

# Generative Artificial Intelligence, the Future of Work, and Taxes

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# Experimental evidence on the productivity effects of generative artificial intelligence

[SHAKKED NOY](#)  AND [WHITNEY ZHANG](#)  [Authors Info & Affiliations](#)

- College educated writers increased productivity by 40%.
- Inequality between writers fell – by the bottom levelling up to third quartile. Job satisfaction increased – in aggregate.
- Top 20% of writers not helped, abandoned tool.

Noy & Zhang (2023)

# Why Can't LLM Get Things Right?

- Recently, Louis Lippens (Ghent University) reported experiments at a meeting on AI & Labour Economics that chatGPT was racist in its hiring assessments – but less so than human hiring (as per Lippens, Vermeiren & Baert 2023).
- “Generative” AI is based on (somewhat elite?) human examples.
- These examples are compressed, then indexed via text.
- This is only a little like human language production. Our production is motivated – and includes other “prompts” by the rest of our beings, including our understanding.

Finnish



English



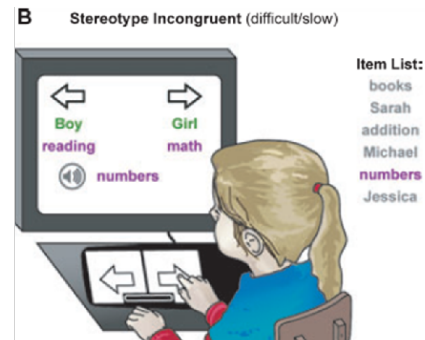
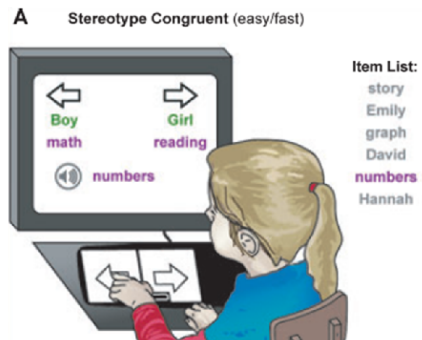
Hän sijoittaa. Hän  
pesee pyykkiä.  
Hän urheilee.  
Hän hoitaa  
lapsia. Hän tekee  
töitä. Hän tanssii.  
Hän ajaa autoa.



He invests. She  
washes the laundry.  
He's playing sports.  
She takes care of the  
children. He works.  
She dances. He  
drives a car.

@vuokko, though Aylin Caliskan did it first

# AI Trained on Human Language Replicates Implicit Biases



## Gender bias [stereotype]

Female names: Amy, Joan, Lisa, Sarah...

Male names: John, Paul, Mike, Kevin...

Family words: home, parents, children, family...

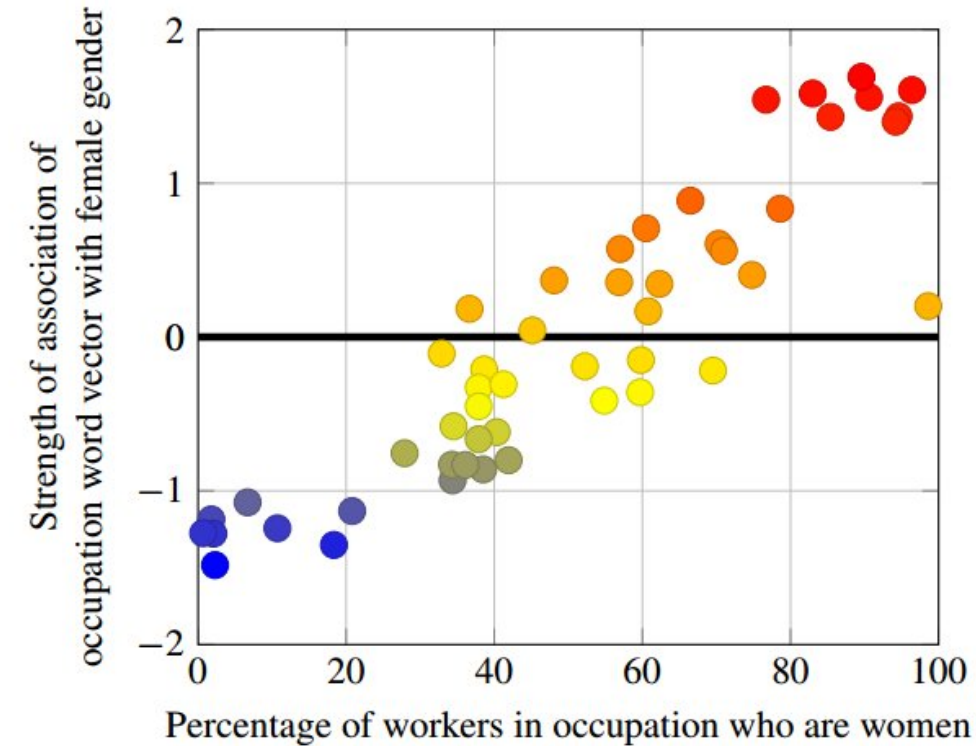
Career words: corporation, salary, office, business, ...

Original finding [N=28k participants]:  $d = 1.17, p < 10^{-2}$

Our finding [N=8x2 words]:  $d = 0.82, p < 10^{-2}$

Caliskan, Bryson & Narayanan  
(*Science*, April 2017)

Our implicit behaviour is not our ideal. Ideals are for explicit communication, and planning.



**Figure 1.** Occupation-gender association  
Pearson's correlation coefficient  $\rho = 0.90$  with  $p$ -value  $< 10^{-18}$ .

2015 US labor statistics  
 $\rho = 0.90$

# Experimental evidence on the productivity effects of generative artificial intelligence

SHAKKED NOY  AND WHITNEY ZHANG  [Authors Info & Affiliations](#)

Our implicit behaviour is not our ideal.  
Ideals are for explicit communication, and planning.

Apparently, OpenAI mines better-than-average text for chatGPT.

- College educated writers increased productivity by 40%.
- Inequality between writers fell – by the bottom levelling up to third quartile. Job satisfaction increased – in aggregate.
- Top 20% of writers not helped, abandoned tool.

Noy & Zhang (2023)

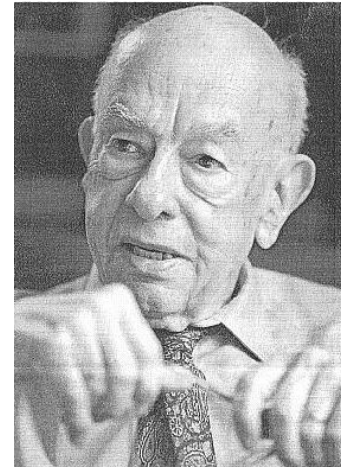
# Outline

- A little more about how LLM works.
- Some more on AI, jobs, and wages.
- Some other economic concerns.

# Semantics: What Does Meaning Mean?

How can we know what words mean?

Hypothesis: a word's meaning is no more or less than how it is used.



(Quine 1969)



(Wittgenstein  
1953)



From the 1990s

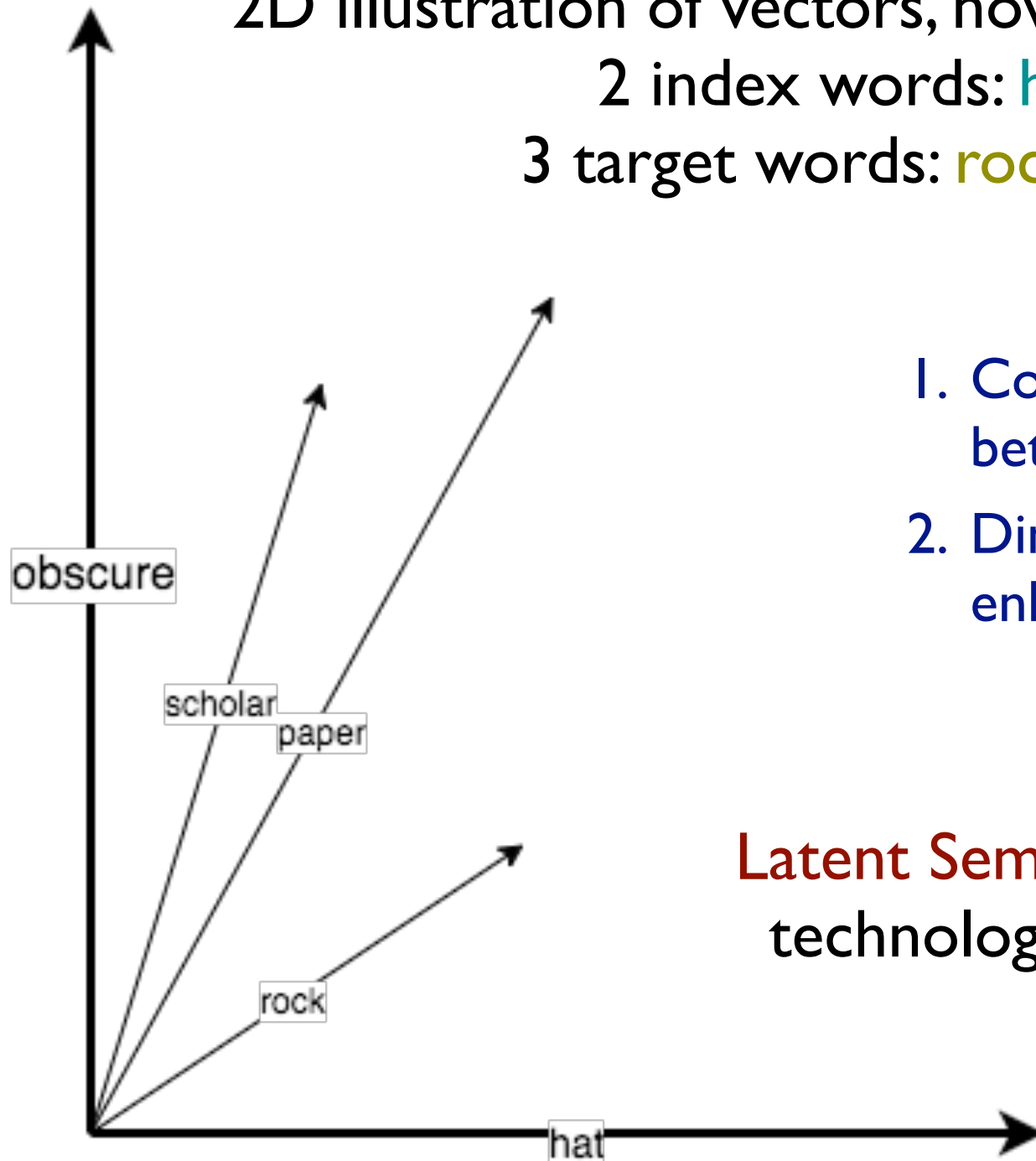
# Large Corpus Semantics

- We can learn how a word is used (its meaning, or **semantics**) by parsing normal language (Finch 1993, Landauer & Dumais 1997, McDonald & Lowe 1998).
- Record co-occurring words (those nearby on either side of the target word).
- Store counts for 75 **fairly** frequent words...
  - $\Rightarrow$  'Meaning' is cosine in 75-D space.

2D illustration of vectors, now called **word embeddings**:

2 index words: **hat** & **obscure**

3 target words: **rock**, **paper**, **scholar**



1. Cosine measures distance between targets' meanings.
2. Dimensional compression enhances signal.

**Latent Semantic Analysis** – basic technology of search engines.

Cosines between semantic vectors correlate with human reaction times

(Figure: 75-D space projected in to 2-D, McDonald & Lowe 1998)



# Corpus, training, and stimuli all established standards

Common crawl: web corpus

- 840 billion tokens
- 2.2M unique

All “off the shelf”

Explored standard effects in existing, widely-used AI tools

GloVe

- Stanford project, state of the art
- Pre-trained embeddings
- 300-dimensional vectors

2,200,000-D space projected in to 300-D

[Very similar results with word2vec/Google News]

# Hypothesis: corpus semantics will capture the IAT biases

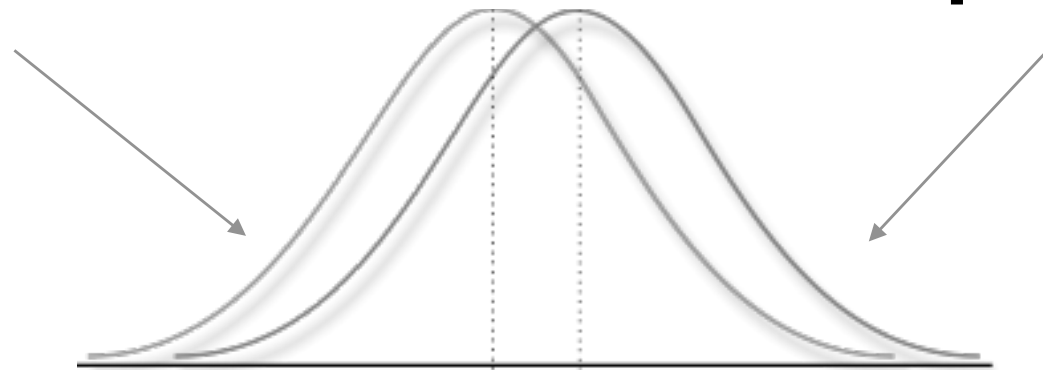
## Word Embedding Association Test (WEAT)

similarity(male-names, math-words)  
+  
similarity(female-names, reading-words)

**[congruent]**

similarity(female-names, math-words)  
+  
similarity(male-names, reading-words)

**[incongruent]**



Same measures for reporting very different measures:

- Cohen's d effect size = Difference between mean vectors for two different clusters of words.
- probability of sets of terms being drawn from the same population (p value).

Hypotheses: **if** corpus semantics will capture these same biases, then

AI built with ML will contain some society's implicit biases, and

Implicit Biases Are a Part of Ordinary Semantics

# Warmup: universal biases

Greenwald, McGhee, & Schwartz (1998)

Flowers: aster, clover,  
hyacinth, marigold...

Insects: ant,  
caterpillar, flea,  
locust...

Pleasant: caress,  
freedom, health, love...

Unpleasant: abuse,  
crash, filth, murder...

Original finding [N=32 participants]:  $d = 1.35, p < 10^{-8}$

Our finding [N=25x2 words]:  $d = 1.50, p < 10^{-7}$

# Racial bias [valence]

Greenwald, McGhee, & Schwartz (1998)

European-American names: Adam, Harry, Josh, Roger, ...

African-American names: Alonzo, Jamel, Theo, Alphonse...

Pleasant: caress, freedom, health, love...

Unpleasant: abuse, crash, filth, murder...

Original finding [N=26 participants]:  $d = 1.17, p < 10^{-6}$

Our finding [N=32x2 words]:  $d = 1.41, p < 10^{-8}$

Our finding on the Bertrand & Mullainathan (2004) Résumé Study (assuming less pleasant  $\Rightarrow$  fewer invites):  $d = 1.50, p < 10^{-4}$



# Basic Definitions

Caliskan, Bryson & Narayanan 2017

- **Bias**: expectations derived from experiencing regularities in the world.
- **Stereotype**: biases reflecting regularities we do not wish to persist.
- **Prejudice**: acting in alignment with stereotypes.

# Example

Caliskan, Bryson & Narayanan 2017

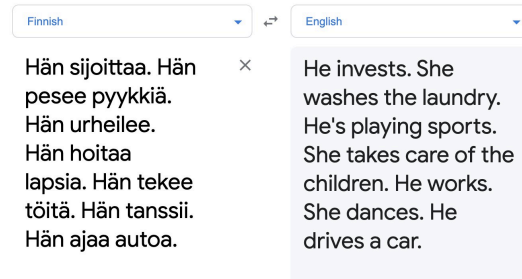
- **Bias**: expectations derived from experienced regularities. Knowing everything about the use of the word *programmer*, including that most are male.
- **Stereotype**: biases reflecting regularities we do not wish to persist. Knowing that most programmers are male.
- **Prejudice**: acting on stereotypes. Hiring **only** male programmers.

# Critical Implication

- **Bias**: expectations derived from experiencing regularities in the world.
- **Stereotype**: biases reflecting regularities we do not wish to persist.
- **Prejudice**: acting on stereotypes.
- **Stereotypes are culturally determined.**
- No algorithmic way to discriminate **stereotype** from **bias** in word embeddings!

- **Bias**: expectations derived from experiencing regularities in the world.
- **Stereotype**: biases reflecting regularities we do not wish to persist.
- **Prejudice**: acting on stereotypes.
- **Stereotypes are culturally determined.**
  - No algorithmic way to discriminate **stereotype** from **bias** in word embeddings!
- Solutions to prejudice we humans use are **architectural**.
  - **Explicit** knowledge and memory (consciousness) is used for planning, reasoning and coordination with others.
  - Explicit knowledge though is ‘boot strapped’ by **implicit**.

# Translator



ML  
simple, transparent algorithm

stereotyped output

XAI human readable hacks

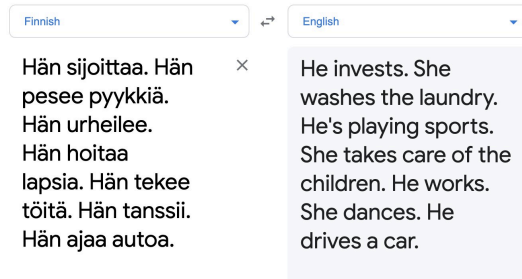
predefined fair output

Replicates  
lived  
experience

Tests of  
suitability  
documented  
in design plans

@vuokko, though Aylin Caliskan did it first

# Translator



the whole thing is the translator

ML  
simple, transparent algorithm

stereotyped output

ML simple, transparent alg.

predefined fair output

Replicates lived expertise should be auditable and replicable.  
Each stage of development should be auditable and replicable.  
Tests of determinability meet criteria.  
in design plans

# Summary on LLM

- ‘Bias’ is a problem – of the real world, not just AI.
  - Most bias is actually useful knowledge, only some of bias are **stereotypes** we now want to change.
- Watching for and addressing harmful stereotypes is now standard practice in the AI industry – and part of **due diligence**.
- Feel free to ask me about EU Legislation (the Digital Services & Market Acts, the AI Act).

