ECON-C5100 Digital Markets

Iivo Vehviläinen

October 12, 2022

Aalto University
iivo.vehvilainen@aalto.fi

Lecture 12: Regulation

The square and the tower

Market square in Siena, Italy. Source: Tuscany, Beautiful Everywhere.

> There are two kinds of games in economics. One is the game where people use only legal moves. Then there is the true game, the one like real life, where the strategies and moves people make, some of them contain illegal gains. So you take into account when you write the rules of the game that the players will try to cheat. –*Leonid Hurwicz.*

Outline – Why regulate?

Typical concerns are

- Externalities
- Consumer protection
- Market power

Externalities

Externalities – What are the concerns?

- Algorithmic externalities: your data may reveal something about me
  - Examples earlier: pricing decisions, Google, data intermediaries
  - What if an algorithm is your boss?
- Disruptions from sharing and gig economy platforms.
  - Big things: Are people in the gig economy employed or not?
  - Small local concerns: Sharing platforms such AirBnB driving up the local housing market prices?
- Environmental externalities from data processing.

Labor market effects – Example

Figure. UberEats workers arranged a strike by ordering pizzas via Uber.

Figure: Mark Kerrison / Alamy.

Labor market effects

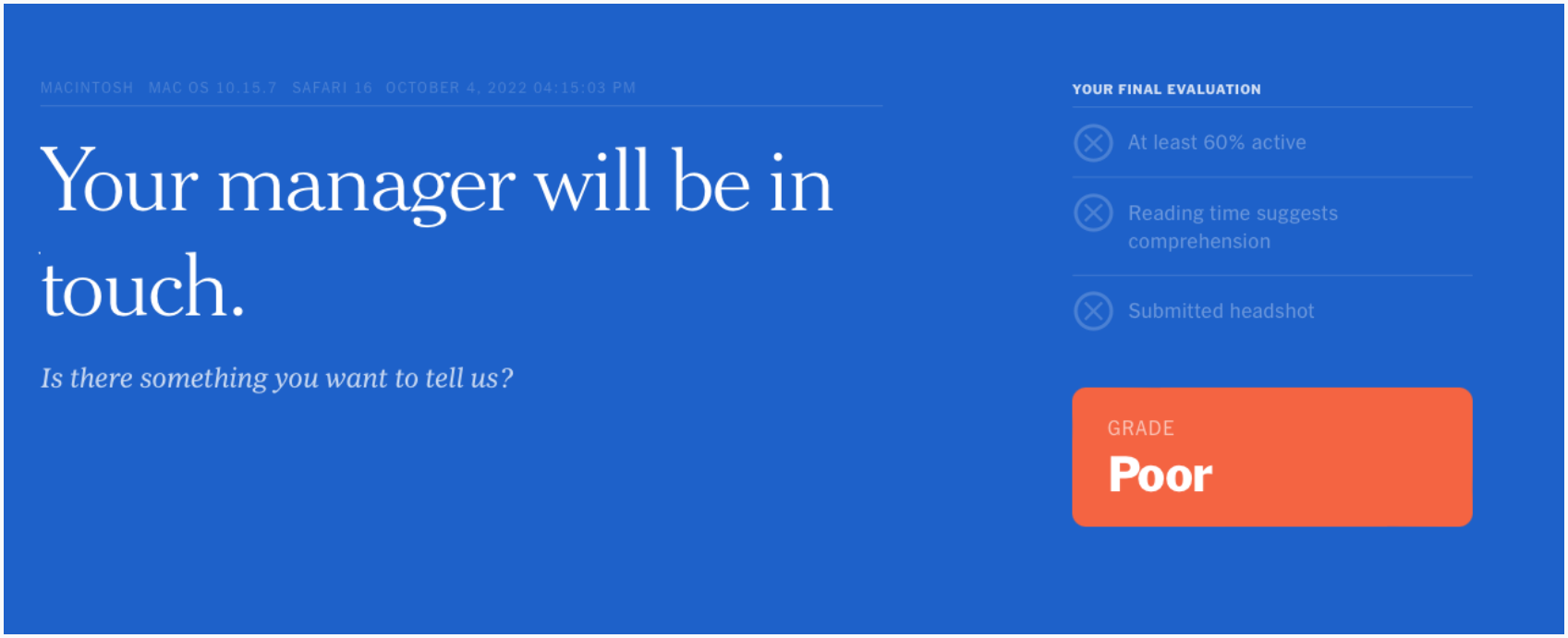


Figure. Firms increasingly use tracking technologies to monitor worker productivity.

Figure: New York Times, 14 Aug 2022.

Labor market effects

- Gig economy platforms typically try not to have employees, but contract their workers as self-employed.
  - Workers are outside the normal labor law protections.
  - Status has been challenged in the courts of many jurisdictions.
- Algorithms that control the worker hours and pay bring efficiency to the users, but are insensitive to workers.
- Workers with no office and no knowledge on their colleagues may find it hard to organize.
  - Bargaining power more in the hands of the platforms.

Labor market effects– Example


The New York Times

Account

The SoftBank Effect: How $100 Billion Left Workers in a Hole

SoftBank poured money into start-ups that use armies of contractors. That has upended the lives of drivers, hotel operators and real estate agents around the world.

Figure. Drivers for Grab protesting against unfair oversight.

Figure: Storyful News, via New York Times.

Labor market effects

- Large upfront investments by platforms to attract "workers".
- For individuals, selecting to contract with a platform may
  - Require investments of their own, e.g. own car, or
  - Mean a lost opportunity to do something else, e.g. drive a taxi, try to improve other skills.
- If the platform becomes successful, then it can leverage the dominant position to degrade the contract terms later.
  - Workers may get locked in to a poor paying low-skill jobs.
- Oversupply of cheap labor is an enabler for such activity
  - Problems not constrained to low income countries.
  - Policy solutions needed, trade-off with the overall efficiency gains.

Externalities – Environment

- The development of technology drives the costs of collecting, storing, and processing big data down.
- Data will continue to be processed as long as it has value.
  - Like with the manufacturing of other goods in the markets.
- Theory would suggest that environmental concerns are best tackled at source.
  - If electricity generation is polluting, tax the pollution there, which will increase the price and affect the consumption of electricity in all sectors.

Consumer protection

> Big data and privacy. . . represents one of biggest challenges to our society, and to competition law and consumer protection.
> –*J. Stiglitz, 2018.*

Consumer protection: What are the concerns on data?

- Privacy
  - Considered to be a human right on its own.
  - Privacy paradox: Consumers do not seem to act rationally.
- Illegal uses of data
  - Firms do something else with the data than they say they do.
  - Data can be compromised.

Big data and privacy – Example

Target by custom data feeds

Trainline used Dynamic's SmartContent platform to integrate a custom data feed containing the latest train journey offers and availabilities at various train stations. Different digital screens displayed customised creatives showing passengers the most relevant availabilities at their train station, and helping them to make the most of the offers at a given time and place.

Figure: JCDecaux.

Big data and privacy – Informed consent?

- Individuals often don't know the value of data that they are giving to companies . . .
  - Sales of location-targeted advertising reaching an estimated $21 billion in the U.S. in 2018 (NYT 10 Dec 2018).
- . . . or even know that their data is being taken
  - Reading the privacy policies an average American encounters in a year would take 76 work days. (McDonald and Cranor 2008).
- . . . or care if they know that data is being colleced.
  - Privacy paradox: When asked, users say that they care about privacy, but in real life they seem to accept data collection.

Big data and privacy – Data misuse

App	Google Play downloads	Clear information that they share data with non-service provider third parties in the consent flow?	Clear information in the consent flow that shared data is used for targeted ads?	In-app options to reduce data sharing with third parties?
Clue	10,000,000+	✗	✗	✗
Grindr	10,000,000+	✗	✗	✗
Happn	50,000,000+	✓	✗	✗
Muslim: Qibla Finder	10,000,000+	✗	✗	✗
My days	5,000,000+	✗	✗	✗
My Talking Tom 2	100,000,000+	✓*	✓*	✓*
OkCupid	10,000,000+	✗	✗	✗
Perfect365	50,000,000+	✓	✓	✗
Tinder	100,000,000+	✗	✗	✗
Wave Keyboard	10,000,000+	✗	✗	✗

*Only provided information and options when the user said they were born in 2002 or earlier.

