value of Difference (4)
Publications in 2001–9	1.239	2.116	−.877	[.000]
1(known, uncertain phenotype)	.401	.563	−.162	[.000]
1(known, certain phenotype)	.046	.073	−.027	[.000]
1(used in any diagnostic test)	.030	.054	−.024	[.000]
Observations	1,682	2,851		

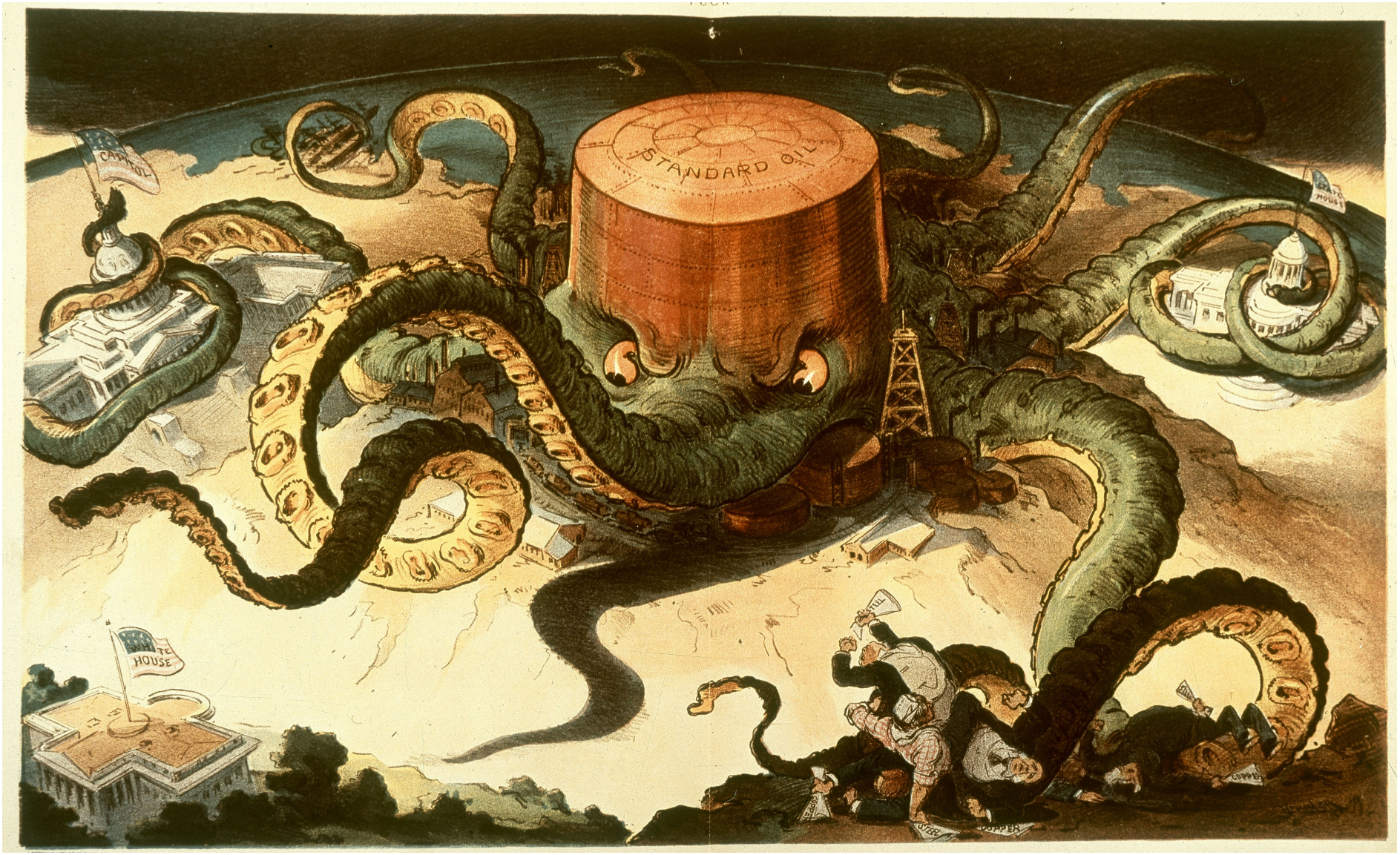
NOTE.—This table compares subsequent innovation outcomes for Celera genes relative to non-Celera genes sequenced in the same year. Gene-level observations. The sample in col. 1 includes all Celera genes; the sample in col. 2 includes all non-Celera genes sequenced in 2001. The p-value reported in col. 4 is from a t-test for a difference in mean outcomes across cols. 1 and 2. See the text and online App. A for more detailed data and variable descriptions.