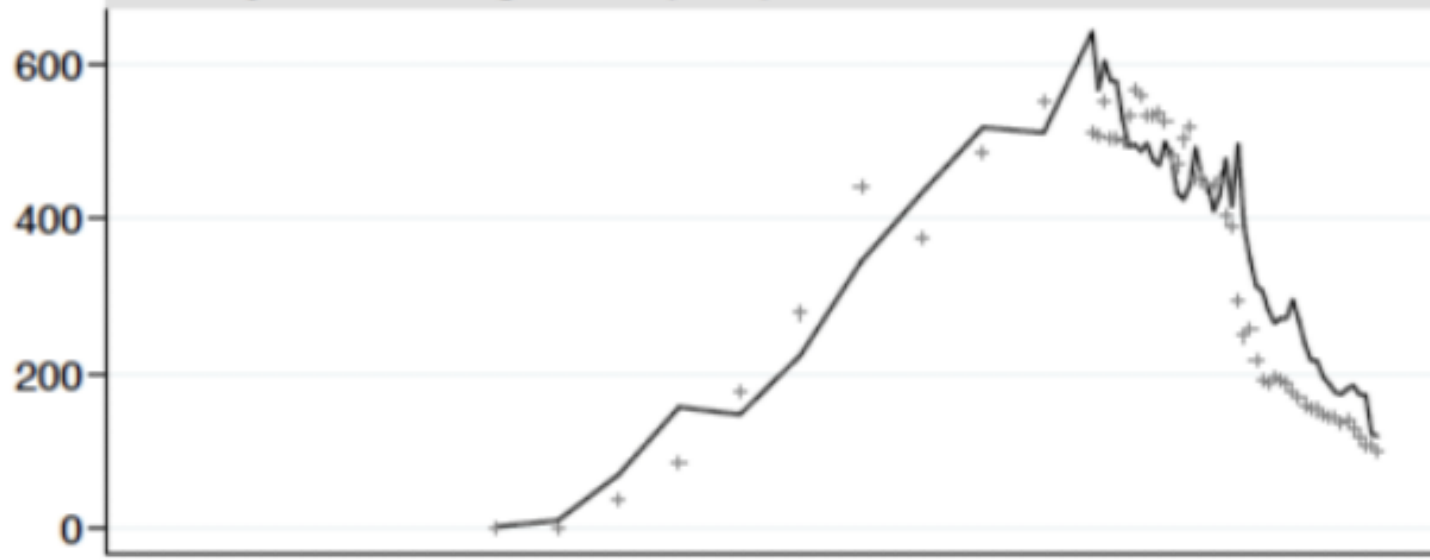
# Outline

- A little more about how LLM works.
- Some more on AI, jobs, and wages.
- Some other economic concerns.



# Technology Often Boosts Employment

B. Primary Iron & Steel Wage Earners (1000s)



C. Motor Vehicle Production Workers (1000s)



Automation is **sometimes** associated with job growth, but sometimes not.

Innovation interacts with **Elasticity of Demand**.

Initially, **productivity improvements** drop prices, increasing demand and employment

Eventually demand may **sate**, jobs gradually reduce.

James. Bessen (2019, cf 2022)

# Geoff Hinton, a deity of Machine Learning

“people should stop training radiologists now”



Hinton spoke in 2016 – 7 years ago.

There's now more demand  
for radiologists than ever.

They produce more value each,  
because of AI.

# AI and Wages



- We have more AI than ever, & more jobs than ever (Autor, 2015, “Why are there still so many jobs.”)
- AI may be increasing **inequality**, by making it easier to acquire skills. This reduces an aspect of **wage differentiation** – an economic factor believed to benefit redistribution.
- **Example 1**: More bank tellers now that we have ATMs. Because each branch has fewer tellers, so branches are cheaper, so more branches.

# AI and Wages

- **Example 1:** More bank tellers now that we have ATMs. Because each branch has fewer tellers, so branches are cheaper, so more branches.
  - Tellers are now better paid, but fewer branch managers, who used to be really well paid.
  - Related: Chatbots increased demand for telephone skills.
- **Example 2:** There aren't enough truck drivers, because truck driving is no longer a well-paid job.
  - Power steering + GPS + excel  $\Rightarrow$  lower wages.

# AI, (unions), and wages

Z. Parolin, *Social Forces*, 2021.

**Automation, Occupational Earnings Trends, and the Moderating Role of Organized Labor**

Zachary Parolin, *Columbia University*

**Figure 1. Earnings returns to RTI by union membership of state-industry**

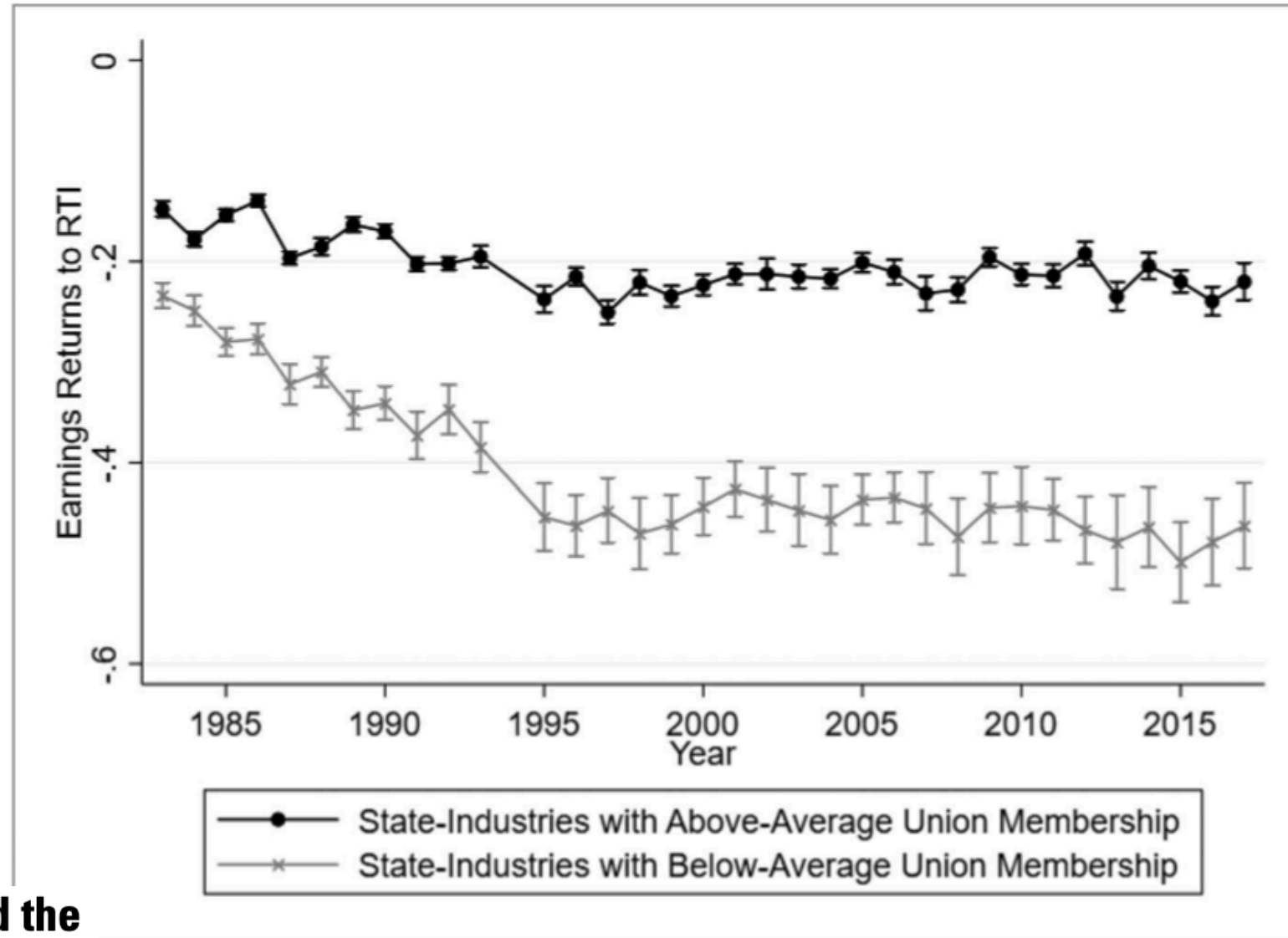


Figure displays the marginal effects of an occupation's RTI on log weekly earnings.

cf Germany: Technological and Organizational Change and the Careers of Workers, Battisti, Dustmann, & Schönberg 2022

Machines don't lower  
wages, access to  
people does.

But machines / AI can increase  
access to people...

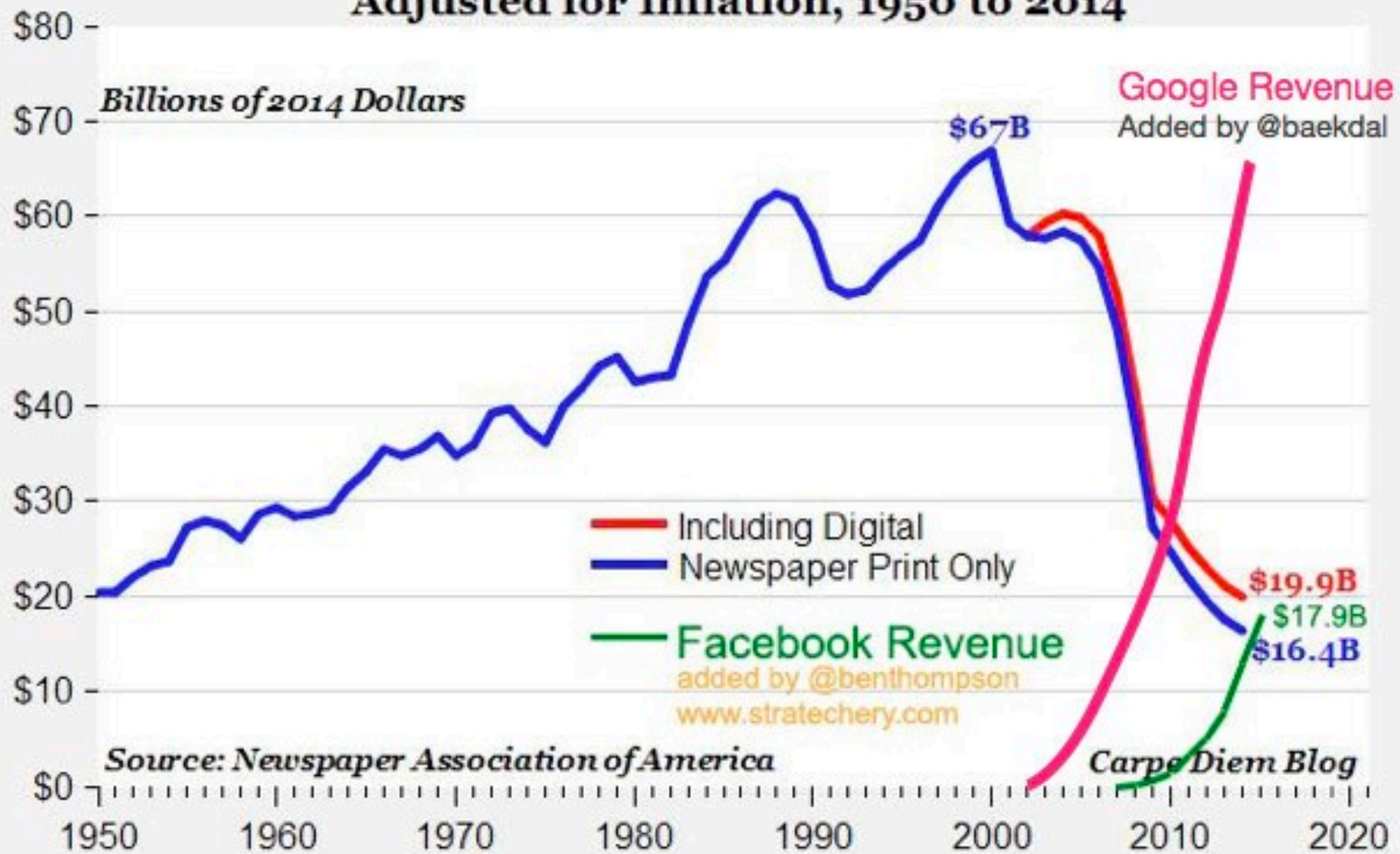


Disability in the  
Industrial Revolution

Physical impairment in British  
coalmining, 1780–1880

DAVID M. TURNER  
AND DANIEL BLACKIE

# Newspaper Advertising Revenue: Adjusted for Inflation, 1950 to 2014





# AI and Employment

- If we make AI software that doubles the efficacy of teachers:
  - We could have twice as good of schools
  - We could pay half as many teachers
- Political (**normative**, policy) decision, but note differences:
  - Fewer people with jobs.
  - Higher average quality teachers? ...
  - (**or?**) Fewer whistle blowers / simpler control problem.
  - **Maybe** less diversity / more fragility (could maybe be avoided).

# AI and Employment

- If we make AI software that doubles the efficacy of ~~teachers~~ **artists**:
  - We could have twice as good of ~~schools~~ **films**.
  - We could pay half as many ~~teachers~~ **artists**.
- Political (**normative**, policy) decision, but note differences:
  - Fewer people with jobs.
  - Higher average quality **artists**? ...
  - **(or?)** Fewer **cats to herd** (whistle blowers) / simpler control problem.
  - **Probably** less diversity / more fragility (or **could work to do better**).

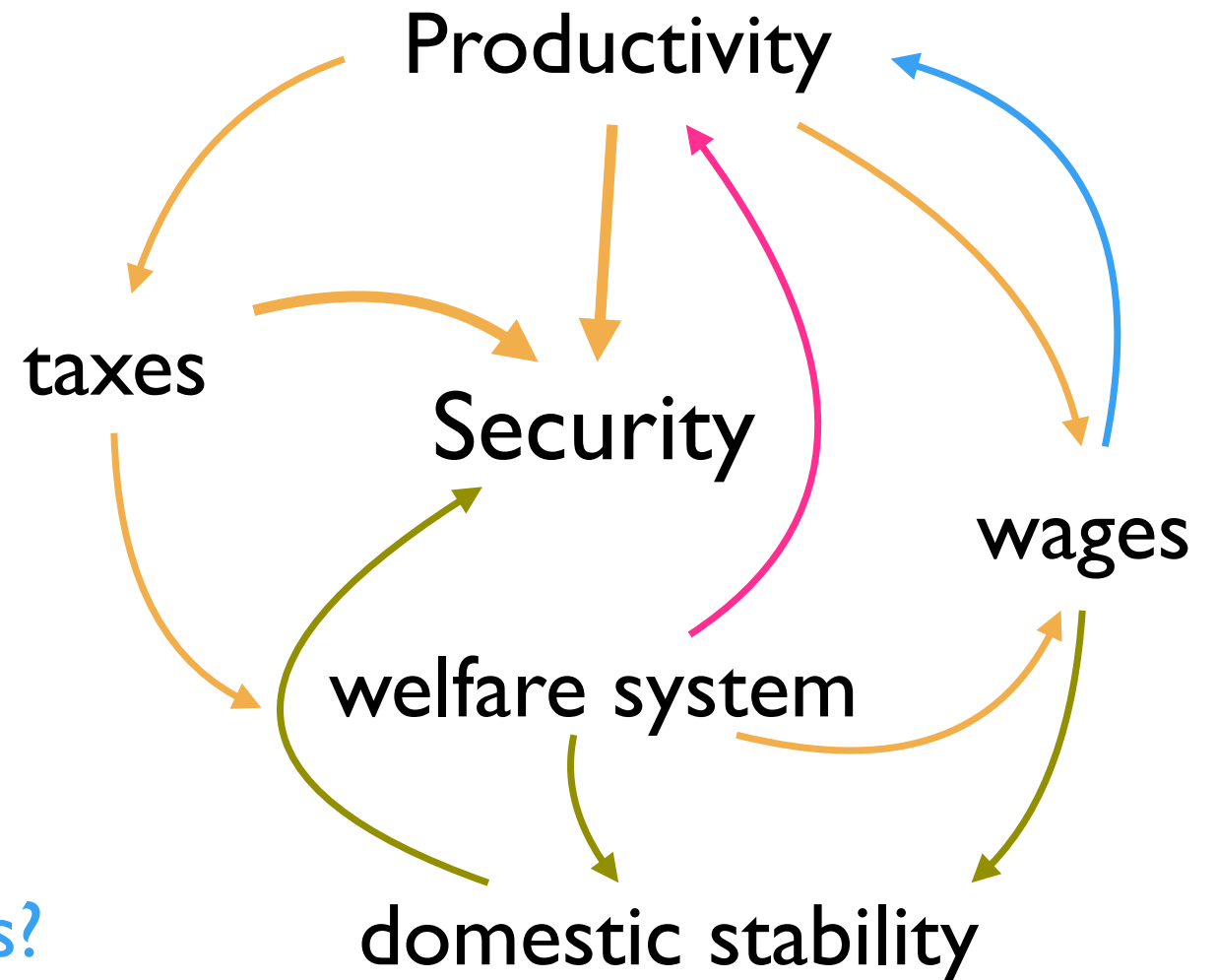
# AI and Employment

- If we make AI software to replace **paralegals or tax consultants**:
  - There's no longer a 20-year path to partnership.
  - Smart creative people may stay in field; become senior sooner.
  - But may be more load on courts.
- Political (**normative**, policy) decision, but note differences:
  - Access to great tax or legal advice could be less expensive.
  - But is the exclusionary costs of these services **now** really a necessity, or as a part of a larger economic dynamic?
- **What determines wages?**

# AI, Security, and Wages

Current Brainstorming!