Figure. Popular dating services like Grindr, OkCupid and Tinder are spreading user information like dating choices and precise location to advertising and marketing companies in ways that may violate privacy laws.

Figure: Norwegian Consumer Council.

Reminder: Big data benefits

Use of user data has also societal benefits:

- Service provision can be made more efficient:
  - Data can be used to present relevant content (e.g. Google).
  - More accurate demand predictions may lead to lower costs of logistics, lower waste etc.
- Advertisement supported content benefits from big data
  - Ads can be targeted with greater accuracy, reducing mismatches and the costs on both sides.
  - Can be argued that similar to targeting by e.g. viewer groups or by the magazine a reader chooses.
  - Advertisement income enables "free" services (e.g. Facebook).
- Information can be "reused", increasing its value.

Big data and algorithms

- Algorithmic use of data leads to high level of selection:
  - Aim is to offer user specific content that increases sales.
  - This can be a purchase decision, click on an ad or more time spent on the platform.
- Algorithmic externalities
  - Discrimination of some users.
  - The content provided may be divisive.
  - Many social media apps use habit-forming technologies: infinite scroll, constant updates, likes etc. These may result in excessive use and addictions.
- Limited transparency on the how the algorithms operate.

Algorithmic discrimination – Examples

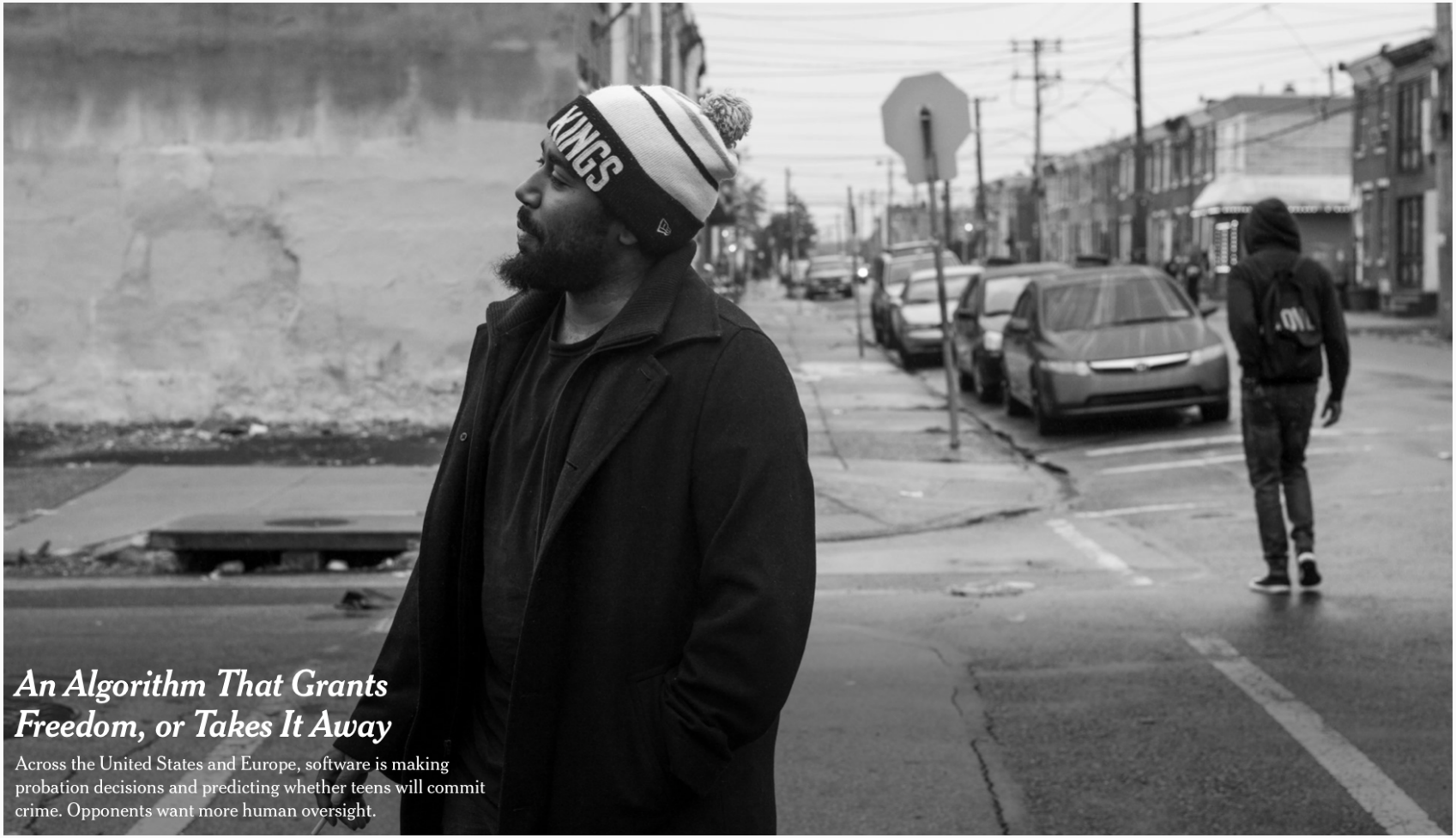


Figure. Profiling is used in deciding probation risk in the U.S., detecting welfare abuses in Holland, and predicting teen crime risk in the U.K.

New York Times, 6 Feb 2020.

Algorithmic discrimination – Trade-off

Trade-off in the use of data in decision making:

- To avoid disparate treatment, *protected category* attributes cannot be considered.
  - For example, cannot give probation to whites and not black.
- To avoid disparate impact, protected category must be considered.
  - For example, need to set different cutoffs to different races to ensure an equal balance of false positives and false negatives.
- Anti-discrimination laws leave balancing to the decision maker.
- But what if the decisions are made by an algorithm?

Cofone, 2019.