Genes sequenced by Celera with Intellectual Property led to reductions in later scientific research and product development by 20–30 percent relative to Genes sequenced in the public domain.

Source is Williams 2003

Historical Context

- Industrial revolution of 1800s: many industries (railroads, shipping, oil, etc.) consolidated into monopolies
- US Gilded Age (late 1800s): monopolized industry and wealth concentration (Robber Barons) squeezing customers, workers, buying competitors and politicians.
- US developed antitrust laws in early 1900s: successful at dismantling monopolies of the Gilded Age. Utilities (water, electricity, gas, telecom, airlines) were regulated
- Since late 1970s, wave of deregulation (e.g., telecom and airlines). Resurgence of monopoly power in new utilities such as cable/broadband and new tech sectors.



Robber Barons illustration: Standard Oil became the US monopoly of oil industry making owner John D. Rockefeller immensely wealthy. Was broken in 1911 into many companies through antitrust.

New Gilded Age

- Today: large tech companies have redeveloped monopoly power (GAFAM: Google, Amazon, Facebook, Apple, Microsoft)
- Apple brand gives it market power, Microsoft has monopoly on operating system of PCs
- Google, Facebook don’t charge users but make money by charging advertisers on platform. Network effect leads to monopoly power
- Amazon doesn’t squeeze consumers (yet) but squeezes suppliers to increase consumer base.