- AI can be used to
  - **commodify** humans, making us more exchangeable, potentially **lowering** wages (for majority?), or
  - to **enhance** human abilities, **increasing** productive, and potentially wages.
- key:
  - **increases with,**
  - **increases against?**
  - **differentiation motivates and filters?**



# Outline

- A little more about how LLM works.
- Some more on AI, jobs, and wages.
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# Polarisation is **not** correlated with use of Social Media

## Adventures in NI

### Science failing to find correlations between social media use and polarisation

6.2.22

<https://joanna-bryson.blogspot.com/2022/02/science-failing-to-find-correlations.html>

- <https://www.pnas.org/content/117/6/2761> How social network sites and other online intermediaries increase exposure to news, Michael Scharkow, Frank Mangold, Sebastian Stier, and Johannes Breuer
- Shared Reality: From Sharing-Is-Believing to Merging Minds E. Tory Higgins, Maya Rossignac-Milon, Gerald Echterhoff <https://journals.sagepub.com/doi/10.1177/0963721421992027>
- Exposure to opposing views on social media can increase political polarization, Christopher A. Bail, Lisa P. Argyle, Taylor W. Brown, John P. Bumpus, Haohan Chen, M. B. Fallin Hunzaker, Jaemin Lee, Marcus Mann, Friedolin Merhout, and Alexander Volfovsky <https://www.pnas.org/content/115/37/9216>
- No echo in the chambers of political interactions on Reddit, Gianmarco De Francisci Morales, Corrado Monti & Michele Starnini <https://www.nature.com/articles/s41598-021-81531-x>
- Historical language records reveal a surge of cognitive distortions in recent decades; Johan Bollen, Marijn ten Thij, Fritz Breithaupt, Alexander T. J. Barron, Lauren A. Rutter, Lorenzo Lorenz-Luaces, and Marten Scheffer <https://www.pnas.org/content/118/30/e2102061118.short>
- The echo chamber is overstated: the moderating effect of political interest and diverse media, Elizabeth Dubois & Grant Blank <https://www.tandfonline.com/doi/full/10.1080/1369118X.2018.1428656?src=recsys>
- Greater Internet use is not associated with faster growth in political polarization among US demographic groups; Levi Boxell, Matthew Gentzkow, and Jesse M. Shapiro <https://www.pnas.org/content/114/40/10612>
- See also particularly chapter 5 of Alberto Acerbi, but also the whole book: Cultural Evolution in the Digital Age, <https://global.oup.com/academic/product/cultural-evolution-in-the-digital-age-9780198835943>
- Does Social Media cause Polarization? Evidence from access to Twitter Echo Chambers during the 2019 Argentine Presidential Debate; Rafael Di Tella, Ramiro H. Gálvez & Ernesto Schargrodsky <https://www.nber.org/papers/w29458> (answer: no. But messing with the feed of polarised people *in any way* does increase theirs. But has no impact on non polarised.)
- Quantifying social organization and political polarization in online platforms <https://nature.com/articles/s41586-021-04167-x>, by Isaac Waller & Ashton Anderson, published in Nature. Yet another paper showing that social media doesn't polarise individual users. Reddit's overall content did get polarised in 2016 though by a) new users being disproportionately polarised coming in & b) conservatives getting weirder.
- review article preprint (499 articles reviewed!) Digital Media and Democracy: A Systematic Review of Causal and Correlational Evidence Worldwide, by Philipp Lorenz-Spreen Lisa Oswald Stephan Lewandowsky Ralph Hertwig <https://osf.io/preprints/socarxiv/p329v/>

# Polarisation Correlates with Inequality (Usually)

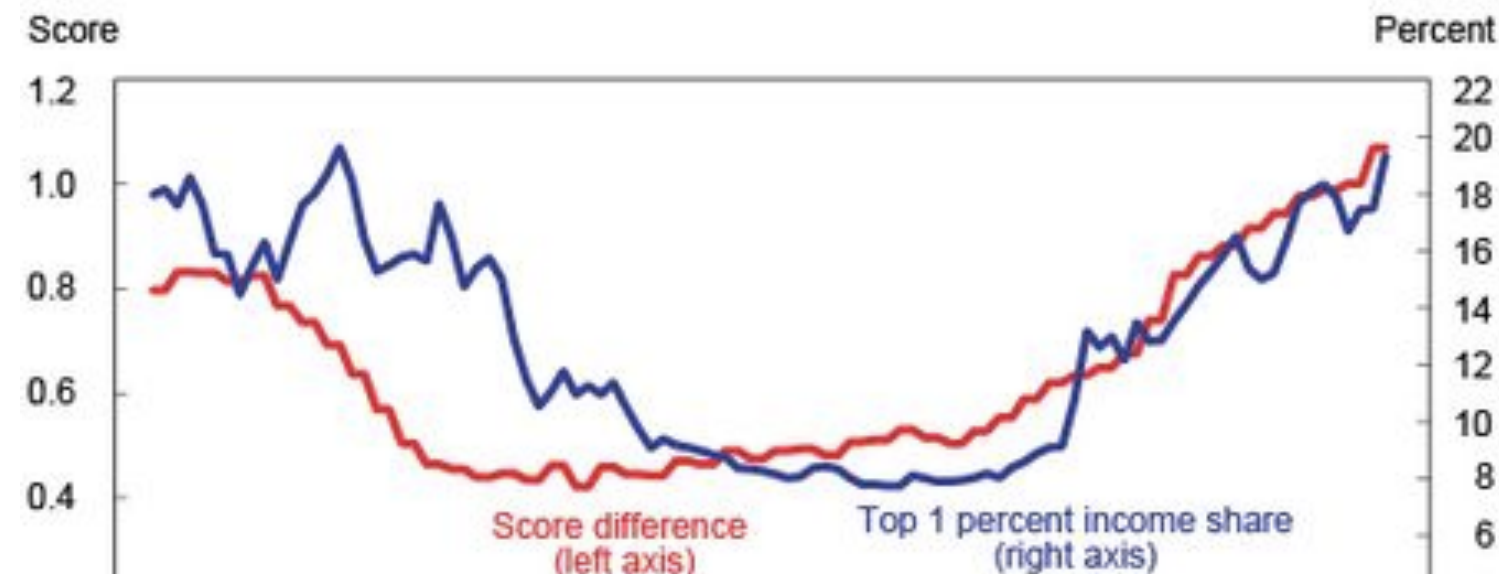
Mean DW-NOMINATE Difference for House versus  
Top One Percent Income Share, 1913-2012



Source: Poole and Rosenthal (Voteview.com), Piketty and Saez (World Top Incomes Database).

# Inequality, Polarisation

Mean DW-NOMINATE Difference for House versus Top One Percent Income Share, 1913-2012



By the way: Transit, storage, and content creation will never be free.

What's changed is relative costs – and therefore governance strategies must too.

- Inequality (over Gini .30) increases with social unrest, loss of social mobility, decline in economy & innovation, general insecurity, political polarisation.
- Economies decline when inequality  $< .27$  (Grigoli & Robles, IMF 2017)
- Probably facilitated by regulatory capture, but initial cause may be distance-reducing technologies creating natural monopolies.



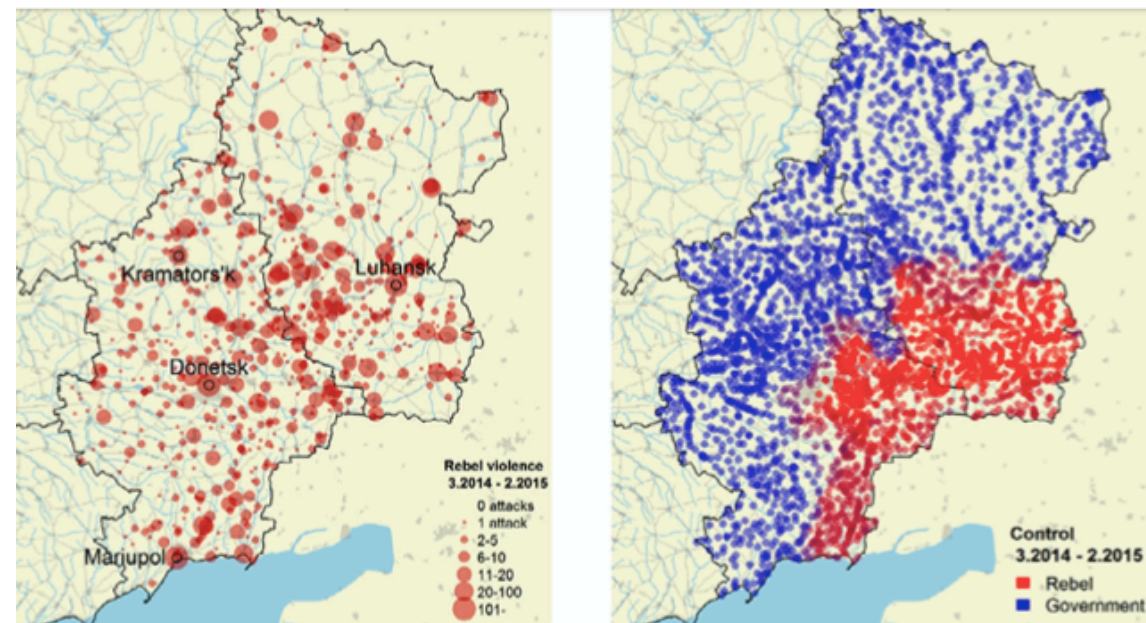
# Economics Predicts Populism Better than Language, Culture, or Social Media Use

Trading hard hats for combat helmets: The economics of rebellion in eastern Ukraine<sup>☆</sup>

Yuri M. Zhukov\*

*Department of Political Science, University of Michigan, United States*

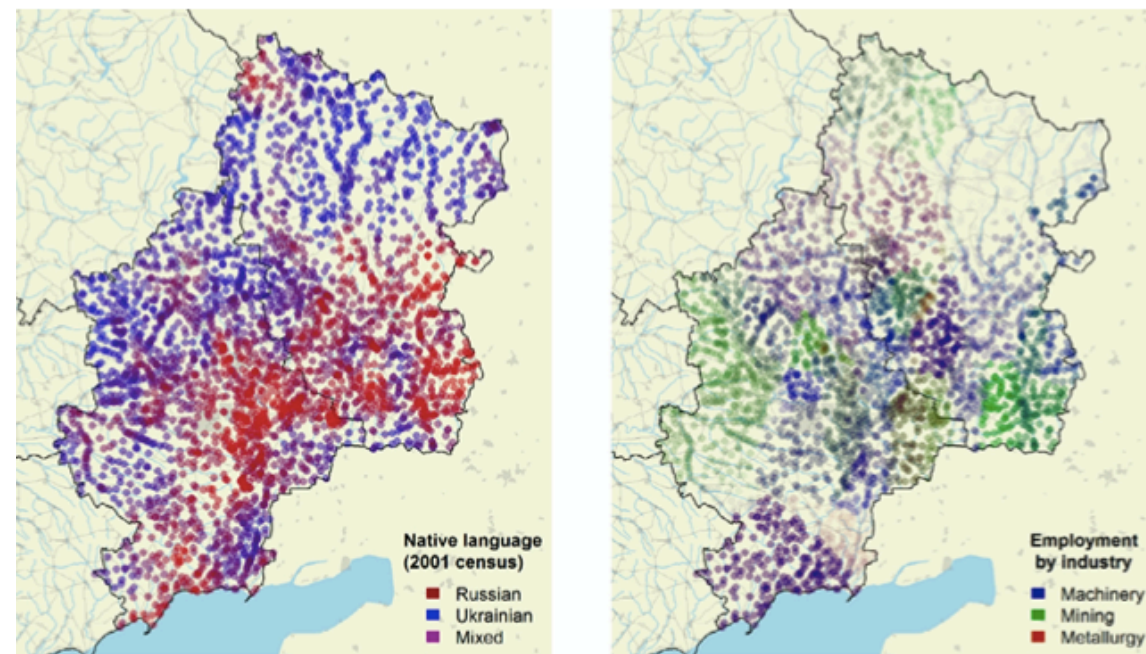
Journal of Comparative Economics, 2015



(a) Rebel attacks (SVM-classified)

(b) Rebel control

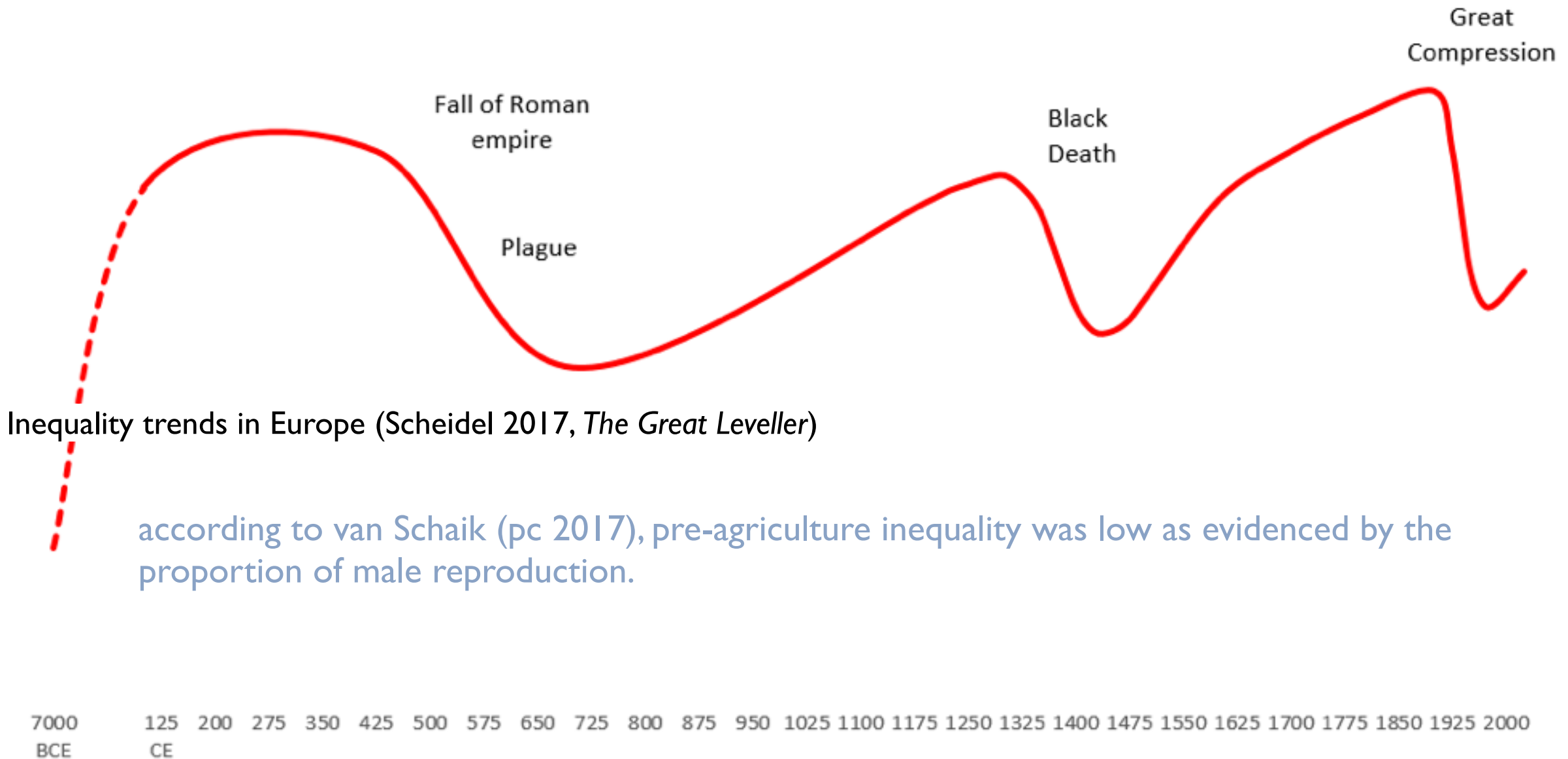
Fig. 2. Outcome variables.