Big data and privacy – Example

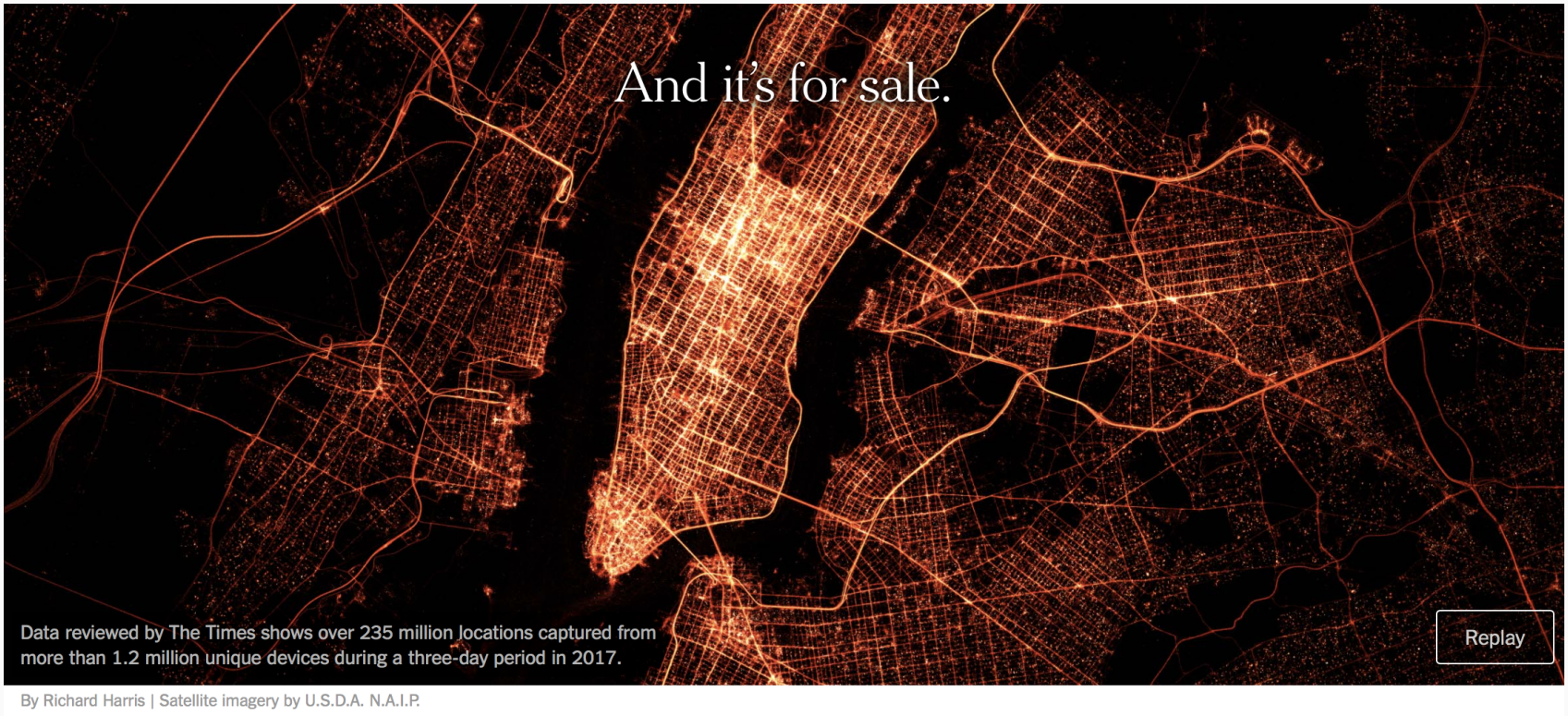


Figure. Example of mobile phone location data in New York City.

Figure: NYT 10 Dec 2018.

Big data and privacy – Example

The Secretive Company That Might End Privacy as We Know It

A little-known start-up helps law enforcement match photos of unknown people to their online images — and "might lead to a dystopian future or something," a backer says.

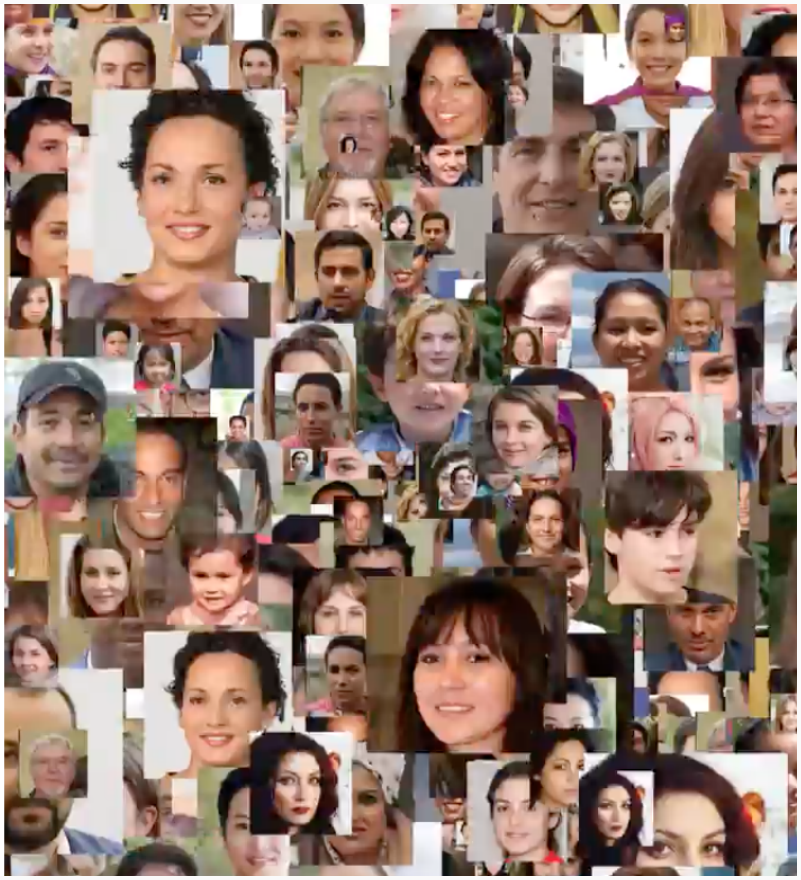


Figure. A start-up helps law enforcement match photos of unknown people to their online images.

New York Times, 18 Jan 2020.

Big data and discrimination – Examples

Public pajama wearing is common in China, particularly among older women. Johannes Eisele/Agence France-Presse — Getty Images

Figure. Elderly ladies walking with "inappropriate" clothes were identified using facial recognition and publicly shamed in China.

New York Times, 21 Jan 2020.

> How transparent should our life be to others?
> –*J. Tirole, Digital Dystopia, AER 2021.*

See also: Black Mirror, Series 3, Episode 1 and George Orwell, 1984.

Regulatory responses – Privacy

- European Union's General Data Protection Regulation (GDPR) is along the lines of J. Stiglitz:
  - "There needs to be far stronger regulation on individual privacy and the transparency of those who acquire data, on combining data sets, on the uses to which data can be put."
- 2020 privacy laws in California a step forward in the U.S.
- But global firms often operate beyond the reach of national regulators, leading to calls on global regulation.

Market power

Market power – What are the concerns?

- Firms use market power so that the market deviates from an efficient allocation
  - Consumers "pay" too much for the service.
  - Consumers don't receive the good they'd mostly value.
- Worry about long-term dynamism of the digital markets
  - Firms with more data have a competitive advantage and grow. Not necessarily firms that are more otherwise more efficient.
  - Impacts entry, innovation, and development.
  - Big firms can extract undue value from other markets (suppliers, other firms, labor) and policy makers.
  - Scale and scope now are unprecedented.
- How long will this last?

Joseph Stiglitz (2018) and Raghuram G. Rajan (2018).

Increasing growth?

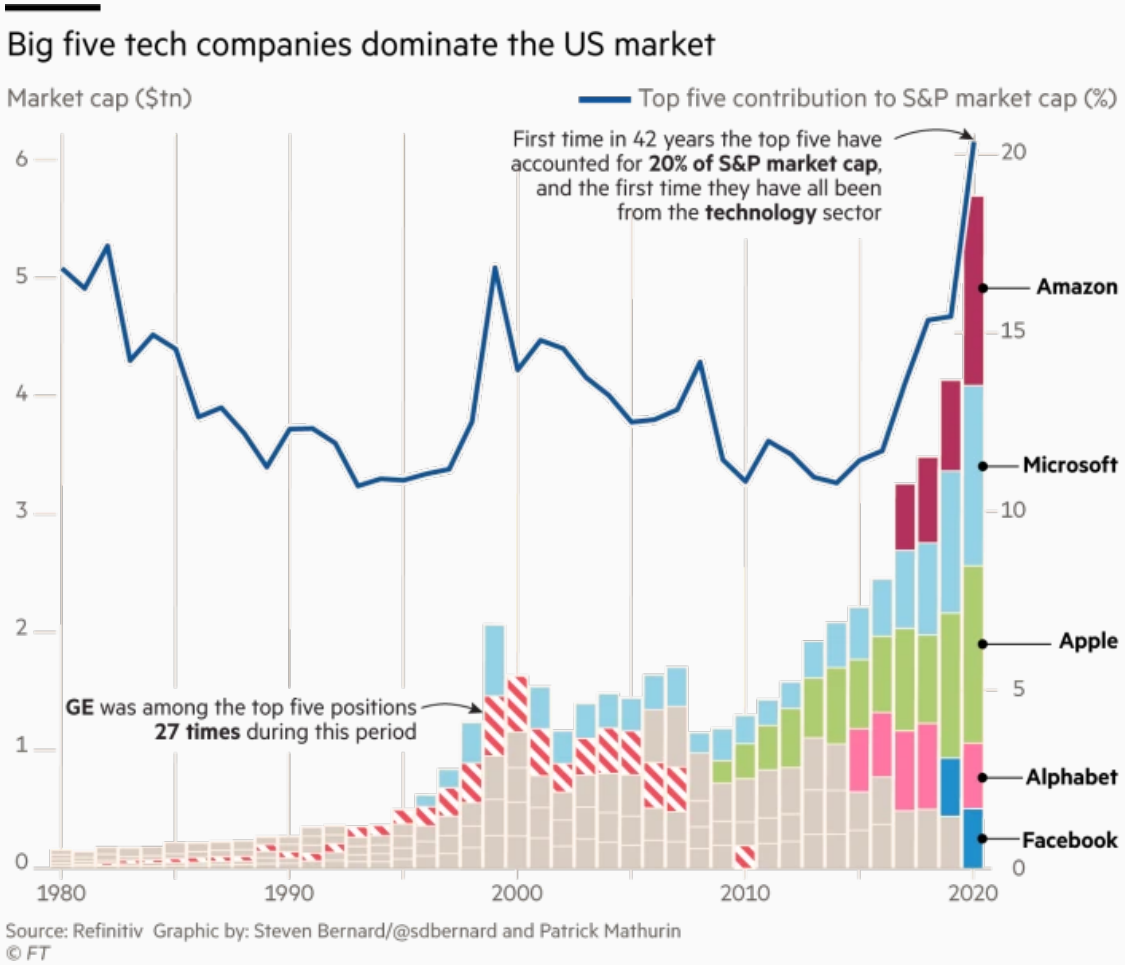


Figure. Share of the top five firms in the S&P index and the absolute market caps of the top firms. Alphabet = Google.