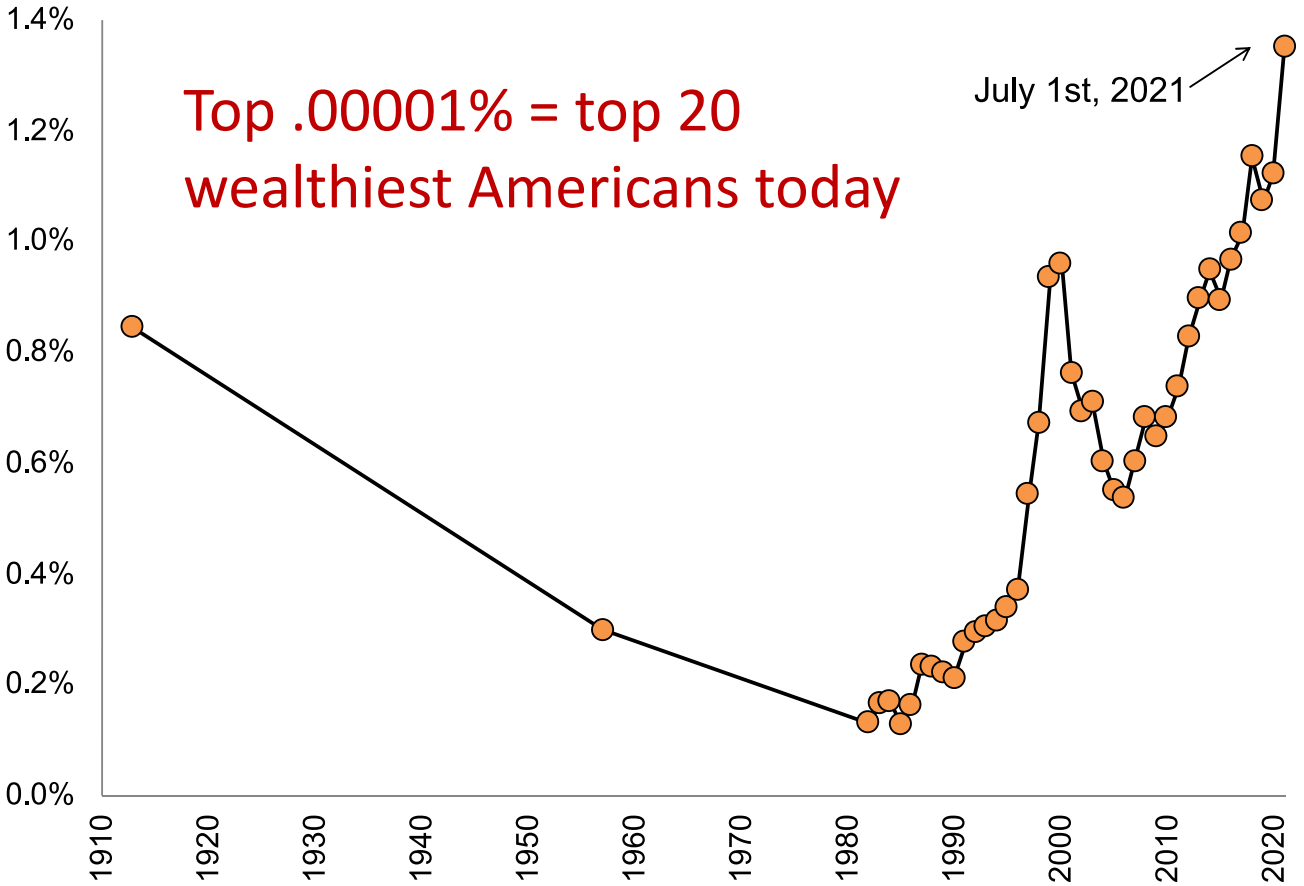


Fig. 3 The Top .00001% Wealth Share in the US using Rich Lists. This figure depicts the share of total household wealth owned by the richest .00001% US families using the Forbes 400 Rich list for 1982–2021, the 1957 Fortune magazine Rich list, and the Forbes rich list for 1918 (aged back to 1913 using overall US equity prices and using John D. Rockefeller estimated wealth of $900 million in 1913). The top .0001% includes 3.8 families in 1913, and 18 families today. The denominator is total US household wealth from Piketty et al. (2018)

Source: Piketty, Saez, and Zucman (2022)

Current Debate on Antitrust Policy

- Consumer welfare standard has come to dominate US antitrust thinking since late 1970s (law&economics)
- As long as price is low and consumer is not harmed, no concern for industry concentration per-se
- Has allowed new monopolies to rise: Walmart, Amazon, Google, Facebook, etc.
- New monopolies develop market share by pricing low and staying dominant by acquiring potential competitors (e.g. Facebook bought Instagram and WhatsApp)
- European Union and US under Biden (Lina Kahn at FTC) have become tougher in antitrust in recent years

Quiz:

Question: What is your view about GAFAM: Google, Amazon, Facebook, Apple, Microsoft:

- A. They provide great new products at low cost
- B. It's great for the US to have such dominant companies
- C. I am concerned that they are too dominant in their industry and stifle innovation
- D. I am concerned that they have too much power to influence society
- E. All of A, B, C, D

Monopoly Sum-up

- Businesses make more profits if they have monopoly power and hence have strong incentives to become monopolists.
- Historically, even industries with standard products (e.g. oil with Standard oil) become monopolized. Perfect competition is rare.
- Requires constant vigilance from governments to regulate monopoly power.
- Analogous to how a democracies can devolve into tyrannies when rulers concentrate power

References

- CORE-The Economy, Unit 7.
- Principles of Economics, Chapter 8.