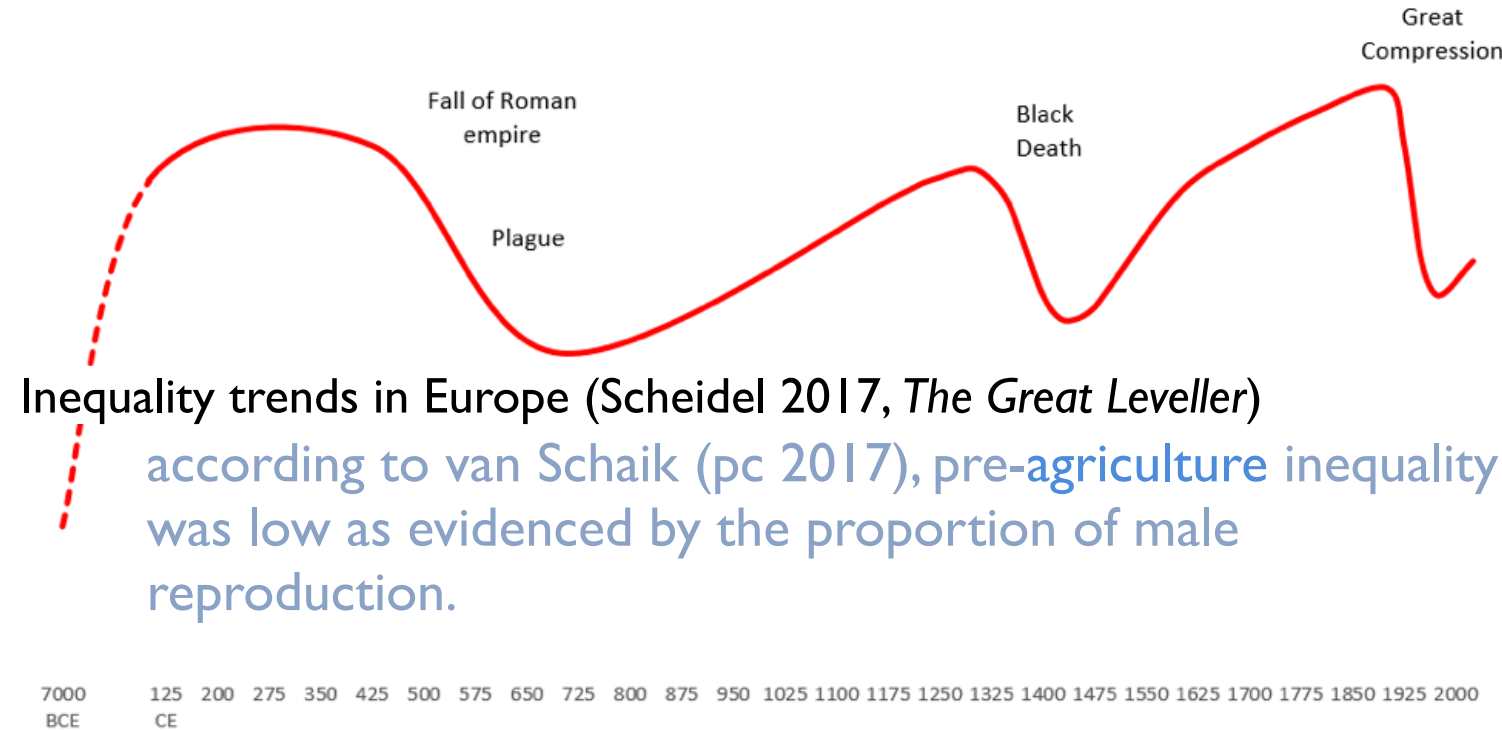
(a) Russian language

(b) Local employment

# Inequality

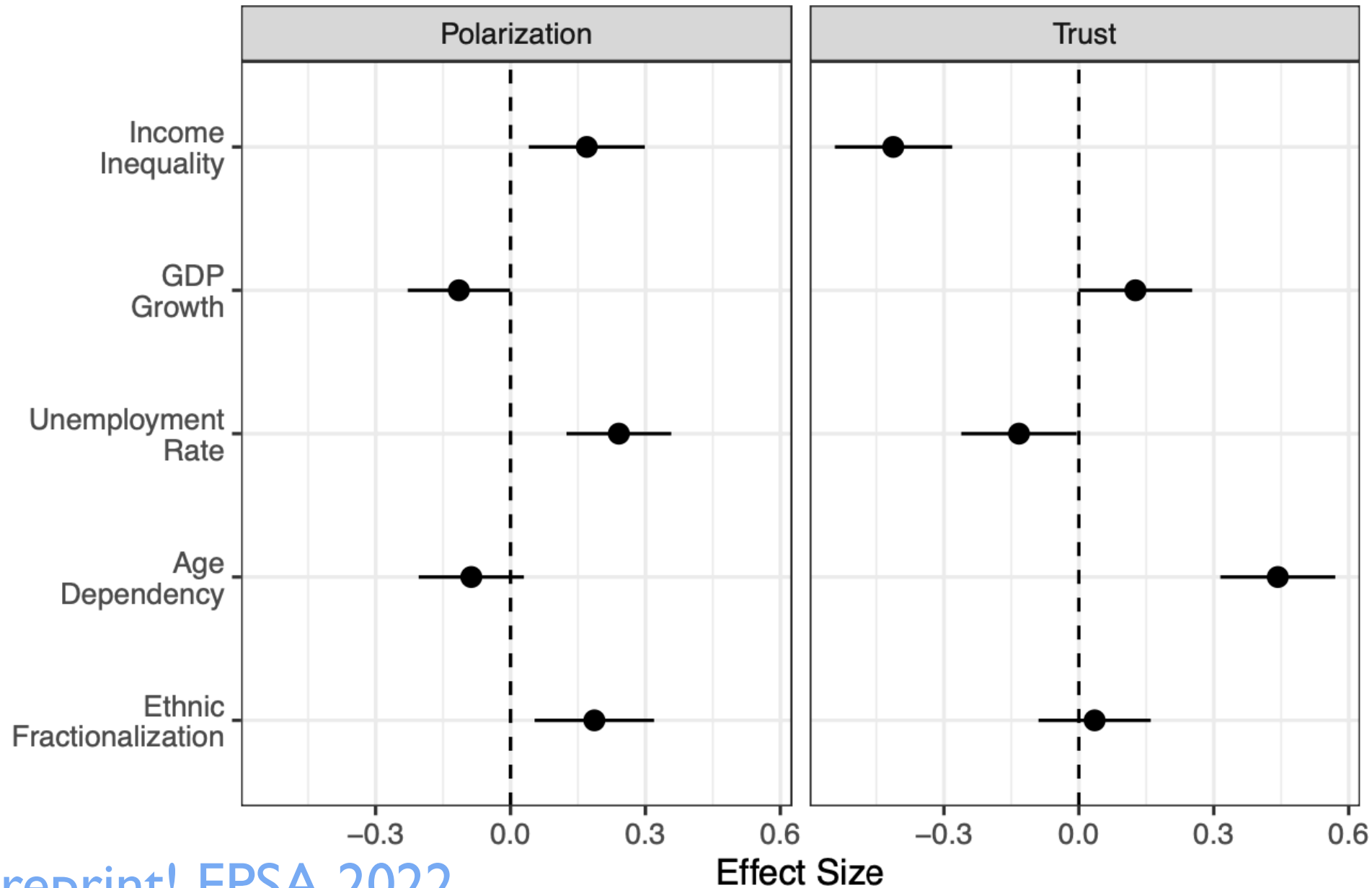


# Monopoly, Inequality, Regulatory Capture



- Distance-reducing technologies (including the horse, oil, telegraph, rail, digital) may account for increases in monopoly and inequality.
- The original goal of antitrust legislation: ensuring that a (democratic) government could avoid regulatory capture, continue to have the monopoly of force.
- After WWII, imposed on Japan & Germany to avoid turn to autocracy.

# Polarisation due to economic precarity?



Preprint! EPSA 2022

Vishali Sairam



Vincent Heddeshimer



# Diversity is high payoff, high risk.

- Polarise when economy declines AND
- Facing catastrophic risk (foreclosure, bankruptcy, loss of custody, death) BUT
- Not yet entirely desperate.

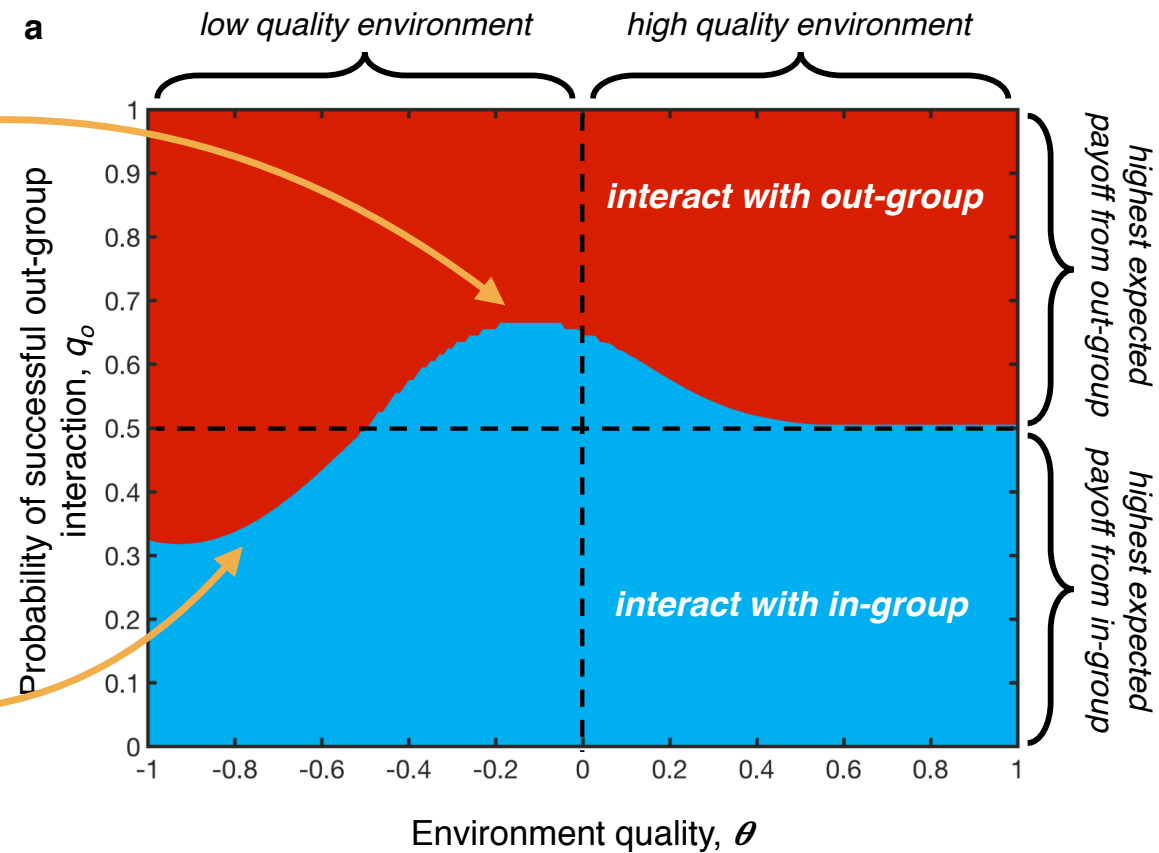
Trust is a luxury good.

You take the risk of innovating novel public goods with diverse others when you can safely afford to.

Vishali Sairam



Vincent Heddesheimer



Polarization under rising inequality and economic decline. Stewart, McCarty, & Bryson *Science Advances* December 2020

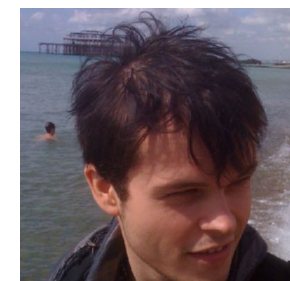
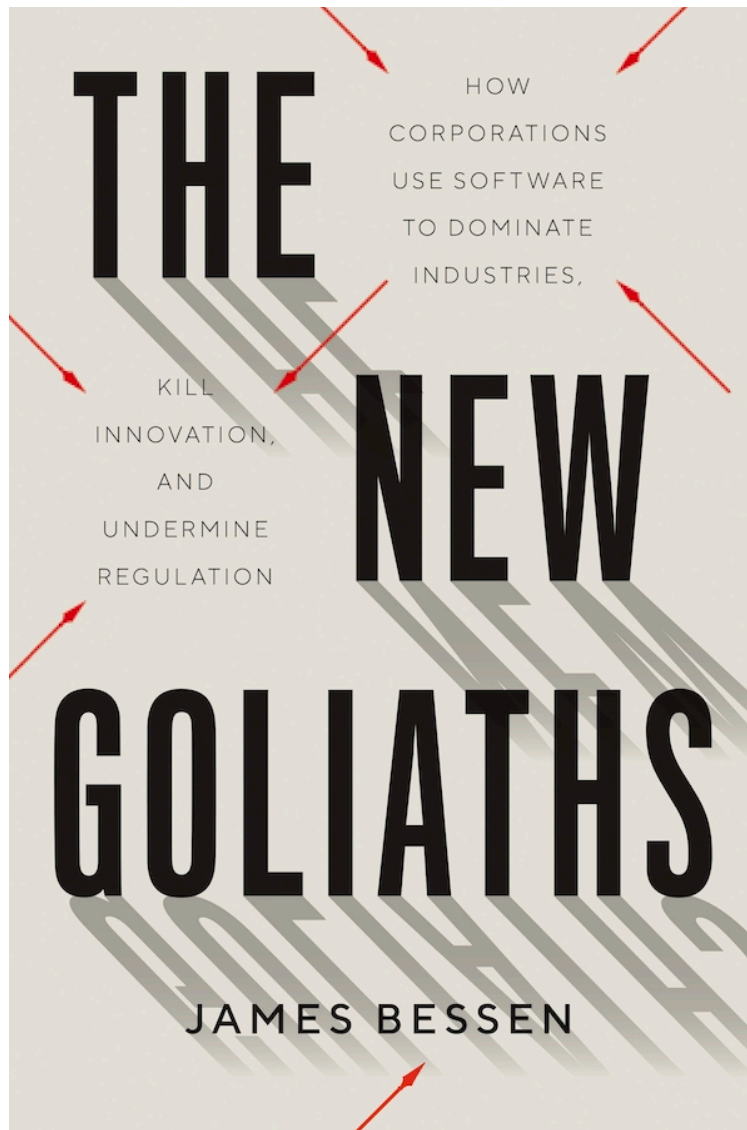




image due to The Verge

- IMO insufficient concern about the public goods nature of some digital artefacts.
- Google's global cyberspace proprietary fiberoptic network: is it essential infrastructure?
- Twitter is not only data (but is a substantial political history of the last 15 years) but also a network constructed through hard computational work of 100 millions of users. (Viljoen 2021, Casy in prep.)



2022

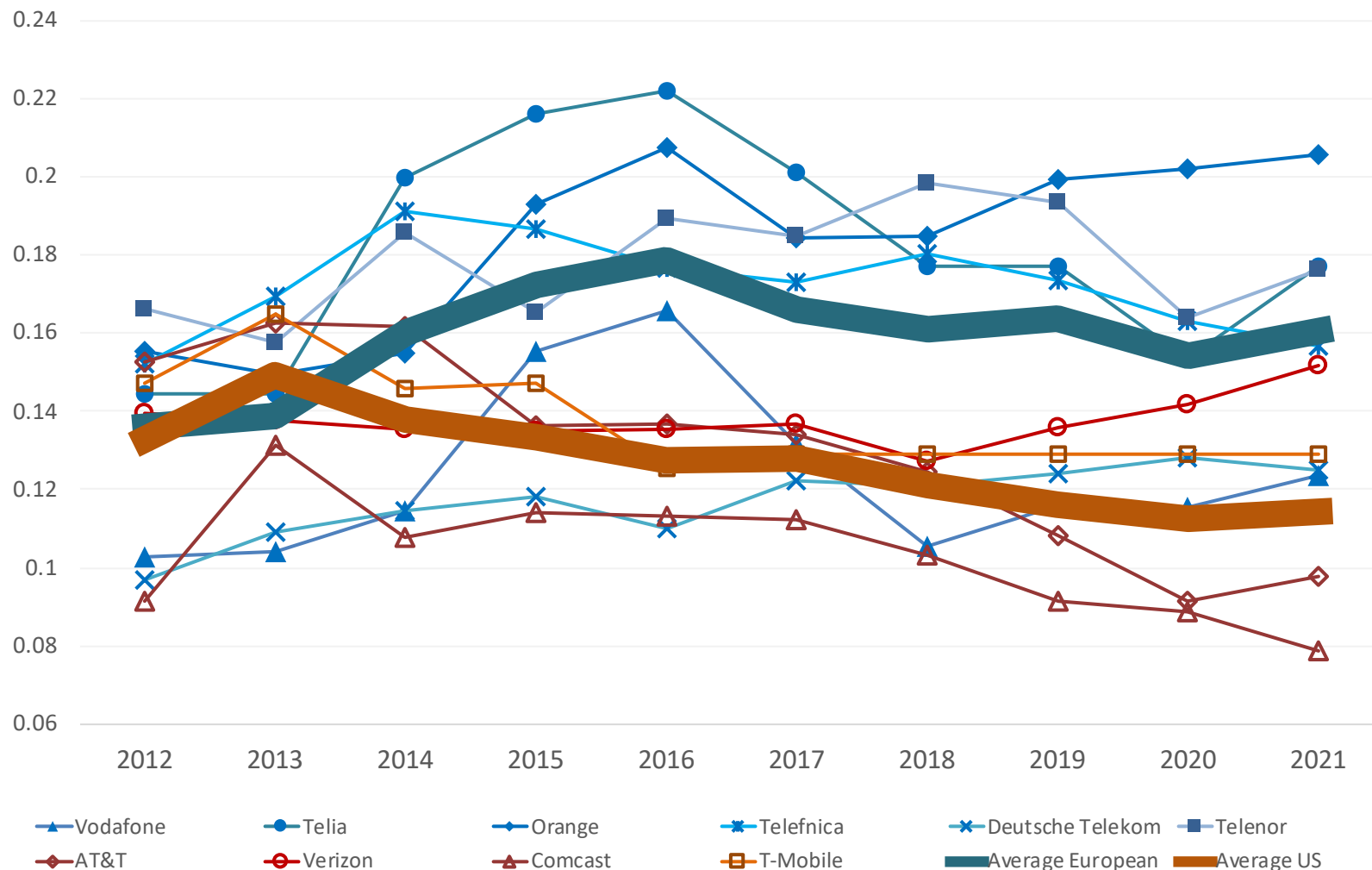
- Bessen (2022) documents that in **every** sector, the corporation that invests most in software is becoming market dominant.
- My take: AI makes any endeavour a “natural monopoly,” by optimising logistics, scaling.
- Monopoly reduces innovation, suppresses change, increases inequality.
- AI cannot coherently fully replace humanity – both physical and intellectual labour.
- Humanity is the motive source of our culture and products. If Economists can’t account for this, they need to be subsumed by Security.

# Are larger corporations better for infrastructure? A case study of EU vs US telco infrastructure expenditure

**Backovsky, Bryson, Garbe, & Malikova in prep.**  
(article authorship, alphabetical, not finalised)



# Capital expenditure for infrastructure investments (capex) in proportion of revenue for European (blue) and US (red) Telcos over 10 years



Backovsky, Bryson, Garbe, & Malikova in prep.

- EU telcos are claiming that they need to be allowed to merge so they have enough revenue to invest in infrastructure.
- In fact, EU telcos are presently investing more of their revenue in infrastructure than the (more consolidated) US Telcos.
- It sounds like a good thing (public service). Is it? Can they afford to? Is it enough?
- Or should they be allowed to merge and increase prices?

Source: annual reports, 10-K forms, Bloomberg

US and European average capex at same point in 2012 at around 13% of revenue. In 2021 average European capex rose to 16% and average US declined to below 12%.

Average Europe is wide blue line for 6 companies: Vodafone, Telia, Orange, DT, Telefonica and Telenor.

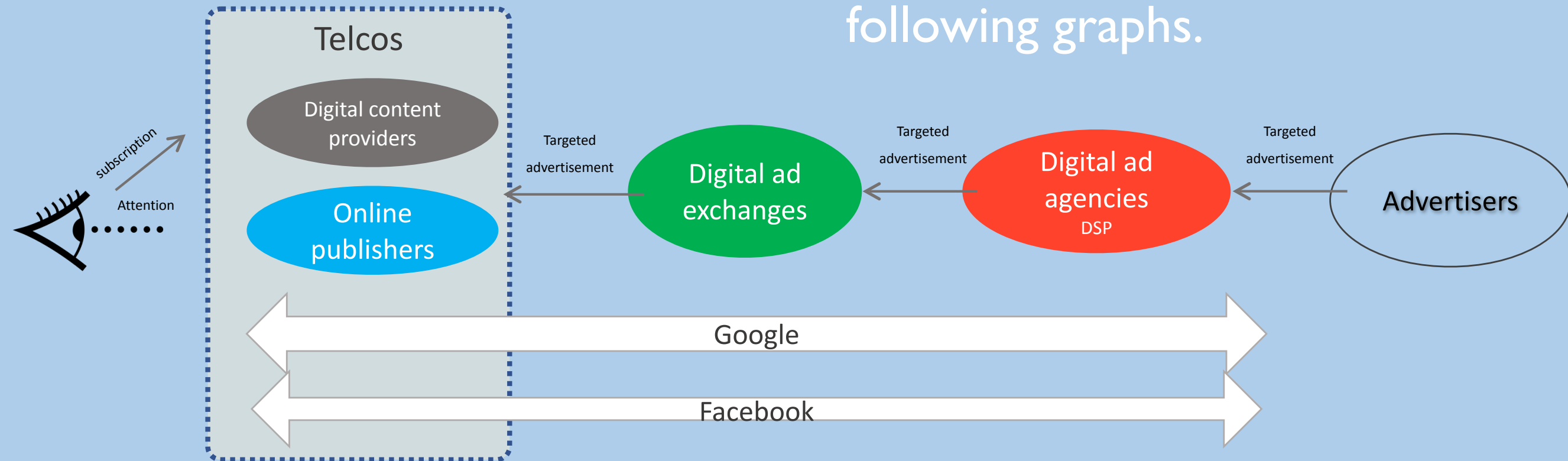
Average US is wide red line for 4 companies: AT&T, Verizon, Comcast, T-Mobile.

Some European telcos are also active in other geographies,. Vodafone is British and is also active in Africa, but most of their revenue is from Europe.

# Digital ad and content value chain

## Eyeball value chain

Overview with colour codes for following graphs.



Digital content is delivered through several stages. The green is the “auctions for eyeballs”. Publishers that display content– e.g. YouTube, The New York Times – are places where the advertisements are seen. Advertisement agencies’ “demand-side platforms” aggregate eyeball demand of product and services-producing companies and participate in e.g. an AdSense auction for the benefit of their customers (e.g. Volkswagen). Google (AdSense) has a large share of digital ad exchange space, after it acquired DoubleClick in 2008. A small percentage of the advertisers participate directly in the digital ad exchange. Other organisations such as Facebook and Amazon have been working on their own digital ad exchange system. In 2018 Meta agreed to join Google in the Jedi Blue agreement.

Backovsky, Bryson, Garbe, & Malikova in prep.