Source: Financial Times, 1 Aug 2020.

Falling growth?

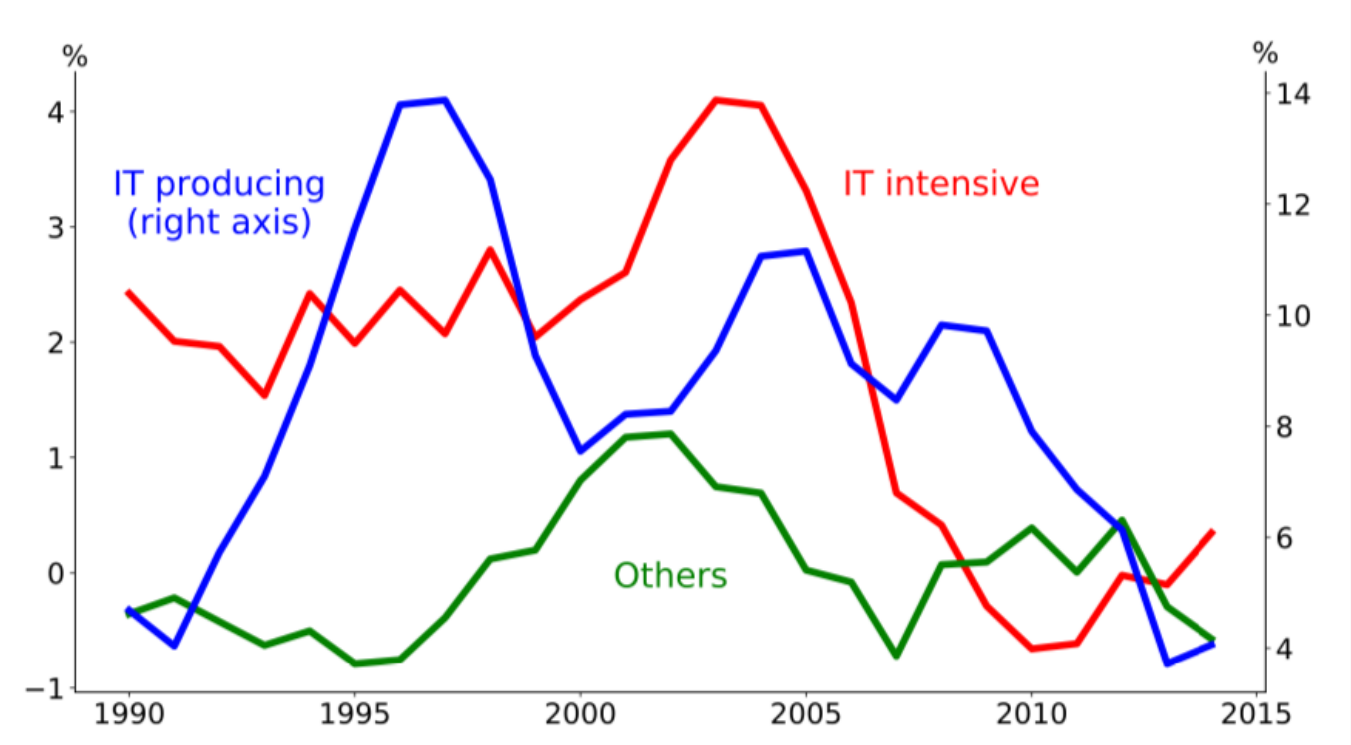


Figure. Growth bursts as most efficient firms spread to new markets. But less efficient firms find it hard to replicate success, leading to less entry and innovation. Big firms also reduce innovation because they do not want to compete with each other.

Source: Aghion et al. 2019.

Reminder: Market power – Search engine manipulation effect

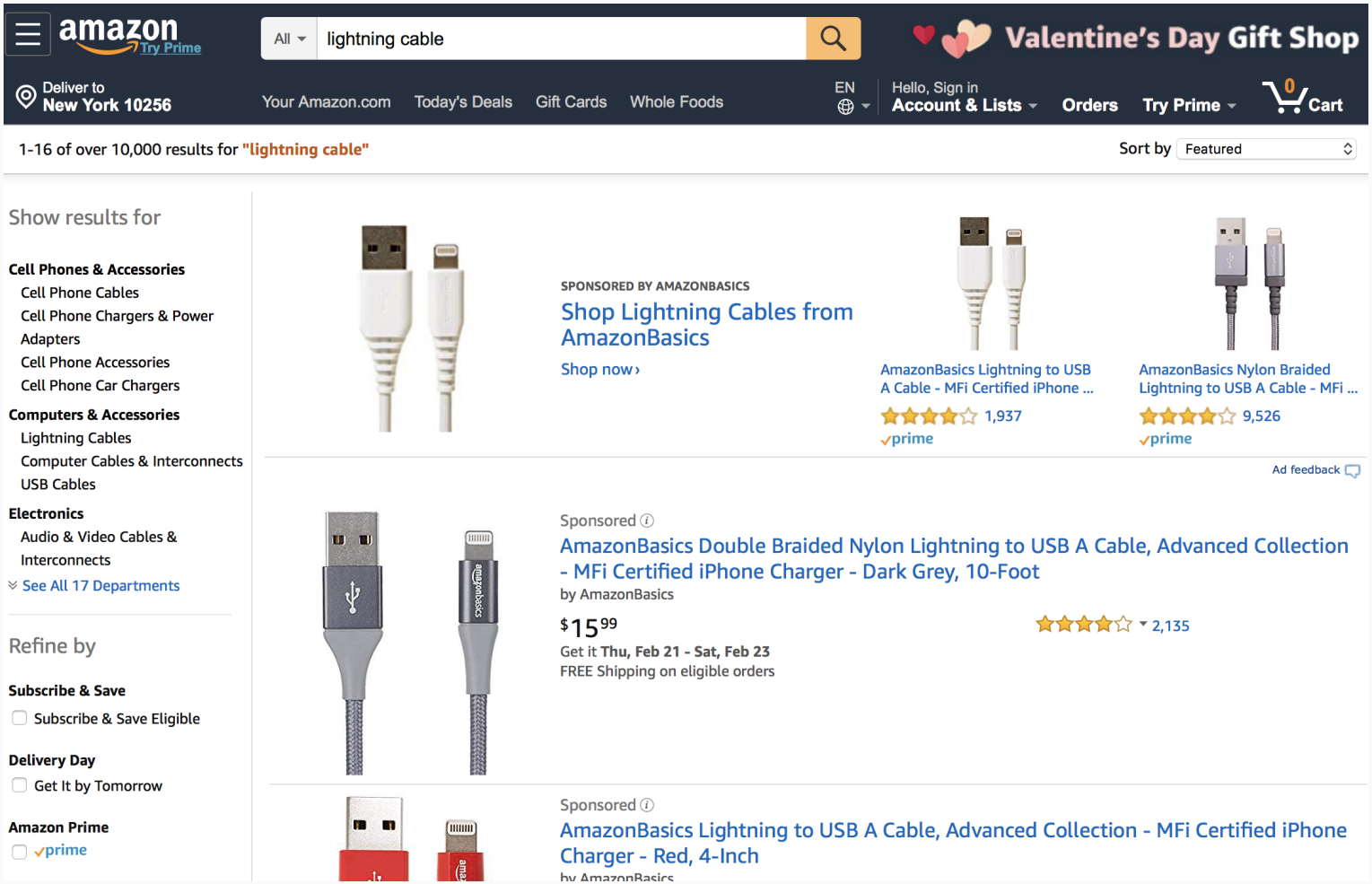
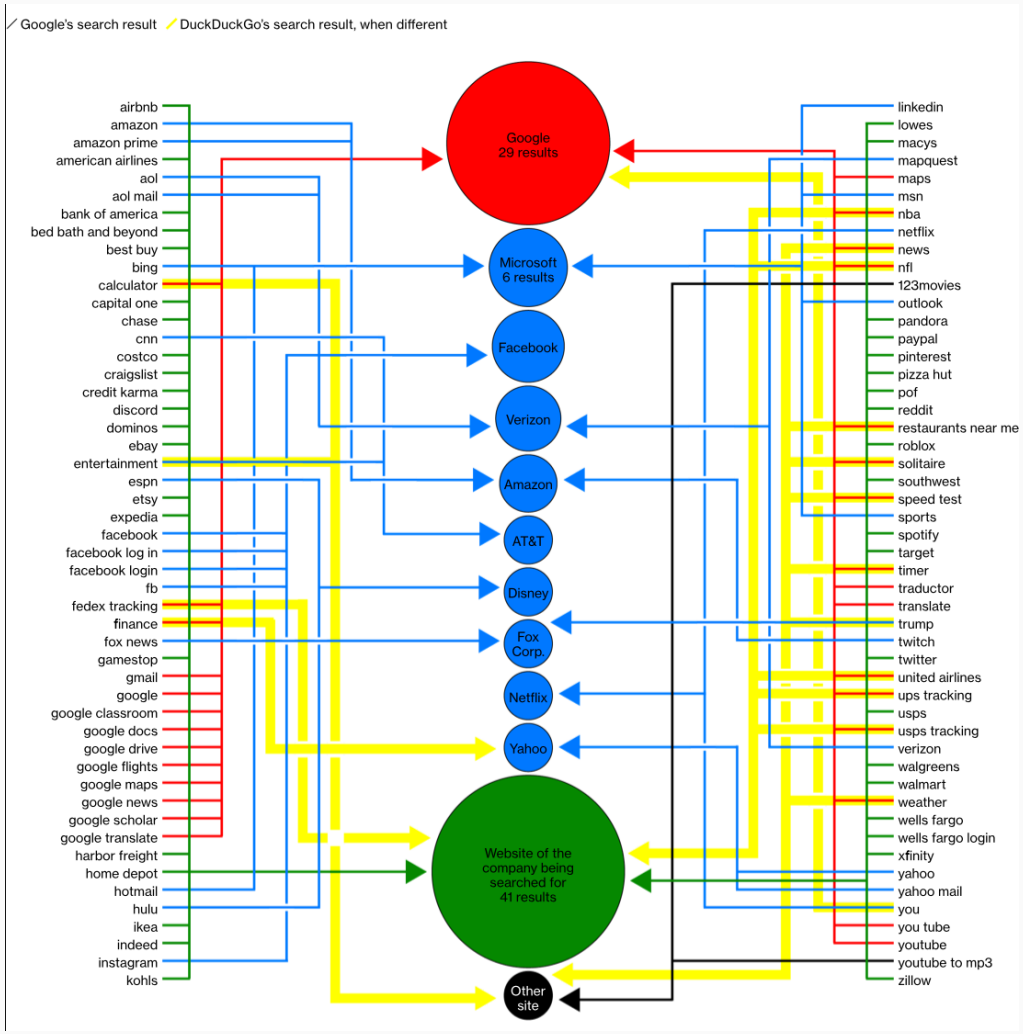