# Profitability and growth (in percentage of revenue), profitability **before** investments in infrastructure (EBITDA level). Bubbles indicate size of companies.

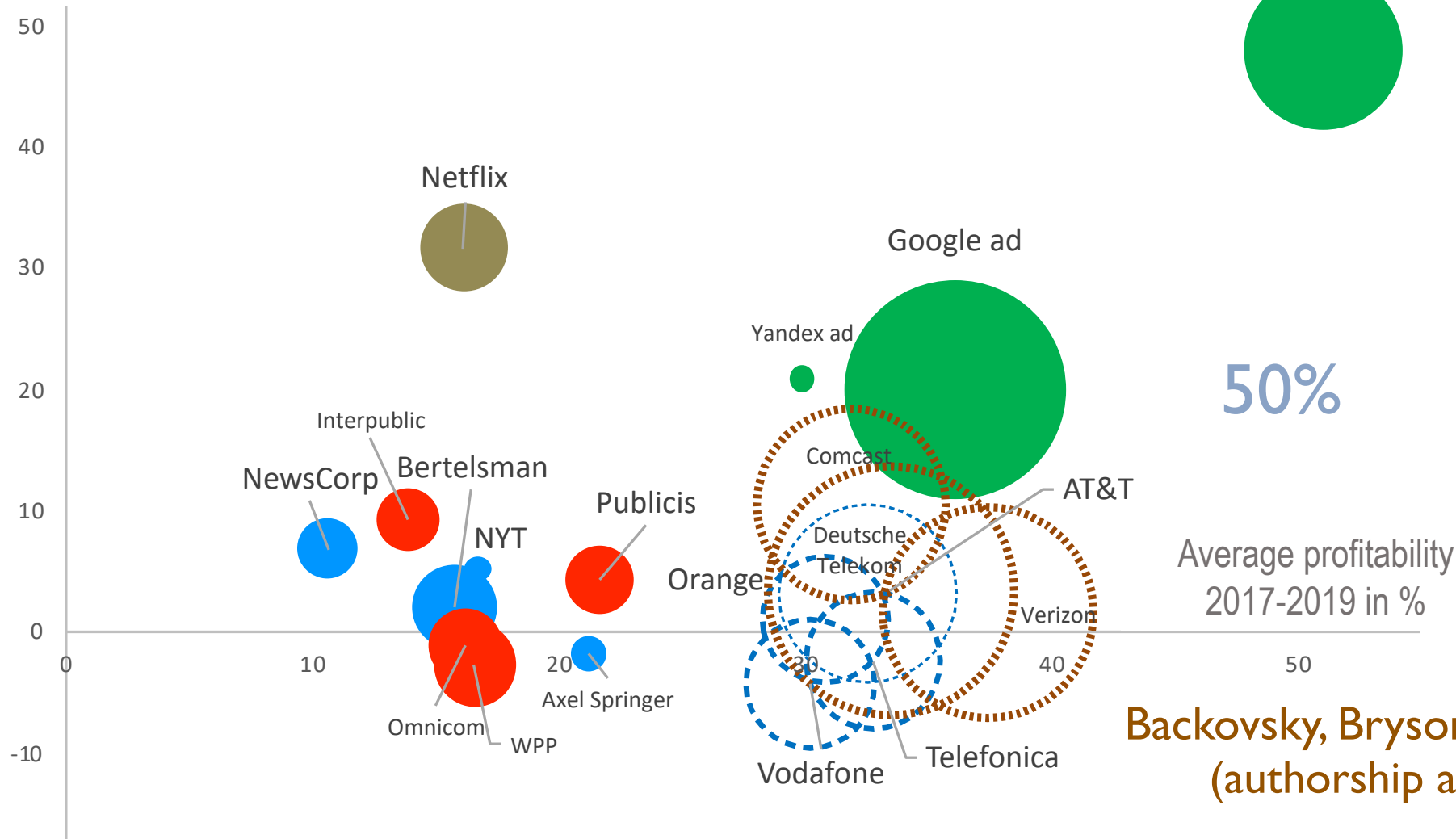
Size of bubble: size of revenue of each company in 2019

Source: Annual reports, 10-K forms, Bloomberg.

## Notes:

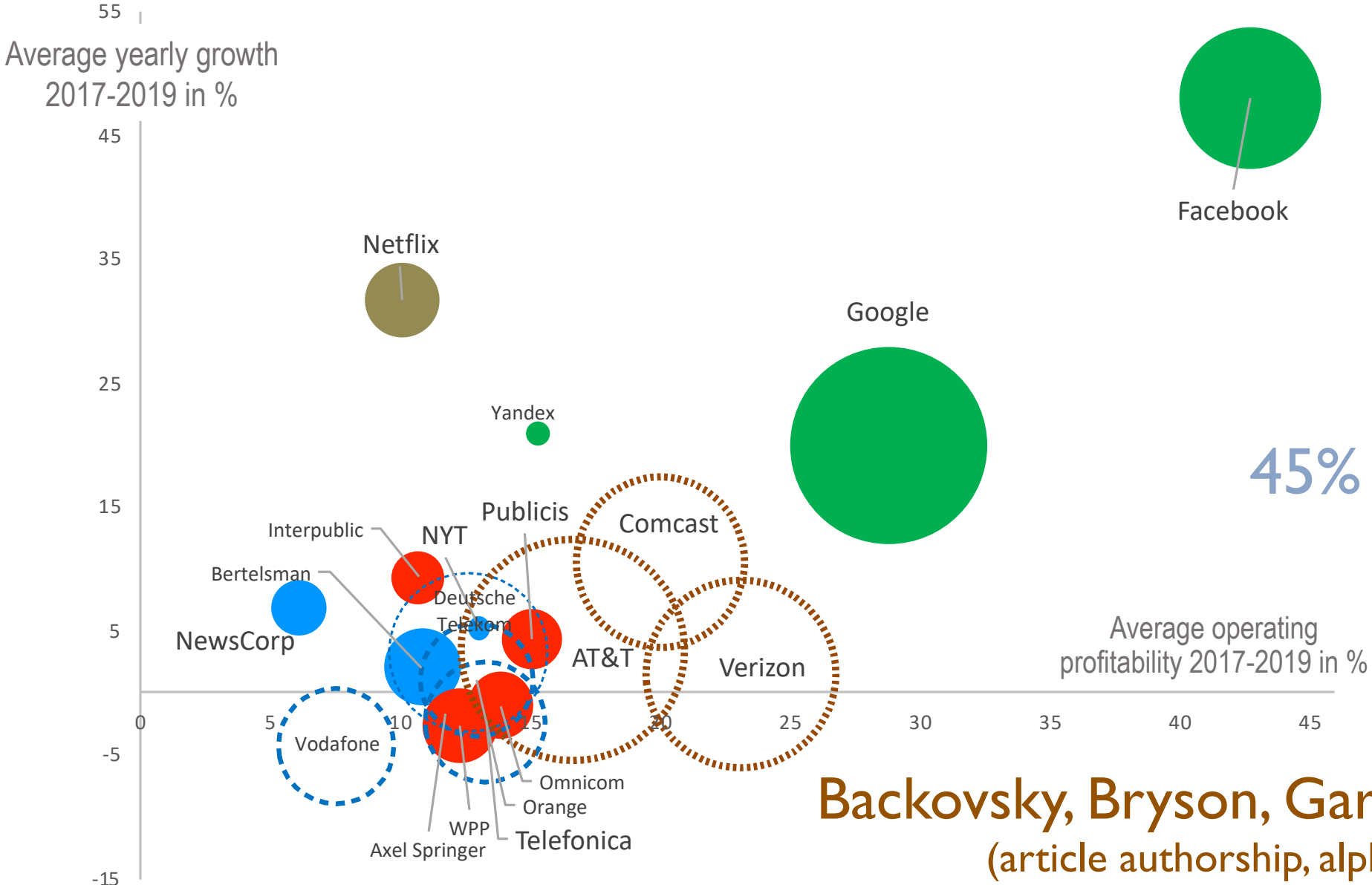
- Yandex are Russian, named in antitrust case. Couldn't find an equivalent for China.
- Telcos are nearly as profitable as Google's advertising. Certainly profitable, though not necessarily still growing.
- Also, European telcos are very large companies by revenue already.

Average yearly growth  
2017-2019 in %



Backovsky, Bryson, Garbe, & Malikova in prep.  
(authorship alphabetical, not finalised)

# Profitability, growth and size, where profitability **after** investments in infrastructure



Size of bubble: size of revenue of each company in 2019

EBIT margins for Facebook, Google based on whole company; size and growth based on ad segment

Source: Annual reports, 10-K forms, Bloomberg.

After infrastructure EU telcos **less profitable** relative to US ones. But still profitable and still comparable to other parts of the value chain – publishers and advertisement agencies.

Platforms operating ad exchanges benefit from telco infrastructure, market concentration and retain the highest profits in proportion to their activity.

Note: Revenue recognition differs across sectors, however all companies represented are active in services and their profitability is to that extent measured in a similar manner.

**Backovsky, Bryson, Garbe, & Malikova in prep.**  
(article authorship, alphabetical, not finalised)

# Conclusions

- Computation (including intelligence) takes time, space, and energy.
  - Nothing really comes for free.
  - Biases are absorbed when we reuse prior computation.
- Artificial intelligence and the digital revolution more broadly afford:
  - More productivity per worker.
  - Market dominance (due to low costs of scaling).
- Market dominance can be regulated, but some infrastructure benefits from scale – may require price setting, redistribution.
  - This may need to be happening at transnational scales.
- Valuing labour benefits security.

# Generative Artificial Intelligence, the Future of Work, and Taxes

Joanna J. Bryson

[@j2bryson](#) [@🐘.social](#)



[in/bryson](#)

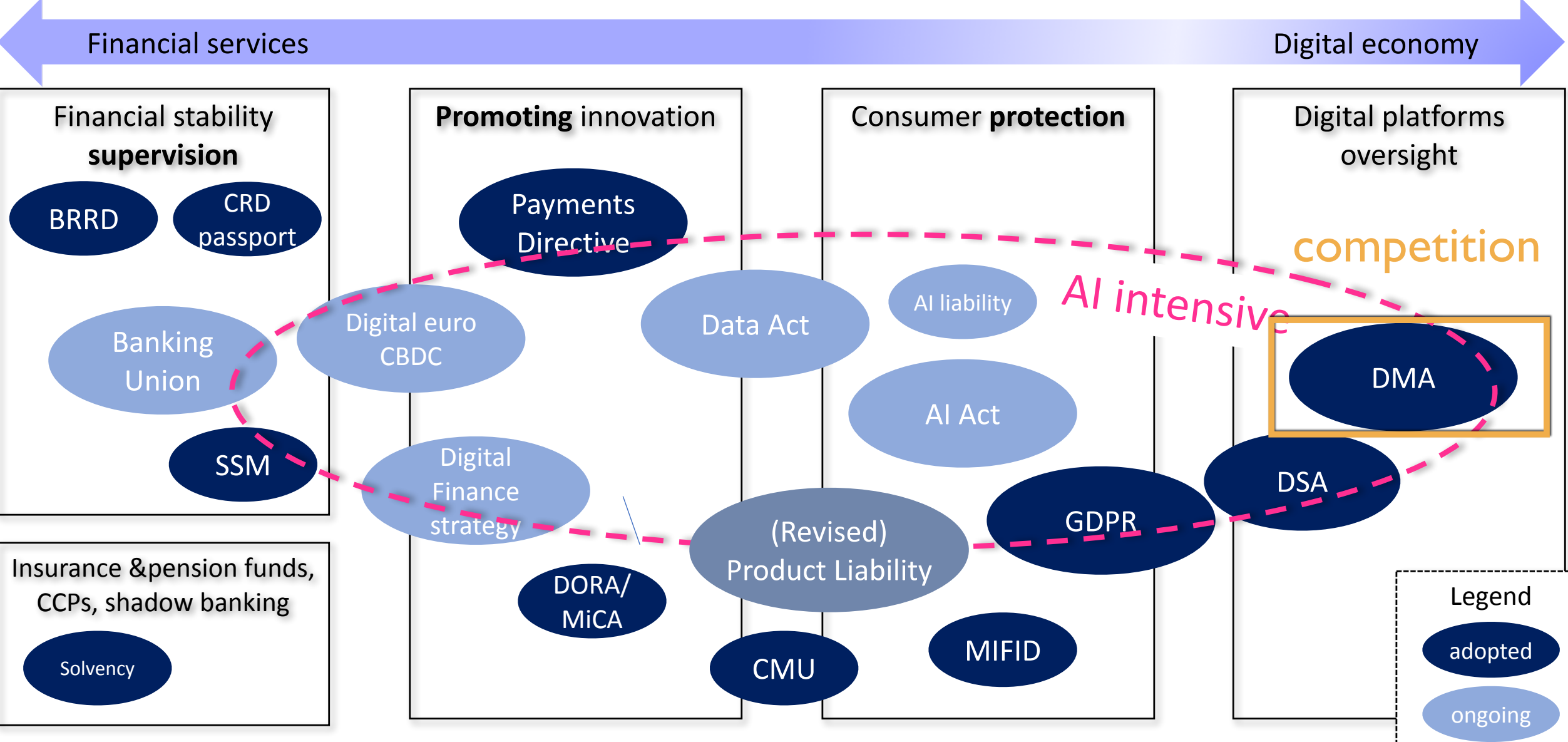


**Hertie School**

Centre for  
Digital Governance



# Overview of selected regulatory initiatives relating to financial services and digital economy ( illustration/non-exhaustive) Helena Malikova



\* Many of the initiatives listed are horizontal in nature, this simplification slide does not capture the full scope and objectives of the proposals



GDPR

INCLUDES A  
**LOT** OF  
WHAT'S  
OFTEN  
ASKED OF  
**THE AI ACT**

## Strengthens the privacy rights of individuals

### VALID CONSENT



Stricter rules for obtaining consent as a legal basis for processing.

### TRANSPARENCY



The right to clear information over what data is collected and how it is processed.

### CORRECTION



The right to rectify inaccurate personal data.

### ERASURE



The right in certain cases to have personal data erased.

### DATA PORTABILITY



The right to move personal data from one service provider to another.

### AUTOMATED PROCESSING



The right not to be subject to a decision based solely on automated processing.

# Digital Services Act DSA

- Aim: to benefit the EU's digital economy by creating a “safe, predictable and trusted online environment”
  - by making it easier to defend users' rights online.
- Regulates **profiling**, **recommendation systems**, and **targeted advertisements**.
  - Some services (e.g. Facebook, twitter) were arguably better with no recommenders. Recommenders enable “lazy following.”
  - Other services are entirely recommendation (AI), e.g. Web search.
  - Targeted advertising seems to give no sales benefit, yet companies crave the information it affords.

# The AI Regulation / “Act”

- Categorises AI into banned, high-risk, and (basically) no problem.
- Banned: large-scale biometric tracking; social credit scoring (cf. UNESCO 2022).
- High-risk: affects important human outcomes e.g. loans, jobs, welfare, school placement, medical.
- Requires **documentation** to support accountability, audits.
  - Really not very onerous, cf. Haataja & Bryson 2022 (socarxiv).
- No problem: requires ensuring users **know they are working with AI**.
  - IMO, should encourage voluntary compliance to **documentation**.

- “Too bad you don’t have your own AI to regulate.” Schmidt to German regulators, 2021.
1. West coast US AI is **produced by** people from all over the world (who migrate there); often **using the data** of people all over the world (who mostly haven’t.)
  2. Each nation signatory to the Universal Declaration of Human Rights have an **obligation** to proactively defend the human rights of every human within its borders.

# Does the EU Have a Right to Regulate AI?



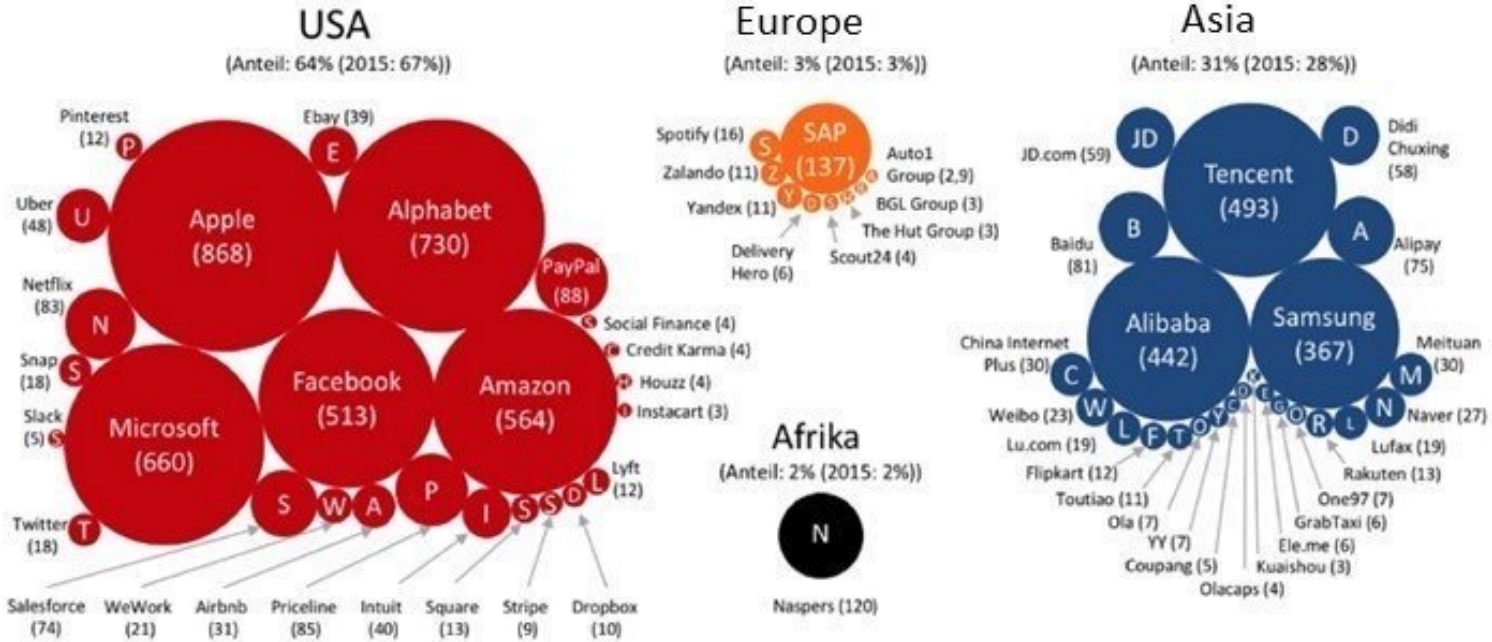
Meme slide focussing on largest companies  
(so less-regulated economies look better.)

Conflates Asia with China!