Figure. Example of Amazon search for "lightning cable".

Figure: Amazon.

Market power – Search engine manipulation effect



Source: Bloomberg Businessweek 23 Oct 2019.

Reminder: Selling eyeballs

2019 Best Personal Loans | Get $1,000 - $50,000 in 24 hrs
Ad www.lendingtree.com/personal
Fast, Free Personal **Loan** Offers in Minutes. Compare Now & Find Your Best Offer! One Form, Multiple Offers. Fixed Rates. Low Interest Rates. Get The Money You Need. up to $50,000 in 24 hrs.
Need A Personal Loan? · Personal Loan Calculator · Start Your Loan Request
$1,000 Loan - from $30.00/mo - 36 Mos Term. 5.46% APR · More

Best Personal Loans | Get $1,000 - $50,000 Fast
Ad www.magnifymoney.com/Loan
Comparing **Loan** Offers Can Save You Money. Fill Out A Quick Form & Find Your Best Rate! Low Fixed Rates. Debt Consolidation. Secure the Money You Need. Easy Online Form. Connect With Top Lenders. Up to $50,000 in 24 hrs. Services: Compare Multiple Offers, Apply in Minutes.

10 Best Loans Online 2019 | Low APR Rates | Easy Approval
Ad www.top10personalloans.com/
Top Online **Loans** | Reliable Reviews & Comparison | Best Rates | No Hidden Fee. Reliable Service.
Best Loan For Bad Credit · Do You Need A Loan? · Best Peer To Peer Lenders · Ask the Loan Expert
36 months Loan - from $478.00/mo - $16,000 Loan · More

10 Best Personal Loans | Get $1,000 - $100,000 in 24hr
Ad www.consumersadvocate.org/Personal-Loan/Comparison
Read Trusted Personal **Loan** Company Reviews. Comparisons Trusted by 20,000,000+. Always Free.
SoFi - from $191.00/mo - $10,000 - 5.49% - 5 yrs · More

Figure. Search for "loans" in Google (U.S.).

Figure: Google.

Market power – Google

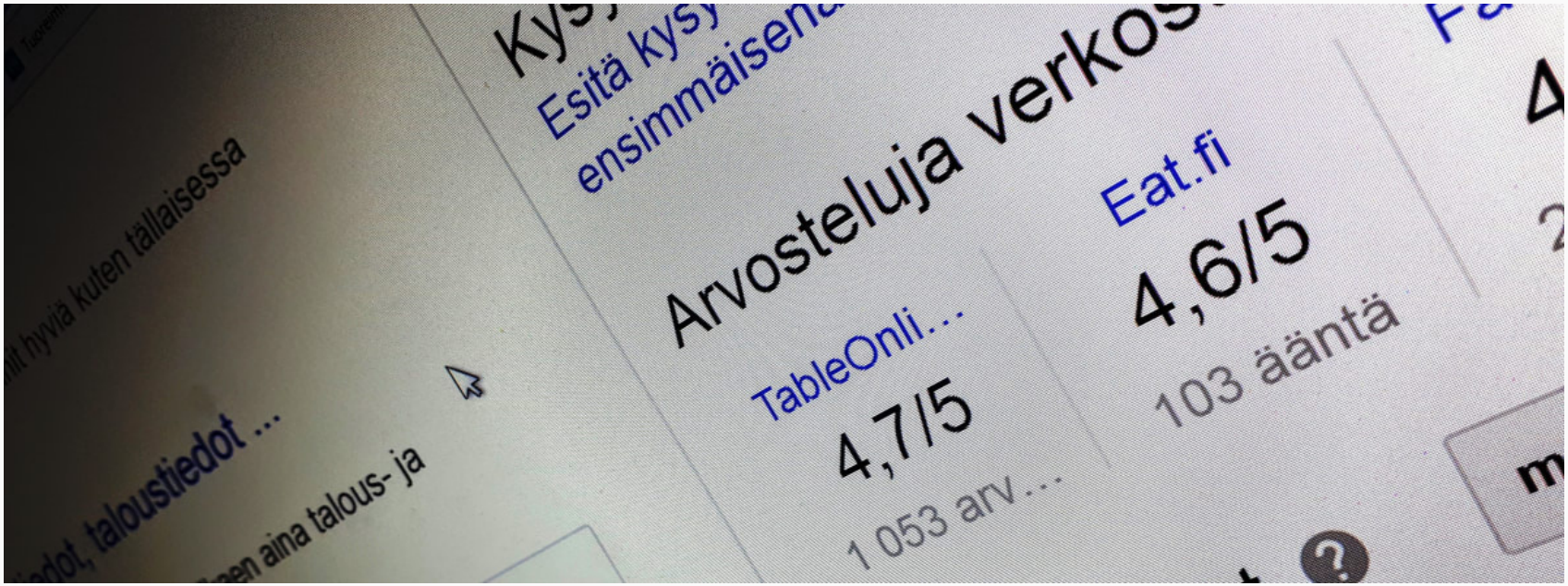


Figure. Example of how Google uses third party data directly on their user search webpage (Yle News 12 Oct 2018).