# US – EU - China

## The imbalance of platform economy

The 60 most valuable global platforms in billion USD on December 31, 2017



USA: libertarian market logic, limited regulation

China: state capitalism, government directs activities of companies

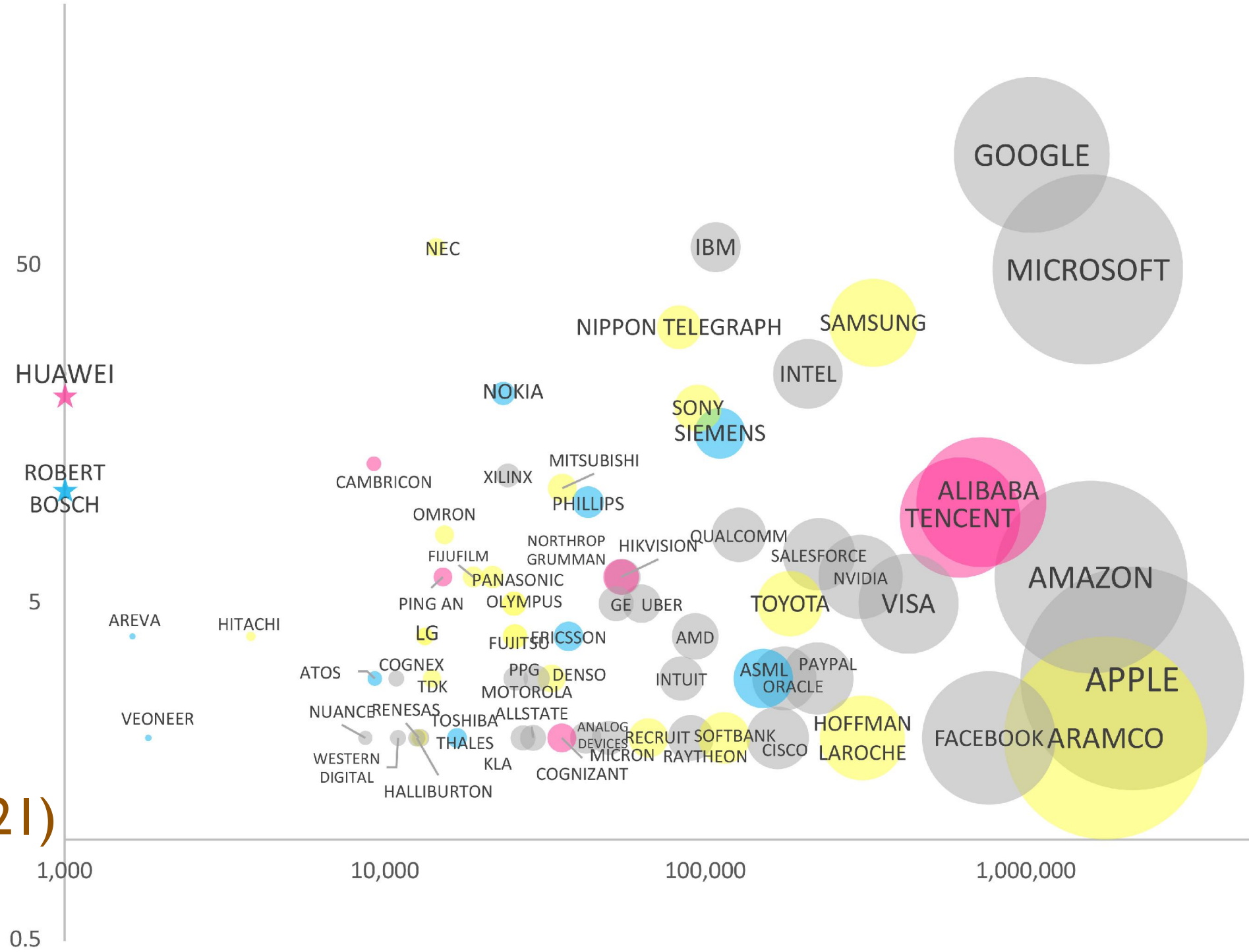
EU: social market economy, multi-stakeholder models. GDPR as first step towards regulating Big Tech

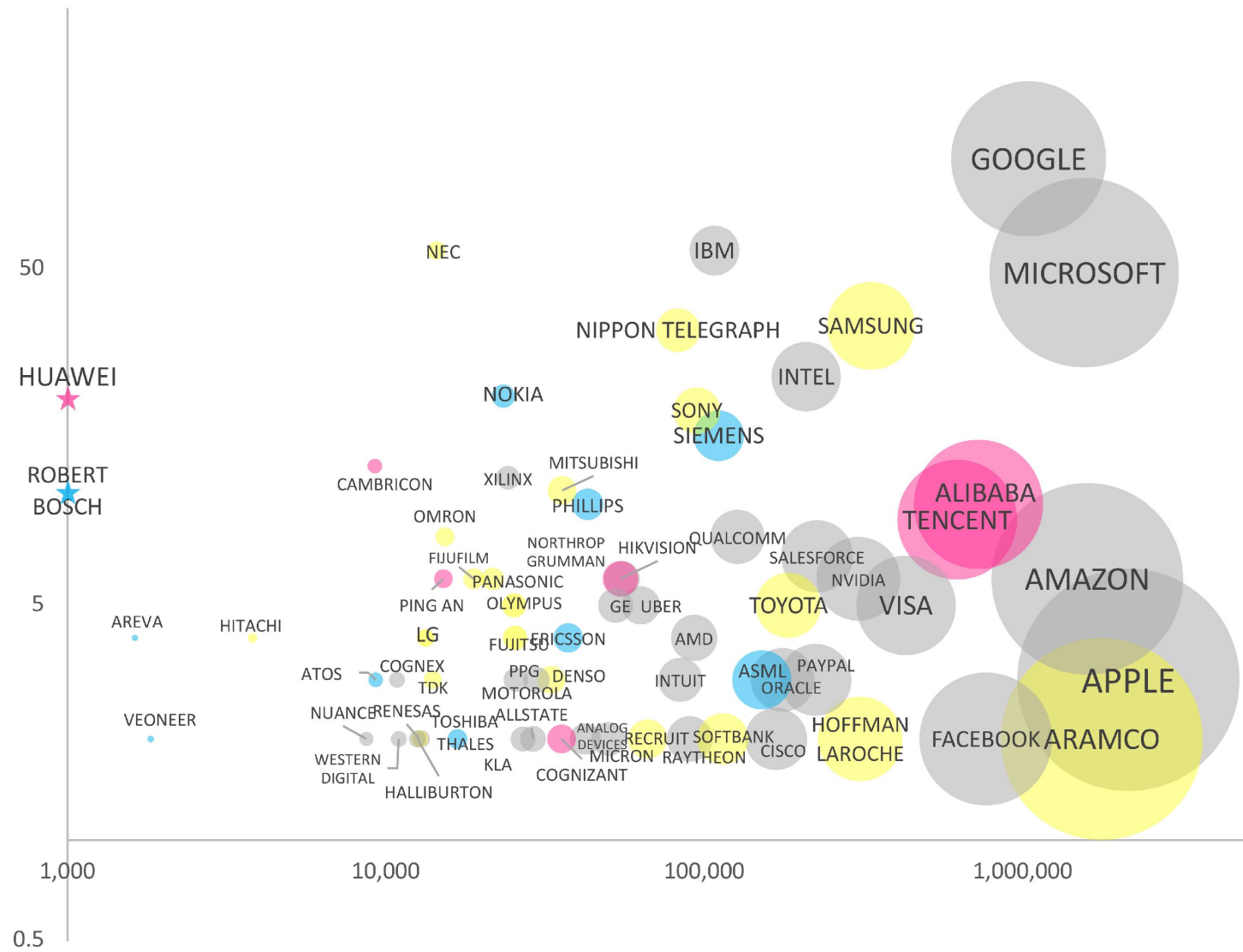
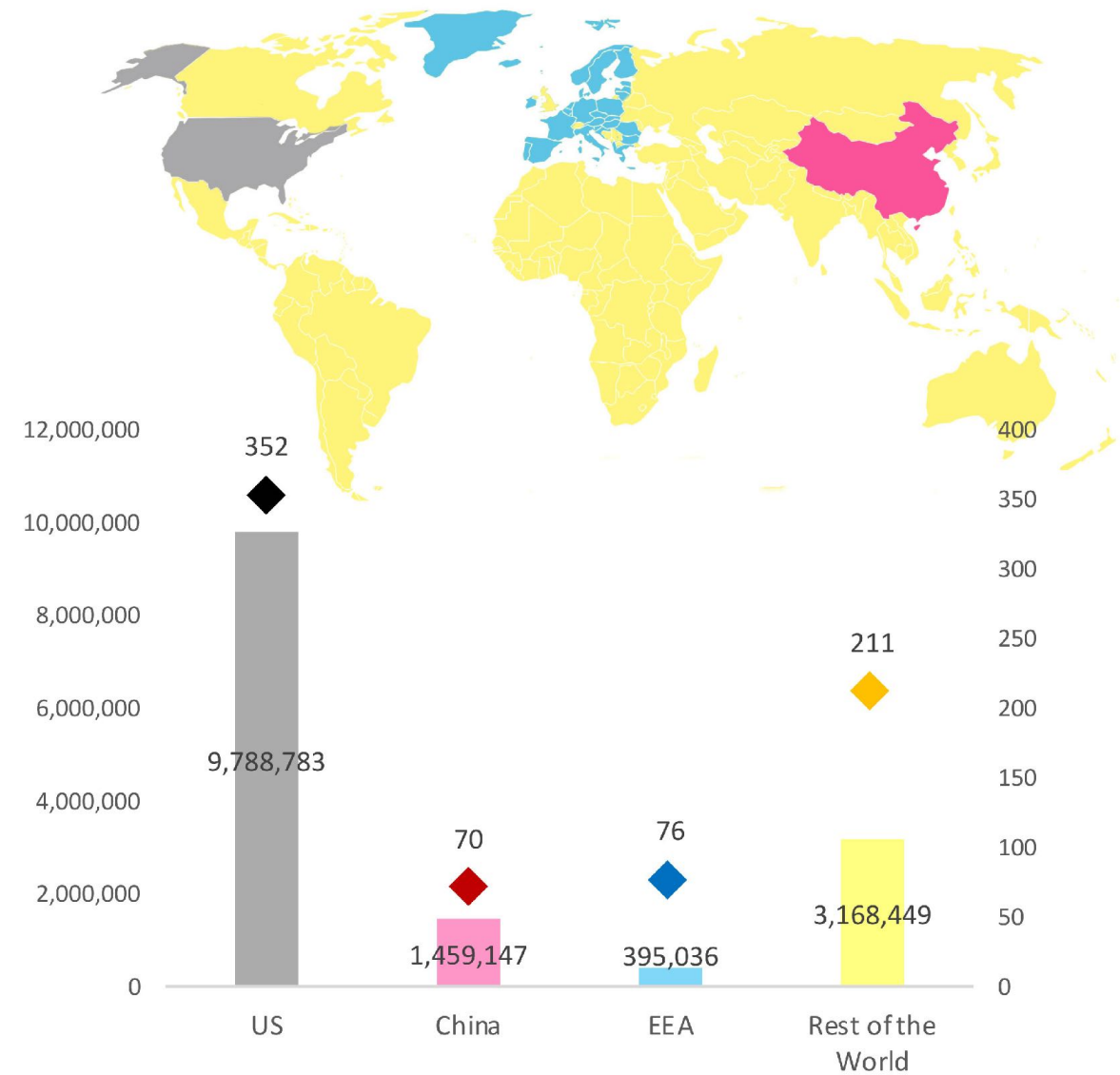
Quelle: Netzoekonom.de / Idee: Peter Evans

↑ y axis = log 2019  
AI patents in  
WIPO (G06N of the IPC  
classification dedicated to  
"Computer systems based on  
specific computational models")

→ x axis = log Oct  
2020 Market  
Capitalisation (for  
companies with at least two such  
patents)

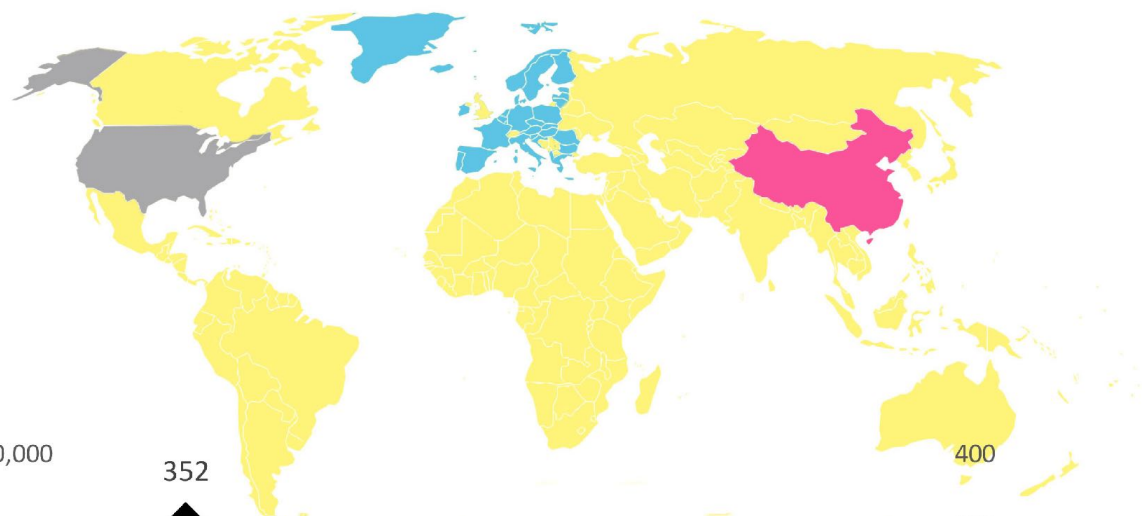
Bryson & Malikova (2021)





Bryson & Malikova (2021)

Is there an AI cold war? *Global Perspectives 2(1)*

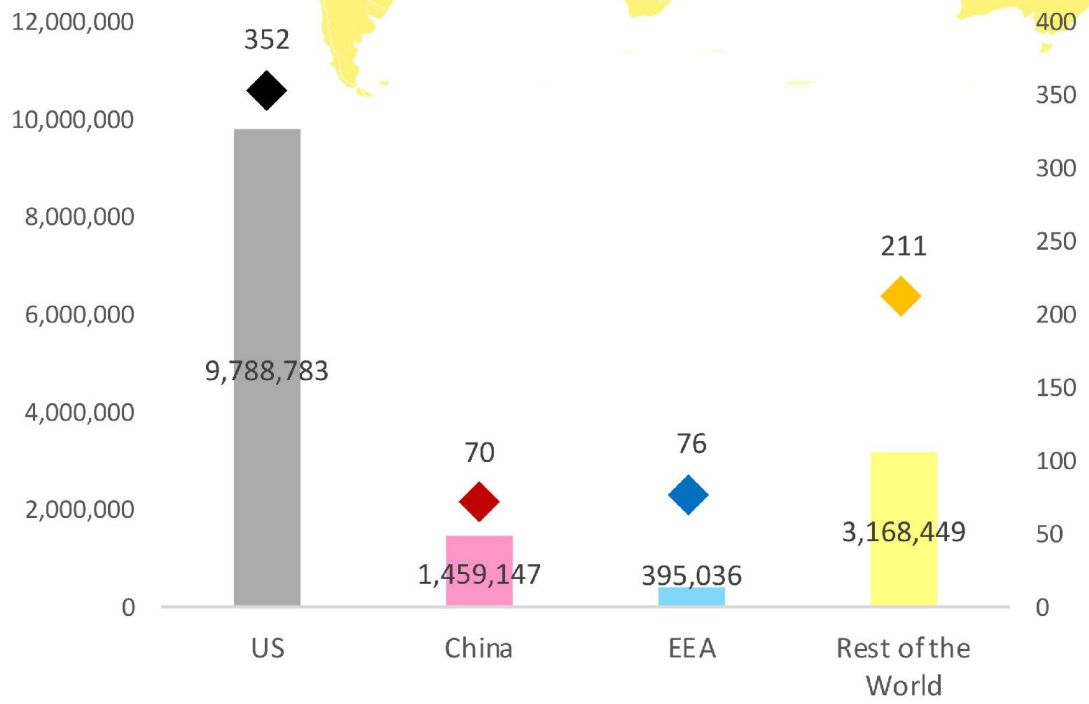


Helena Malikova



Is every year like 2020?