Figure: Yle.

Moral hazard – Search engine manipulation effect

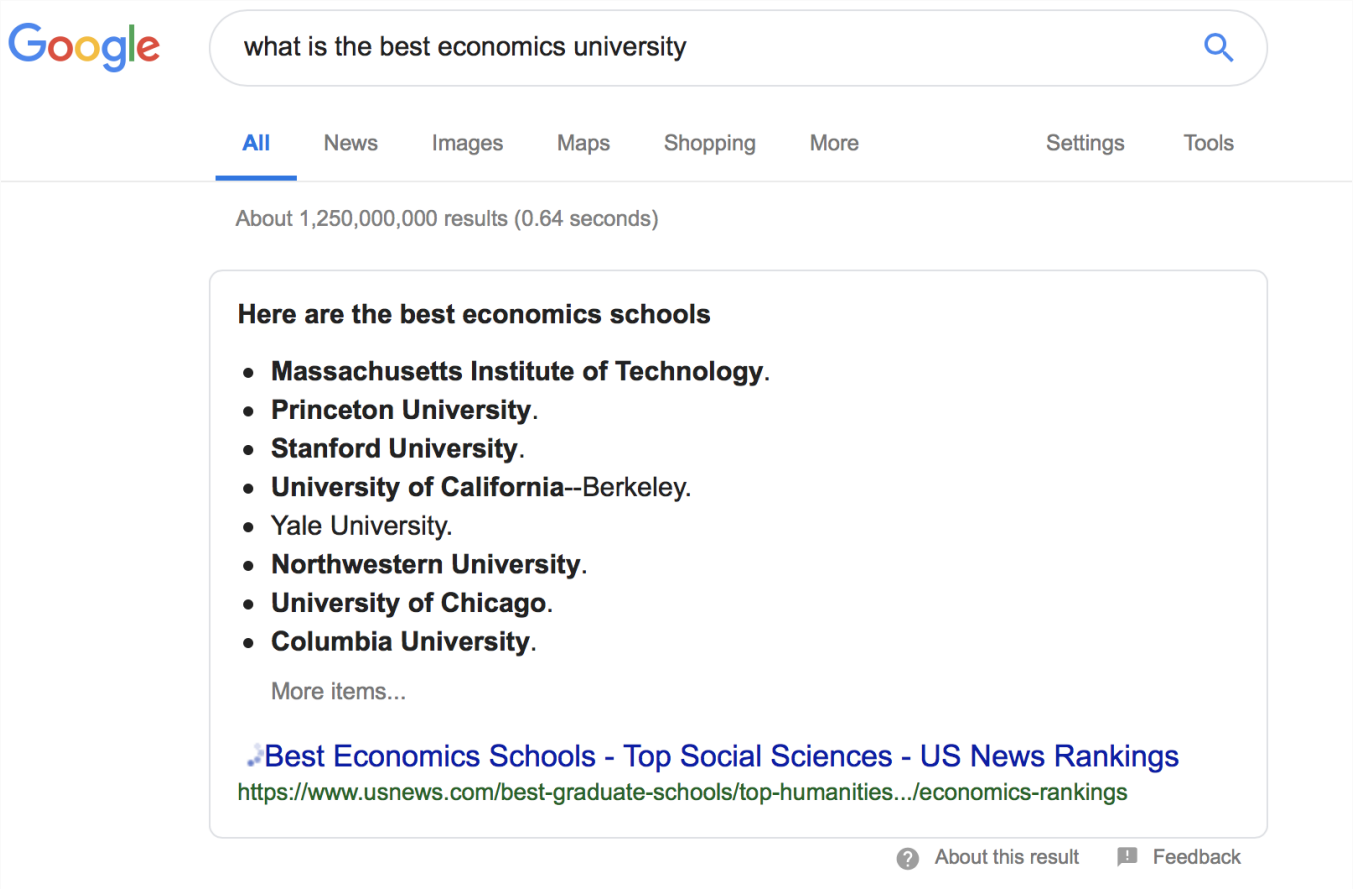


Figure. Example of the power of Google, search "what is the best economics university" in the U.S.

Figure: Google.

Moral hazard – Search engine manipulation effect

Top Universities for Economics in 2017

Top 10 Universities for Economics Worldwide Based on the QS World University Rankings by Subject 2017

Rank	Name of Institution	Location
3	**Stanford University**	US
4	**University of California, Berkeley** (UCB)	US
5	**London School of Economics and Political Science** (LSE)	United Kingdom

8 weitere Zeilen • 16.03.2017

Top Universities for Economics in 2017 | Top Universities
https://www.topuniversities.com/university.../university.../top-universities-economics-20...

Informationen zu diesem Ergebnis Feedback

Figure. Example of the power of Google, identical search "what is the best economics university" in Germany.

Figure: Google.

Moral hazard – Search engine manipulation effect

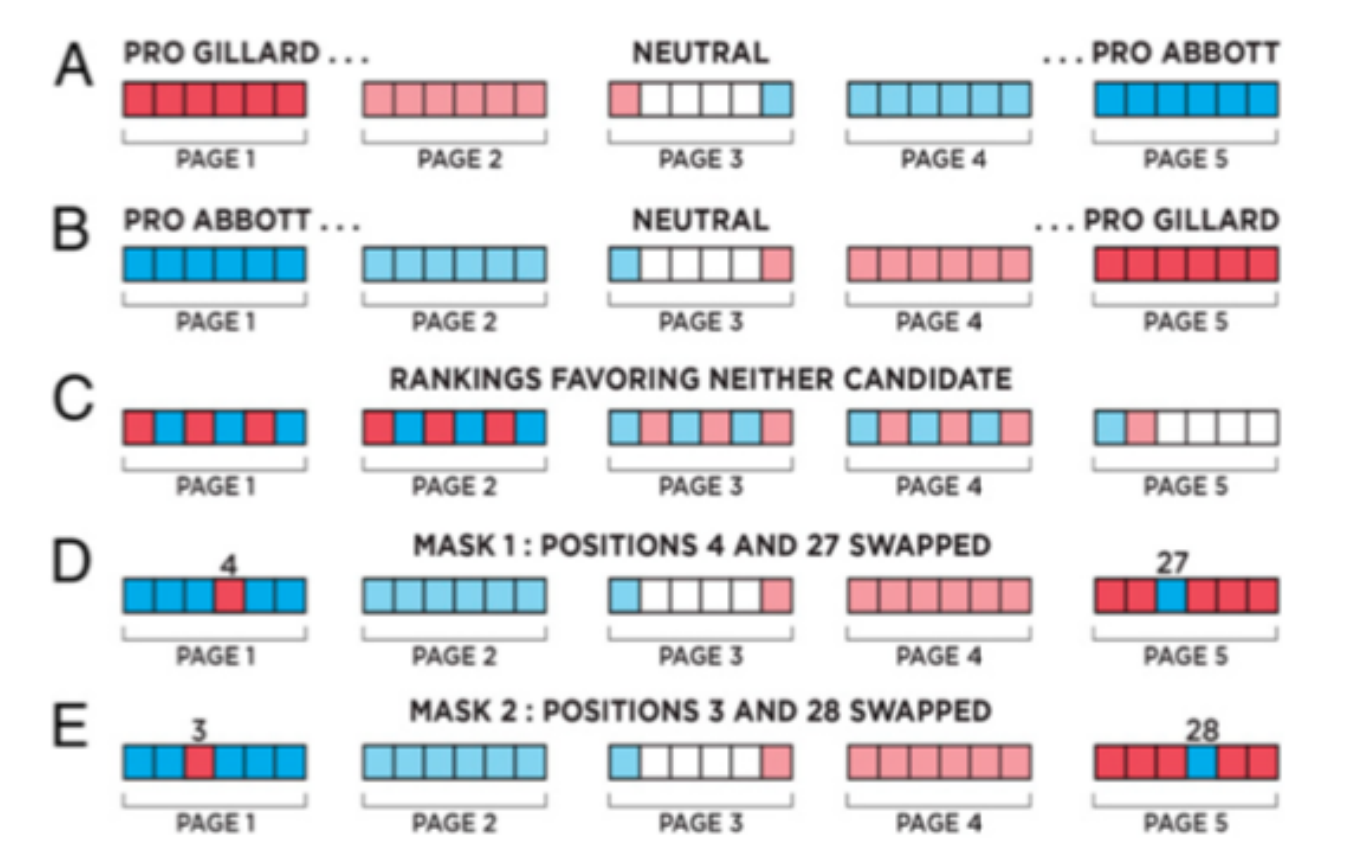


Figure. Controlled test of how changing only the order of search results can affect opinions.

Epstein and Robertson, 2015.

Moral hazard – Search engine manipulation effect

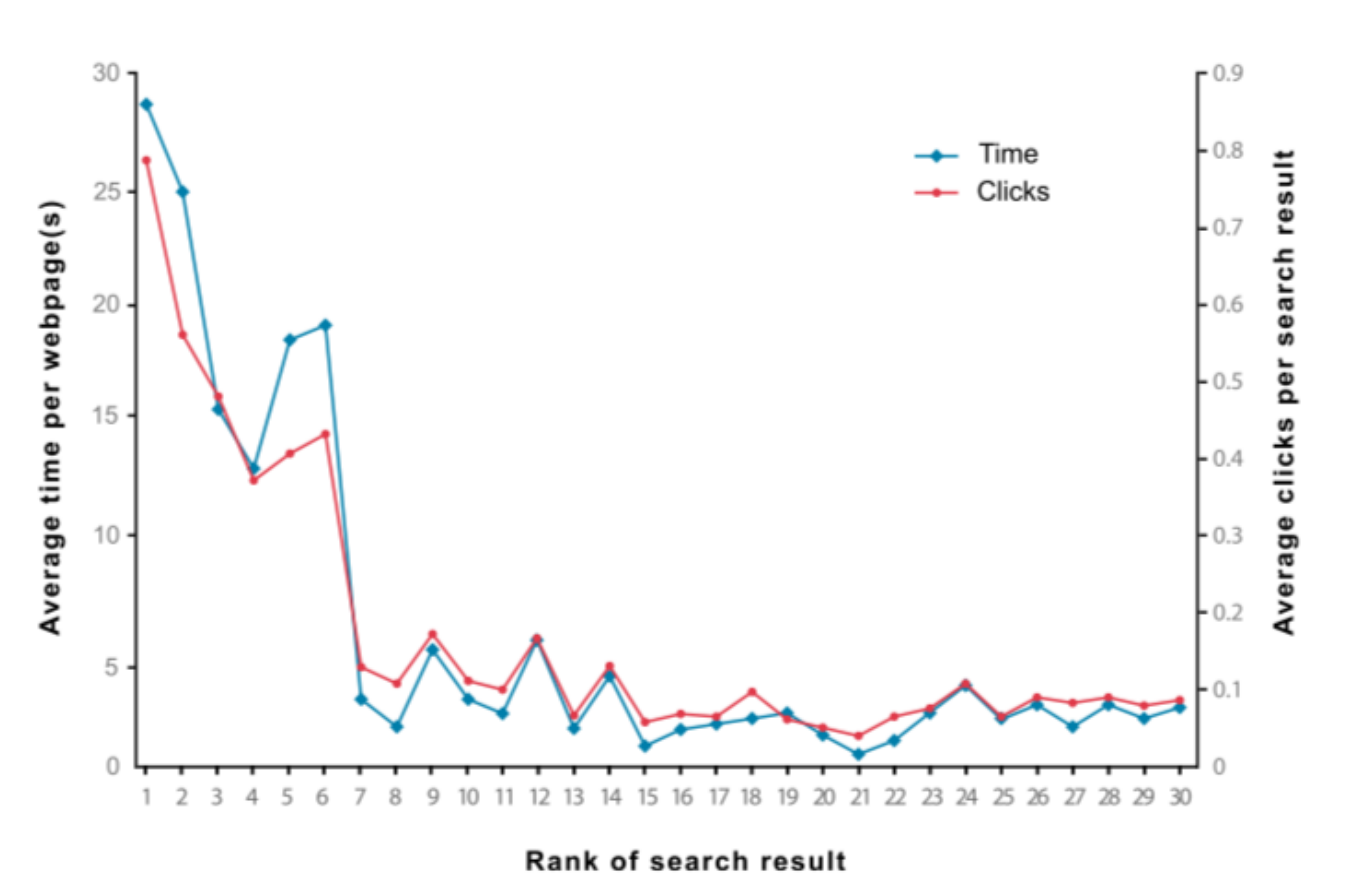


Figure. People click most the results on the top (red line) and also spend more time on those pages (blue line).

Epstein and Robertson, 2015.

Moral hazard – Search engine manipulation effect

Results from a controlled experiment:

- Biased search rankings can shift the voting preferences of undecided voters by 20 % or more.
- The shift can be much higher in some demographic groups.
- Search ranking bias can be masked so that people show no awareness of the manipulation.
- Knowledge of the bias seems only to enforce the impact.

Epstein and Robertson, 2015.

Reminder: Market power – Algorithmic pricing

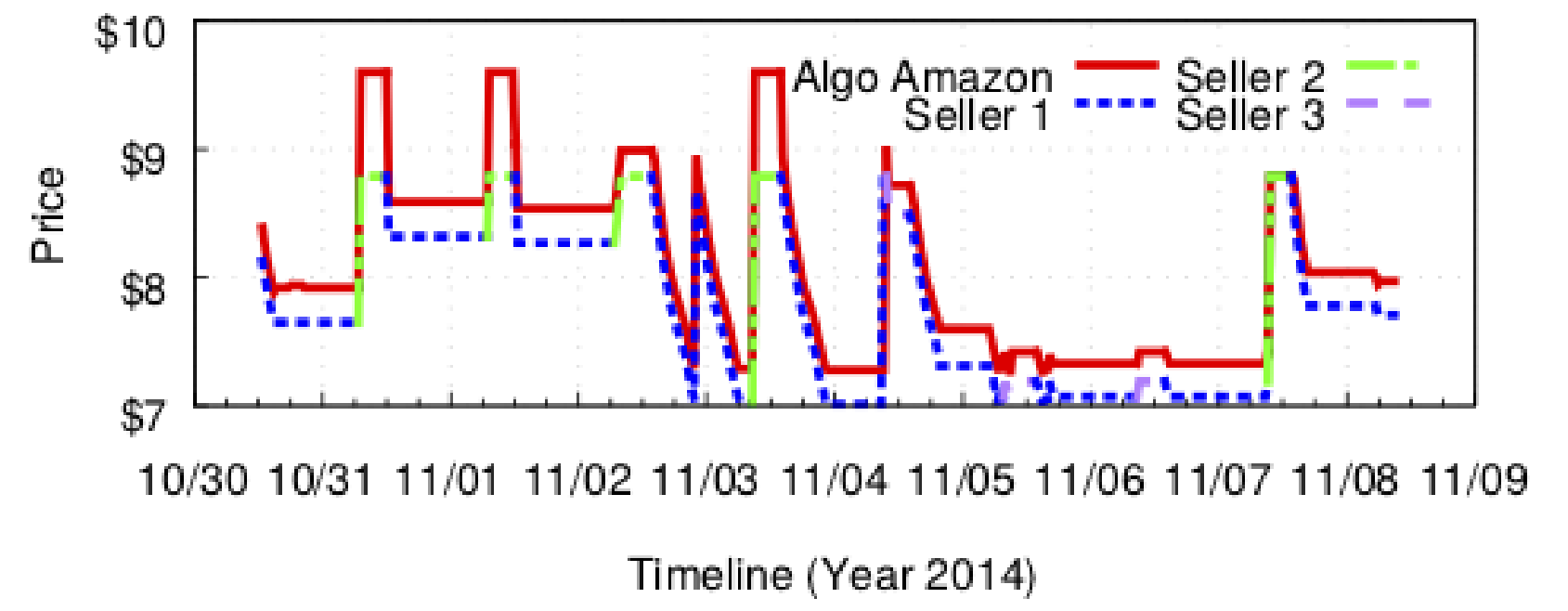


Figure. Example of Amazon keeping a premium over other sellers.