Wiebke Dorfs

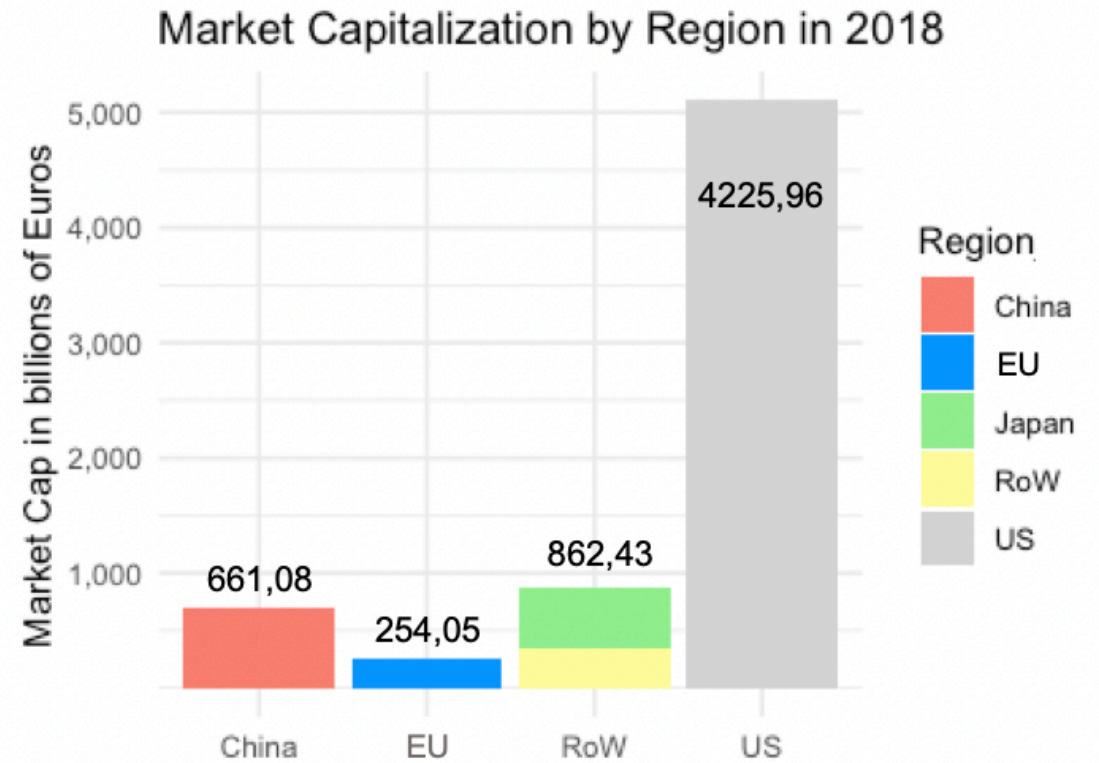
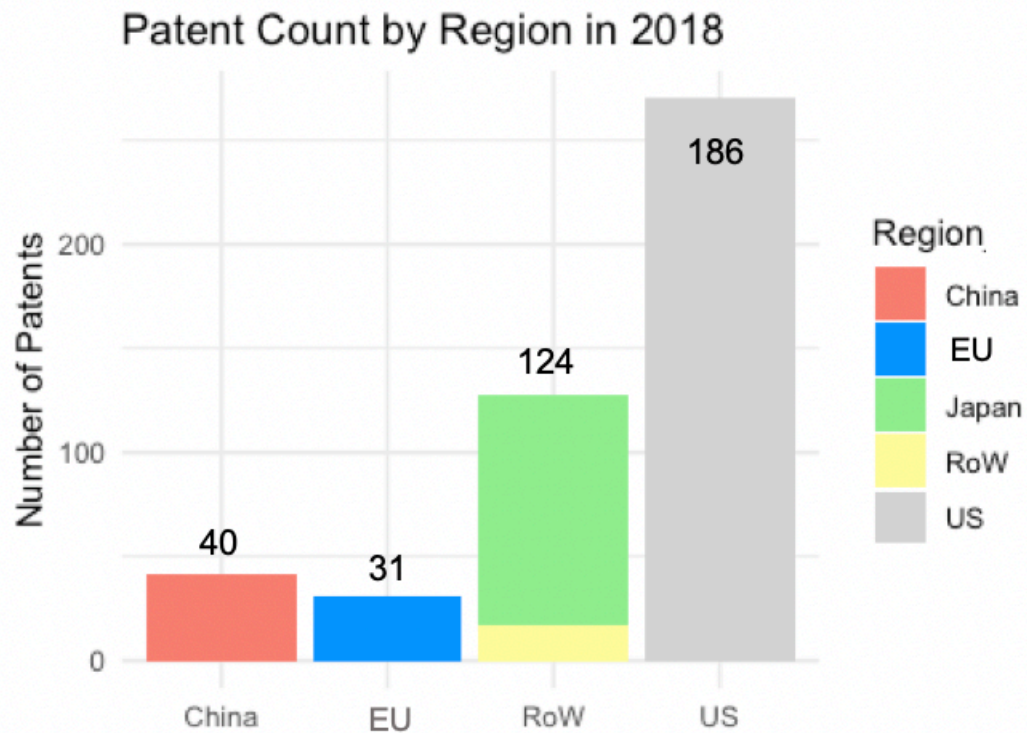


Bryson & Malikova (2021)

Is there an AI cold war? *Global Perspectives 2(1)*

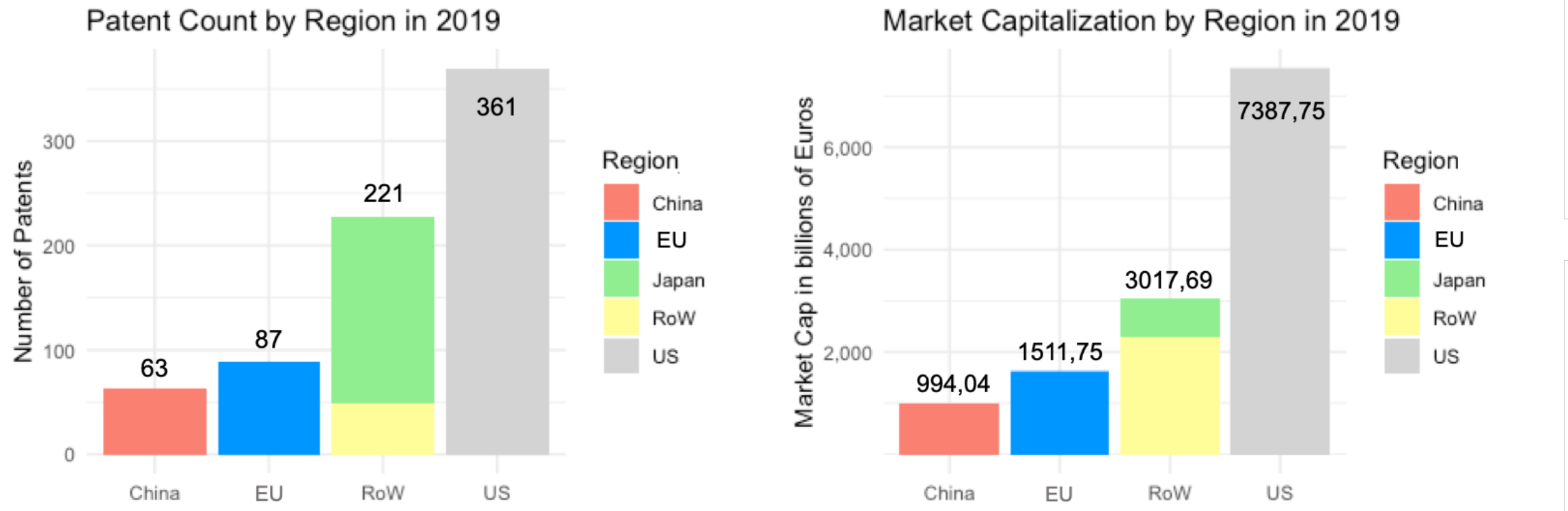


# Results 2018



Wiebke Dorfs – Masters Dissertation / in prep. (for companies with at least ONE such patent)

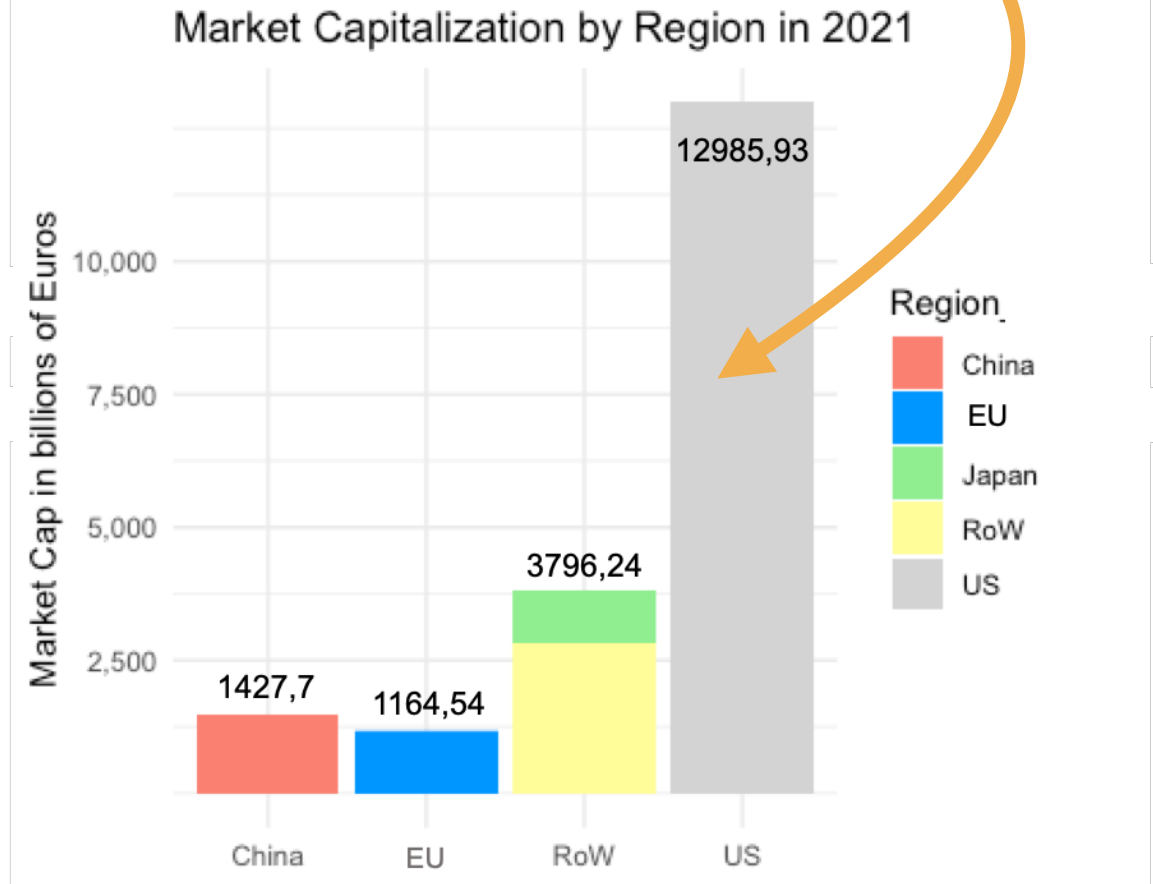
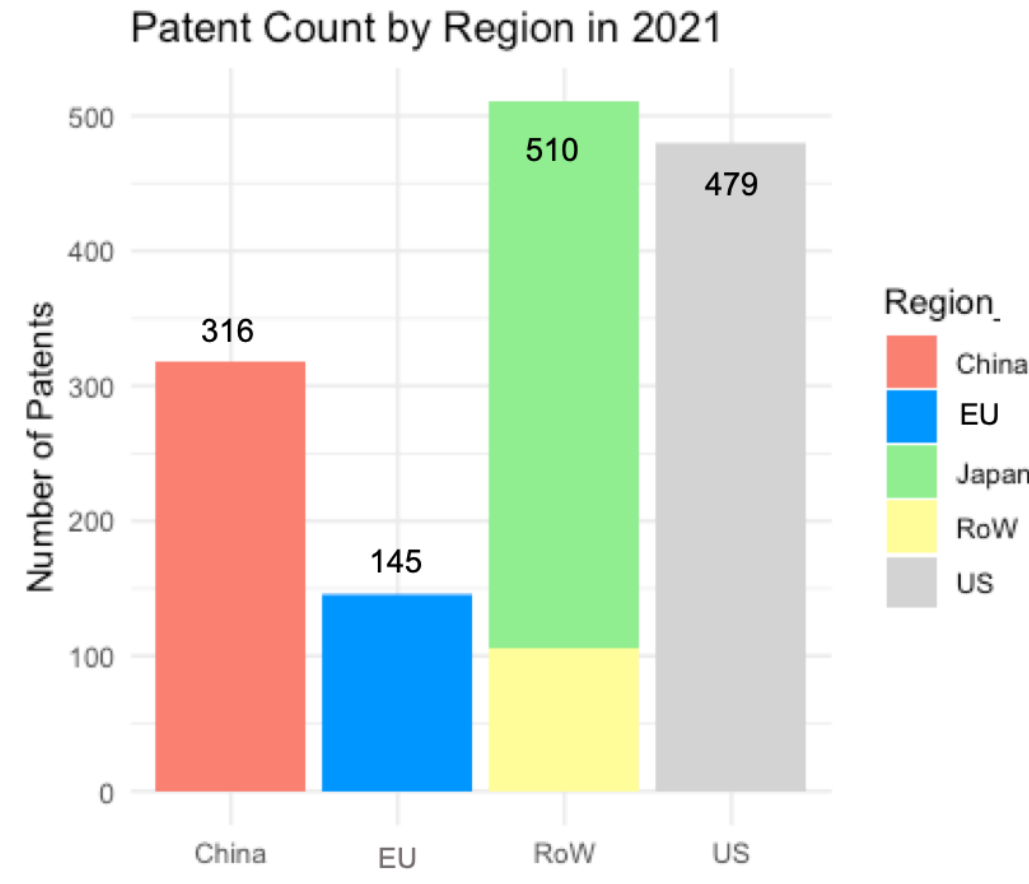
# Results 2019



Wiebke Dorfs – Masters Dissertation / in prep. (for companies with at least ONE such patent)

# Results 2021

Value or Bubble?

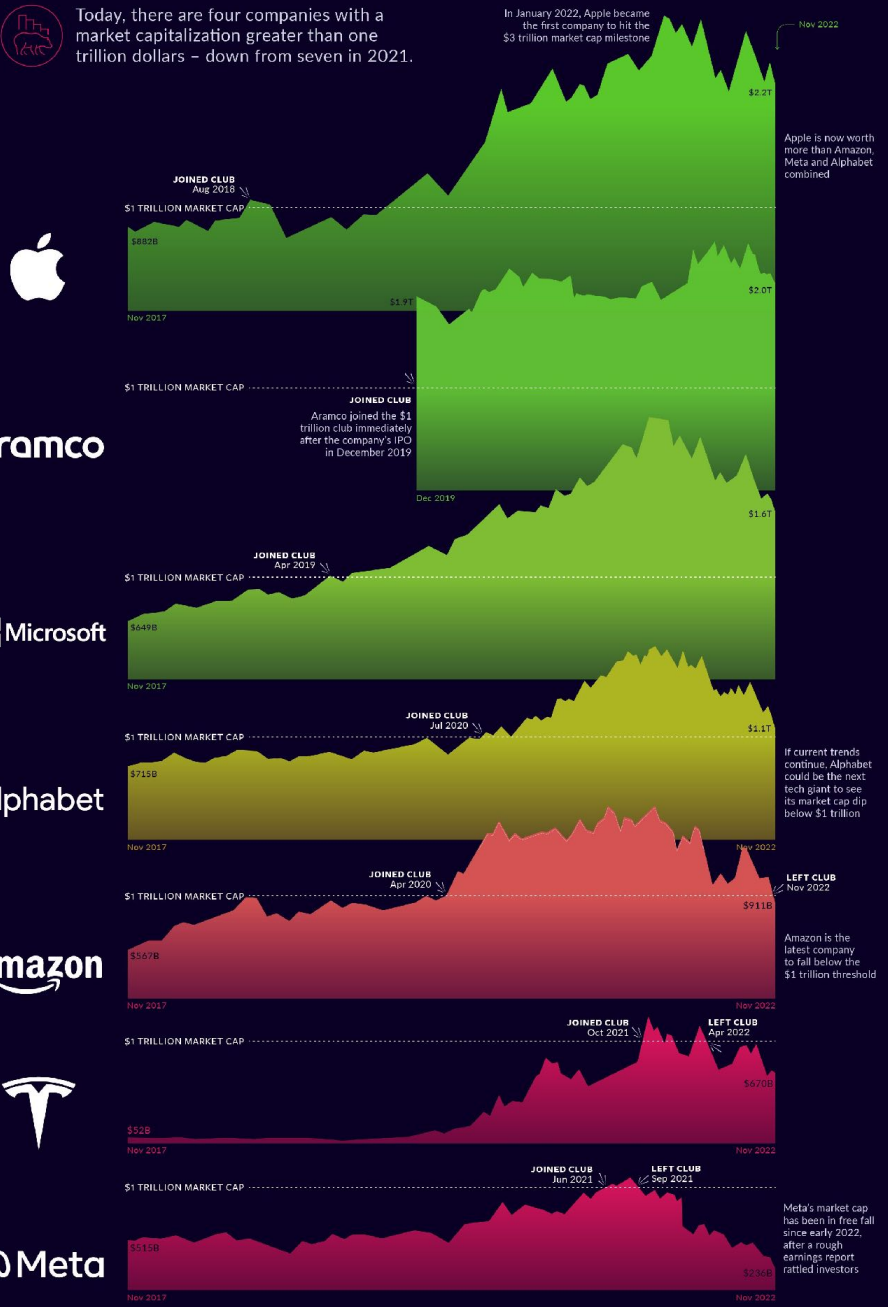


Wiebke Dorfs – Masters Dissertation / in prep. (for companies with at least ONE such patent)

# THE SHRINKING TRILLION DOLLAR CLUB

Today, there are four companies with a market capitalization greater than one trillion dollars - down from seven in 2021.

In January 2022, Apple became the first company to hit the \$3 trillion market cap milestone



Apple is now worth more than Amazon, Meta and Alphabet combined

If current trends continue, Alphabet could be the next tech giant to see its market cap dip below \$1 trillion

Amazon is the latest company to fall below the \$1 trillion threshold

Meta's market cap has been in free fall since early 2022, after a rough earnings report rattled investors

# Via Twitter :-/

# Poverty in the UK is 'systematic' and 'tragic', says UN special rapporteur

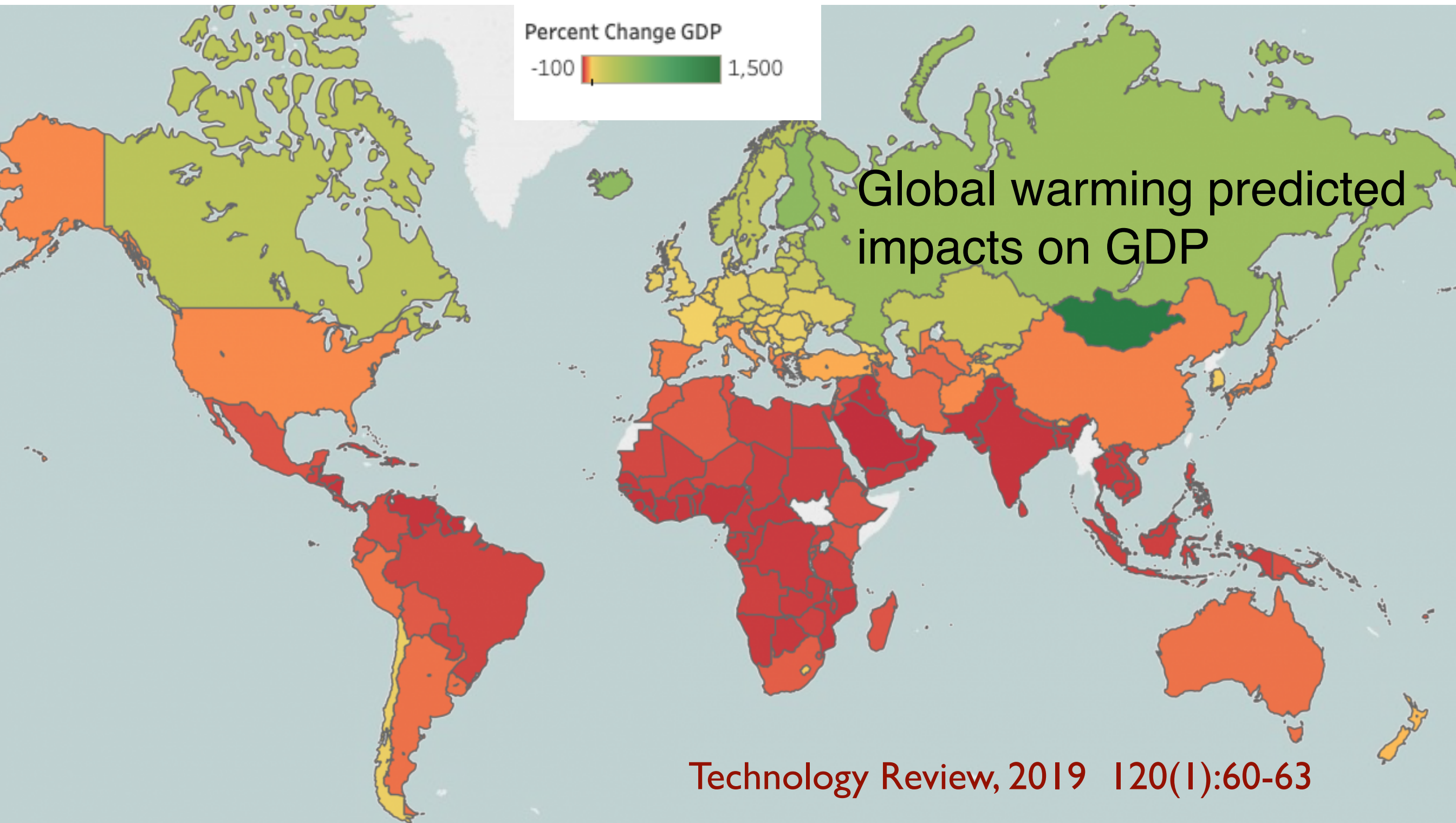
🕒 22 May 2019

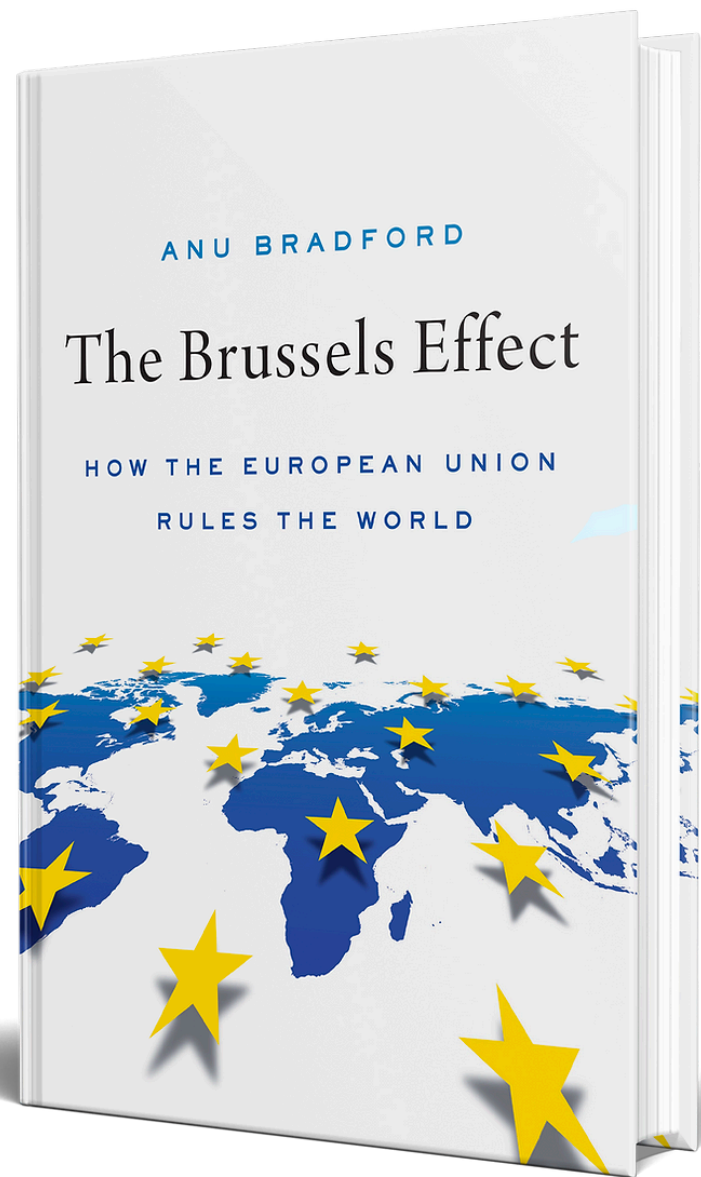


🔗 Share



The tragedy underlying Brexit: a “Resource curse” regulatory capture – not by oil, but by the financial sector.





2020

- The EU's [General Data Protection Regulation](#) (GDPR, 2016) showed that companies are willing to comply with EU legislation to get access to EU markets.
- Bradford (2020, "The Brussels Effect") documents that GDPR-like law and privacy spread well beyond EU's borders.
- EU's [Digital Services Act](#) (DSA, 2022): Providers of widely-used software must identify & address potential harms.
- EU's [AI Act](#) (AIA, actually a [Regulation](#), expected 2023): Software is a product – must demonstrate due diligence in its manufacture or face liability.

# Another Accident

- **Microsoft** created learning chatbots.
  - Expectation: they can learn to be more engaging.
  - Engagement measured by interaction.
- **Xiaoice** introduced in China by Microsoft Asia in 2014, still going strong with tens of millions of users, still available.
- **Tay** introduced in the US in 2016 lasted 16 hours.
  - In China, speakers of objectionable statements are often shunned; in the US, such speakers are often mobbed.



# Cooperation and Public Goods

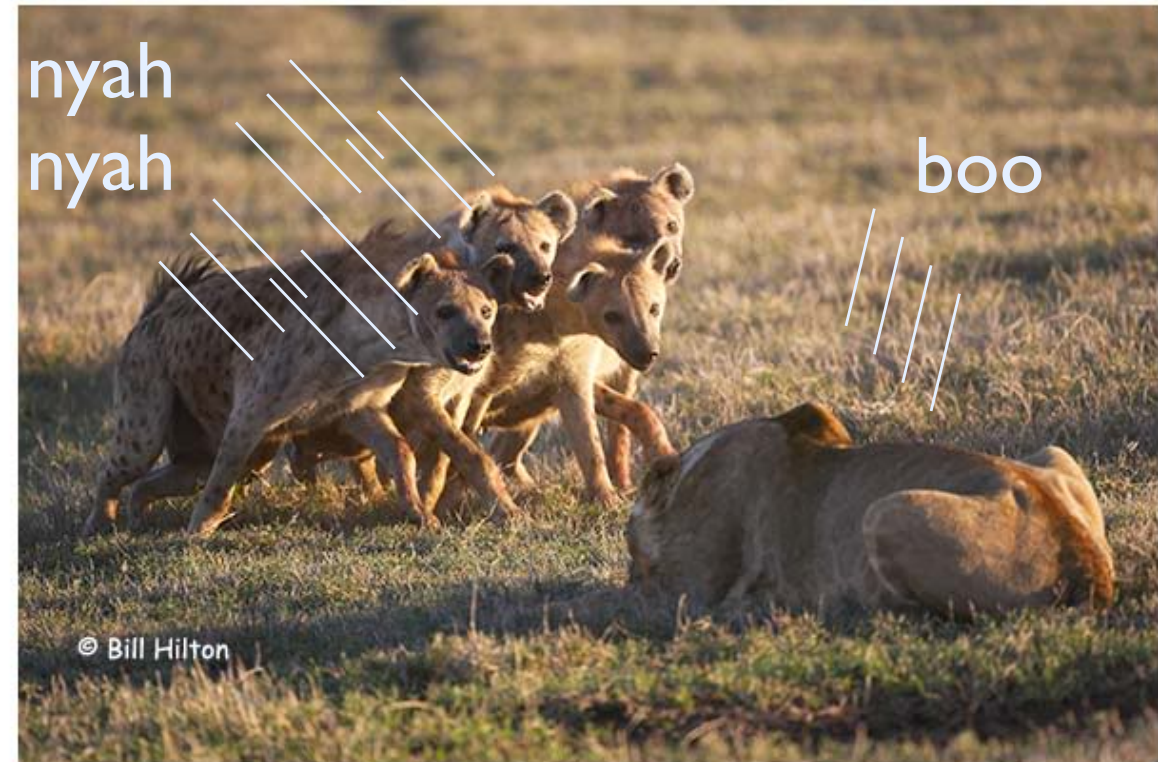


- Fundamentally, life has two problems: **sustainability** and **fairness**.
- **Sustainability**: how beneficial is the pie? (public goods)
- **Fairness**: how beneficial is **my** slice of the pie? Can I **flourish**?
- **Cooperation** improves the entire pie; **competition** improves some slice(s) at a cost to others.
- We **cooperate** when we can find a way to improve the pie, with an apparently better cost/benefit than **competing** over a slice.

# Cooperation Is Natural



Shared Interests!



- **Anarchy** is a society without a government.
- Government chooses and enforces policy for some society, ordinarily a **State** –
  - – a nation defined by cohabiting a geographic region.
- **International Relations** (the society of states) is a classic example of anarchy (cf. A. Wendt, 1999).
  - A small number of actors, relatively evenly matched.
  - Though note that that evenness is often enforced by institutions, in a violation of absolute sovereignty.
  - Order is a **public good**, allowing sufficient stability for flourishing.
  - This order includes powerful, transnational entities (and long has.)



# Incidental 'Violations' of Sovereignty

- Climate, ecosystem – at least initially, cross-border effects were not considered.
- The Internet was initially conceived (or at least funded) as a means to make (US) governance and communication robust against nuclear assault.
- Social media was a way to play, and sell advertisements.

# Incidental 'Violations' of Sovereignty

- Climate, ecosystem – at least initially, cross-border effects were not considered.
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- Social media was a way to play, sell advertisements.

By the way: Transit, storage, and content creation **will never be free**.  
What's changed is relative costs – and therefore governance strategies.


# Intentional Operations Over Social Media

- We can recognise how people will vote from **Facebook likes**, **Kinect** (game console) data (**Youyou & al. 2015**; **Rothschild & al. 2015**).
- We can recognise **personality** from likes, or text use e.g. tweets.
- We can encourage action by **individuals with targeted beliefs** by making them feel a part of a movement/majority (**Chris Wylie**).
- Or inaction (e.g. not voting.)

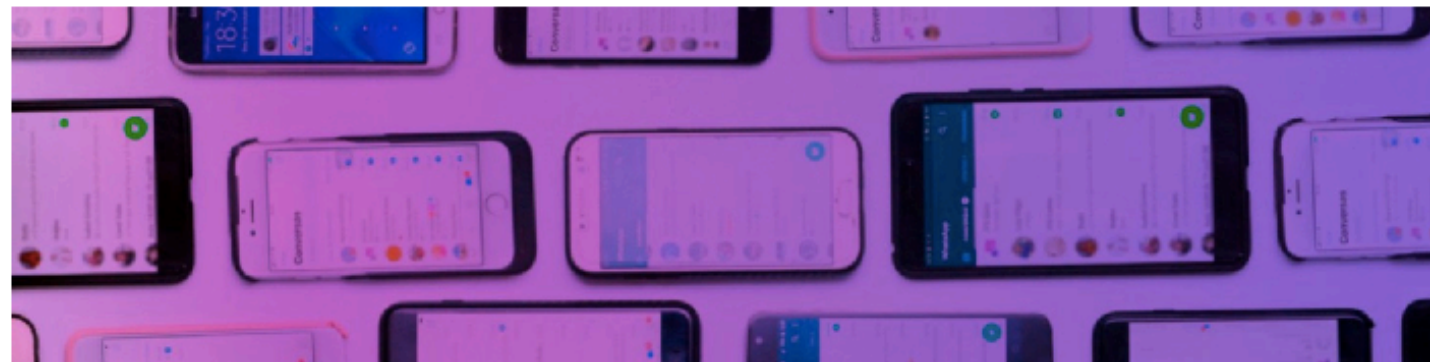


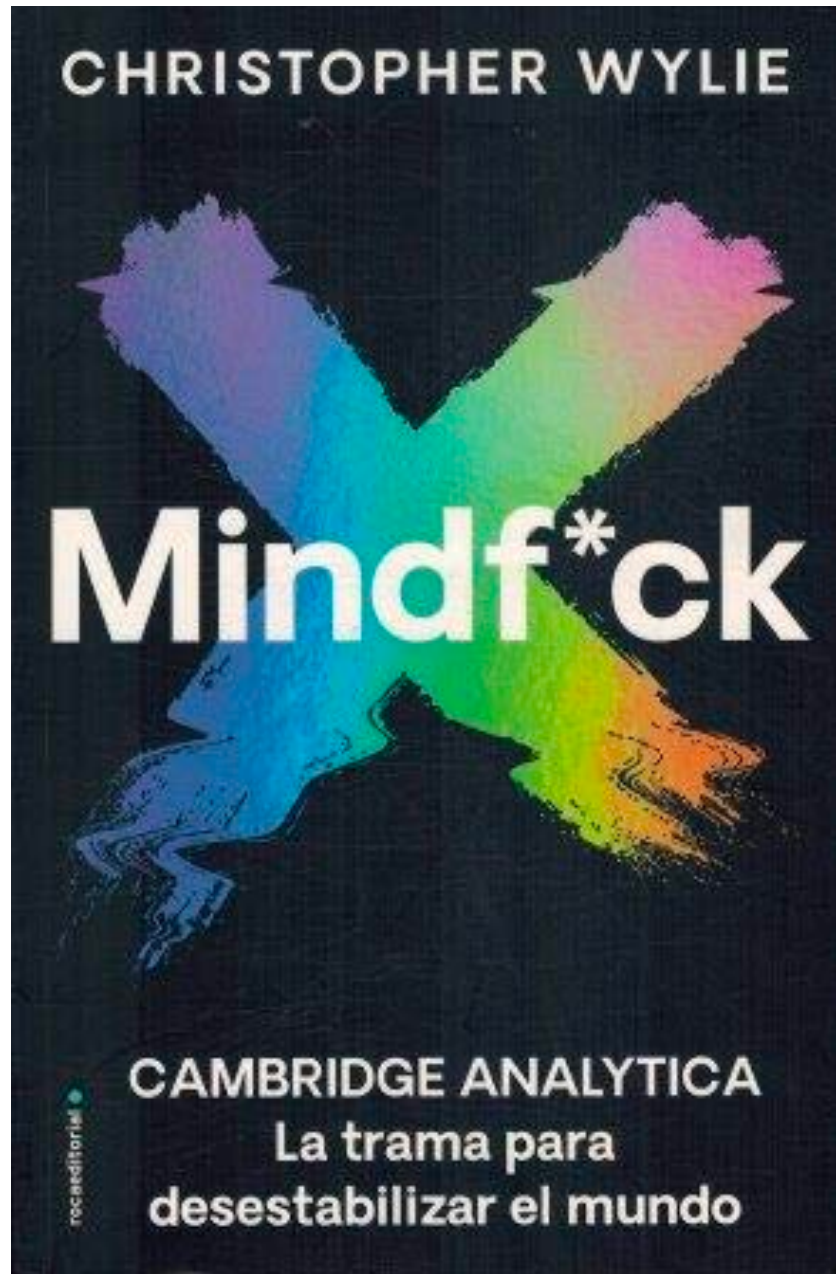
## Computational Power: Automated Use of WhatsApp in the Elections

Study on the use of automation tools to boost political campaigns digitally in the 2018 Brazilian elections

 ITS Rio [Follow](#)  
Oct 26, 2018 · 22 min read

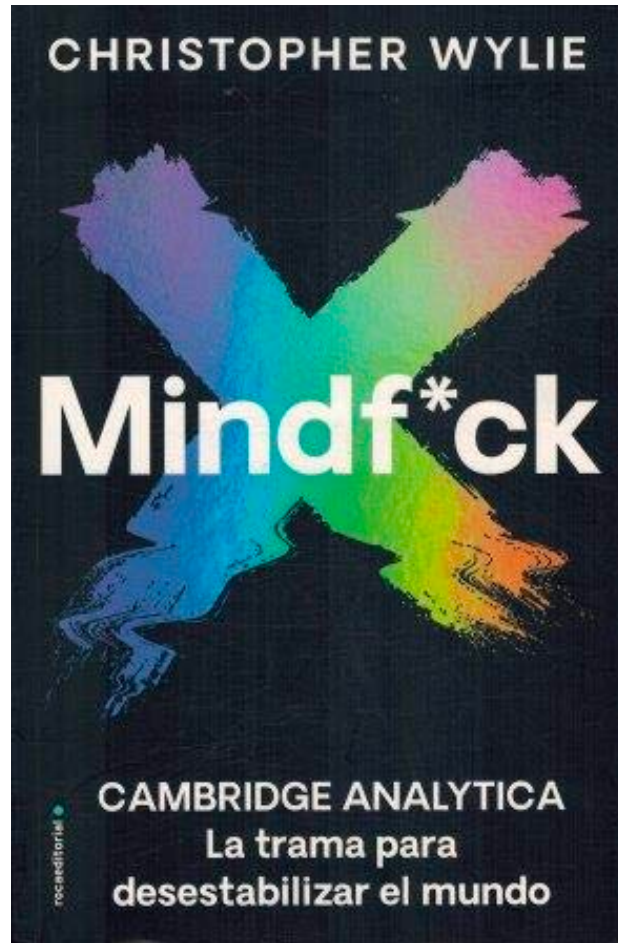
**Caio Machado** and  
**Marco Konopacki**





- Wylie documents who funds SCL / Cambridge Analytica (a shell company), and why.
- Significant interference in **many elections**, through many means over some years.
- **Mercer** paid SCL **£20M** to help **Cruz** be president, but let **Bannon** run it, and **Bannon** preferred **Trump** for 2016.
- Brexit was a “demo” – though with a great deal of Russian interest and money.
- **Autocracy / Democracy is a continuum, not a binary.** Domestic legitimacy and state capacity affect all governments.

**late 2019**



- Wylie also documents how easy it is to find individuals with unusual combinations of interests and beliefs.

## Burning of Qur'an in Stockholm funded by journalist with Kremlin ties

**Permit for demonstration at which anti-Islam provocateur burned Muslim holy book was paid for by far-right journalist linked to Moscow-backed media**



📷 Rasmus Paludan (left) at an event in Denmark in 2022 at which he burned the Qur'an. Photograph: Muhammet Ikbal Arslan/Getty Images

The Qur'an-burning incident in Stockholm that [threatens Sweden's bid to join Nato](#) was funded by a far-right journalist with links to Kremlin-backed media, it has emerged.

**Guardian, 27 January 2023**



# Data Is the New Oil\*

Storing it is  
dangerous.



\*Not really – data's  
value declines with its  
redundancy – except  
for **surveillance**.



# Antidote to Backsliding: Ethnic Politics and Democratic Resilience

Published online by Cambridge University Press: 23 January 2023

JAN ROVNY 

Article Figures

Democracy saved by the diversity it saves. See also Philippine journalist (and Nobel laureate) Maria Ressa on impacts of Musk's deconstruction of Twitter.