Source: Chen et al. 2016.

Market power – Regulatory responses

- Are the firms too big and powerful?
- If yes, then try and regulate market structure
  - Block mergers
  - Split up companies
- For example: U.S. FTC suing Facebook:
  - "Facebook, the prosecutors said Wednesday, should break off Instagram and WhatsApp, and they said new restrictions should apply to the company on future deals. Those are some of the most severe penalties regulators can demand." N.Y. Times 9 Dec 2020.

Market power – Regulatory responses

- Are the firms misusing their market position?
- If yes, then make anti-competitive actions more expensive
  - Prohibit anti-competitive actions
  - Seek liabilities in court
- Example 1: EU has fined Google above €9 billion for misuses.
- Example 2: U.S. DoJ suing Google

WHAT THE D.O.J. SUIT SAYS

"Two decades ago, Google became the darling of Silicon Valley as a scrappy start-up with an innovative way to search the emerging internet. That Google is long gone. The Google of today is a monopoly gatekeeper for the internet, and one of the wealthiest companies on the planet."

Figure: N.Y. Times, 20 Oct 2020.

Market power – Regulatory responses

- The current EU Commission implementing a more permanent legislative solution, EU Digital Markets Act, that will increase Big Tech liabilities
  - Targets "gatekeeper" firms that control how other firms can interact with users.
  - Includes online search, social networking, and online marketplaces.
- In the U.S. discussion on revoking Section 230 that provides liability protection for tech companies.

Cost of regulation

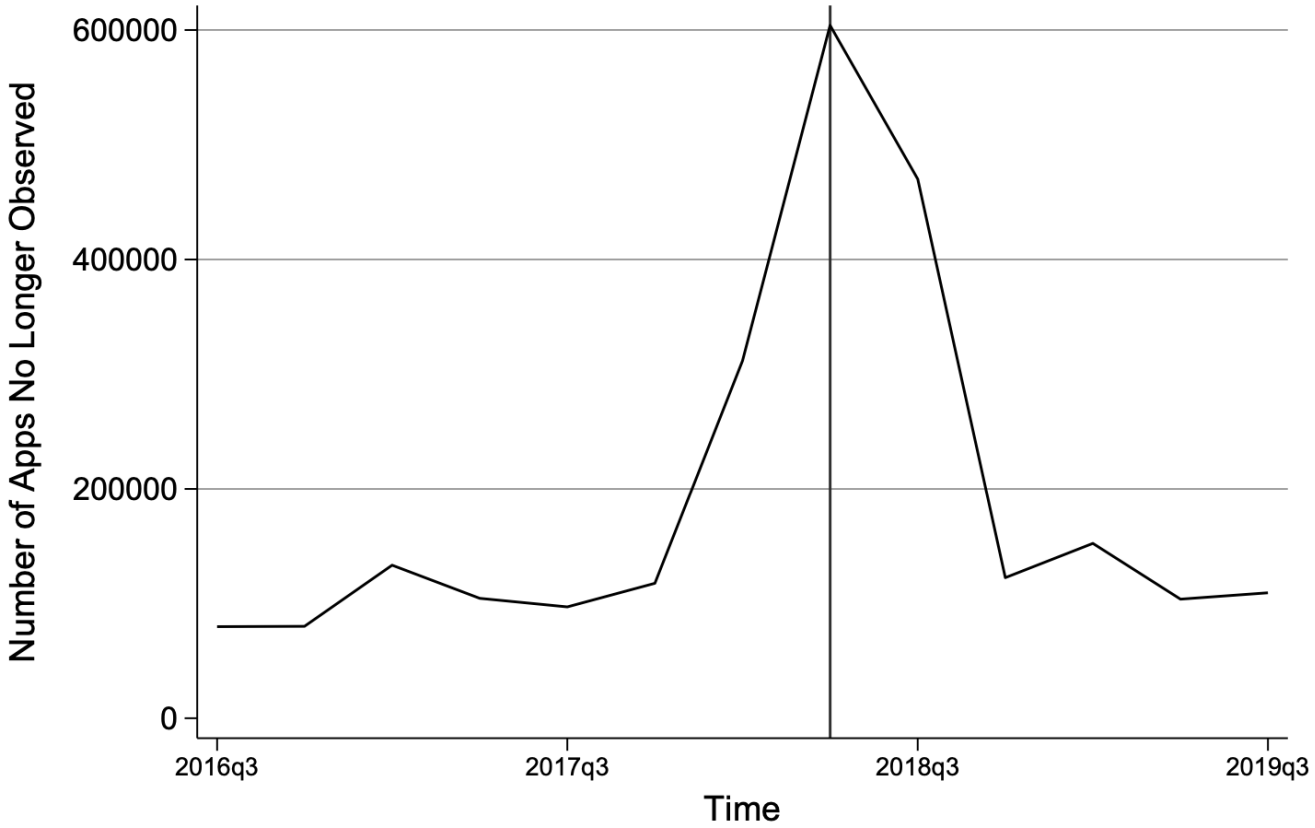
Challenges in regulation

- The complexity of platform economics, data and algorithms makes the regulatory challenges complex.
- Critics charge that the primary competitive advantage of digital platforms is their ability to duck costly regulations that protect third parties.
- Rules and regulation in place for traditional businesses to protect consumers and limit externalities:
  - For example, environmental regulation, consumer protection law, copyright law, health and safety laws, labor laws etc.
- Conflicts when non-traditional business models make rights and compliance requirements of the platforms participants unclear.

> Why do you think that the ecosystems in the U.S. have grown so big? –*Bengt Holmström*

Listen to Common Good Summit: Regulation of Platforms (have a look at least the clips from 36:10 to 40:30 and 47:00-49:50.)

GDPR and the lost generation of innovative apps



Notes: The figure shows the number of apps that are no longer observed in the remaining quarters. The vertical line highlights the quarter after the enactment of the GDPR on May 25th, 2018.

Janßen et al. 2022

Private regulation – Examples

- Firms need to maintain reputation
  - For example, Amazon year 2000 DVD story.
  - Brands who want to differentiate with quality, e.g. relating to privacy (Apple vs. Facebook).
  - Twitter closing the account of Donald Trump in January 2021 (coda: Twitter now being acquired by Mr. Musk).
- Competition has worked in the past
  - In 2008, Von Blanckenburg and Michaelis suggest that regulation of eBay is necessary, because "even in the longer term there will probably be no competition in their market".
  - Obviously, in 5 years or so, Amazon surpassed eBay's revenues.

Private regulation

Possible to decide *not* to regulate despite concerns:

- Need to consider how regulation can be implemented and what the cost of regulation to consumers will be.
- Benefits of online markets and other platforms can be large enough to compensate for the costs and risks.
- Rapid development of new innovations may be unnecessarily hampered with too stringent or early regulation.
- Private regulation by the companies themselves purely on market based incentives may be sufficient.

But. . .

Big tech's harvest of sorrow?

- Connecting the world with social media has led to unintended consequences
  - Strict uniform rules online replace more nuanced off-line communication.
  - May contribute to the erosion of social capital and narrowing trust to traditional media.
- Market proponents highlight that in digital markets decision making is not centralized, allowing for market based corrections.
  - However, no guarantees on how big tech will behave.
- Final safeguard needs to be democratic oversight of how new technologies are developed and deployed.

Acemoglu, 2019.

Learnings today

- Reasons to intervene: externalities, consumer protection, market power
- Trade-off between public and private regulation
- Big data combined with black-box algorithms and the concentration of users are the long-term concerns

Materials for this week

Reading assignment 6:

- **Digital markets**. Lambrecht, Anja, Avi Goldfarb, Alessandro Bonatti, Anindya Ghose, Daniel G. Goldstein, Randall Lewis, Anita Rao, Navdeep Sahni, and Song Yao (2014) "How Do Firms Make Money Selling Digital Goods Online?" Marketing Letters.
  - References to literature, the models that do get sometimes slightly complicated can be freely skipped.
- **Regulation**. Demange, G. (2018) "Mechanisms in a Digitalized World", CESifo Working papers. Should be relatively easy read.

The square and the tower

Market square in Siena, Italy. Source: Tuscany, Beautiful Everywhere.