Measuring the consumer *benefits* of digital technologies and AI

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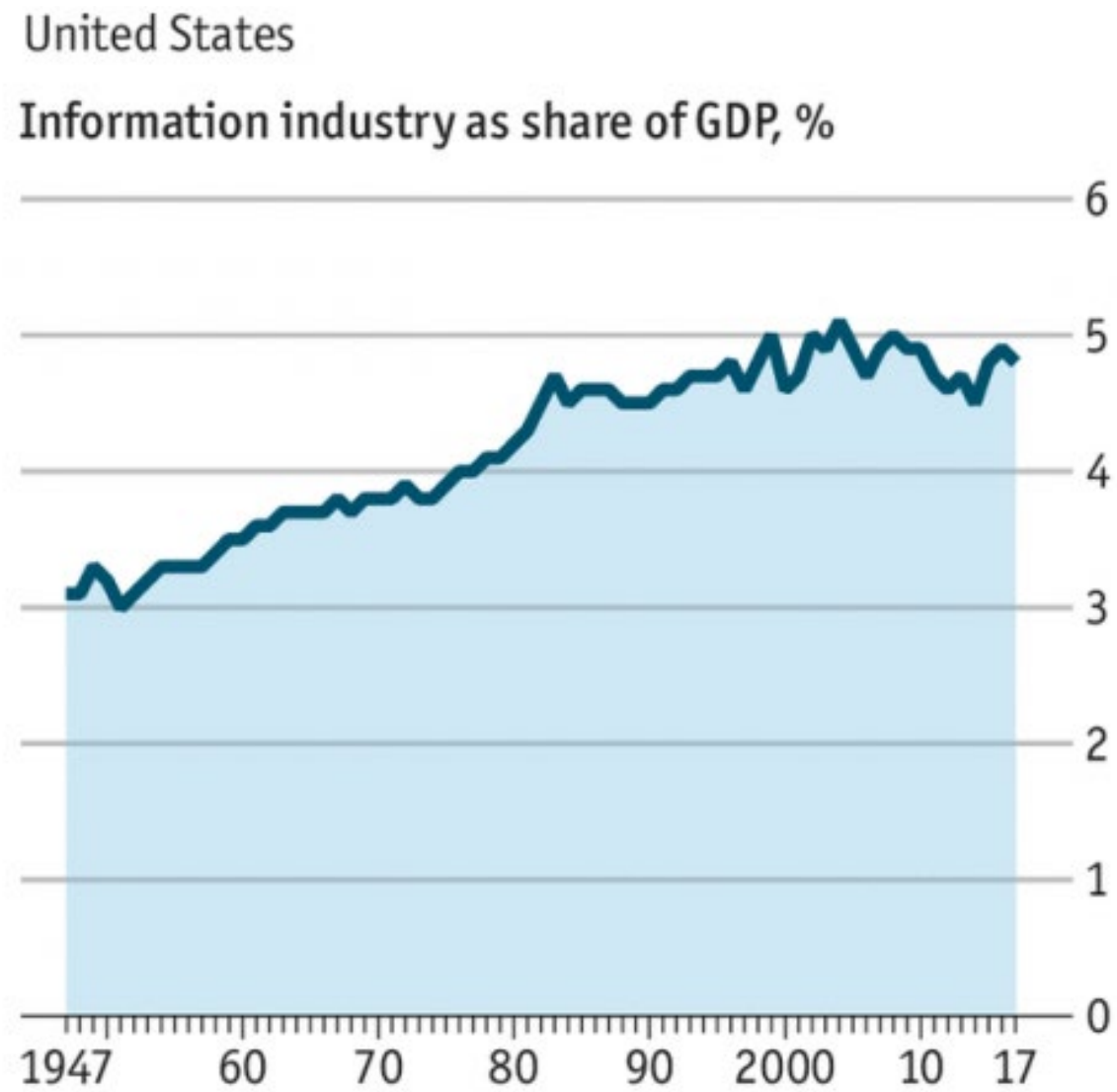
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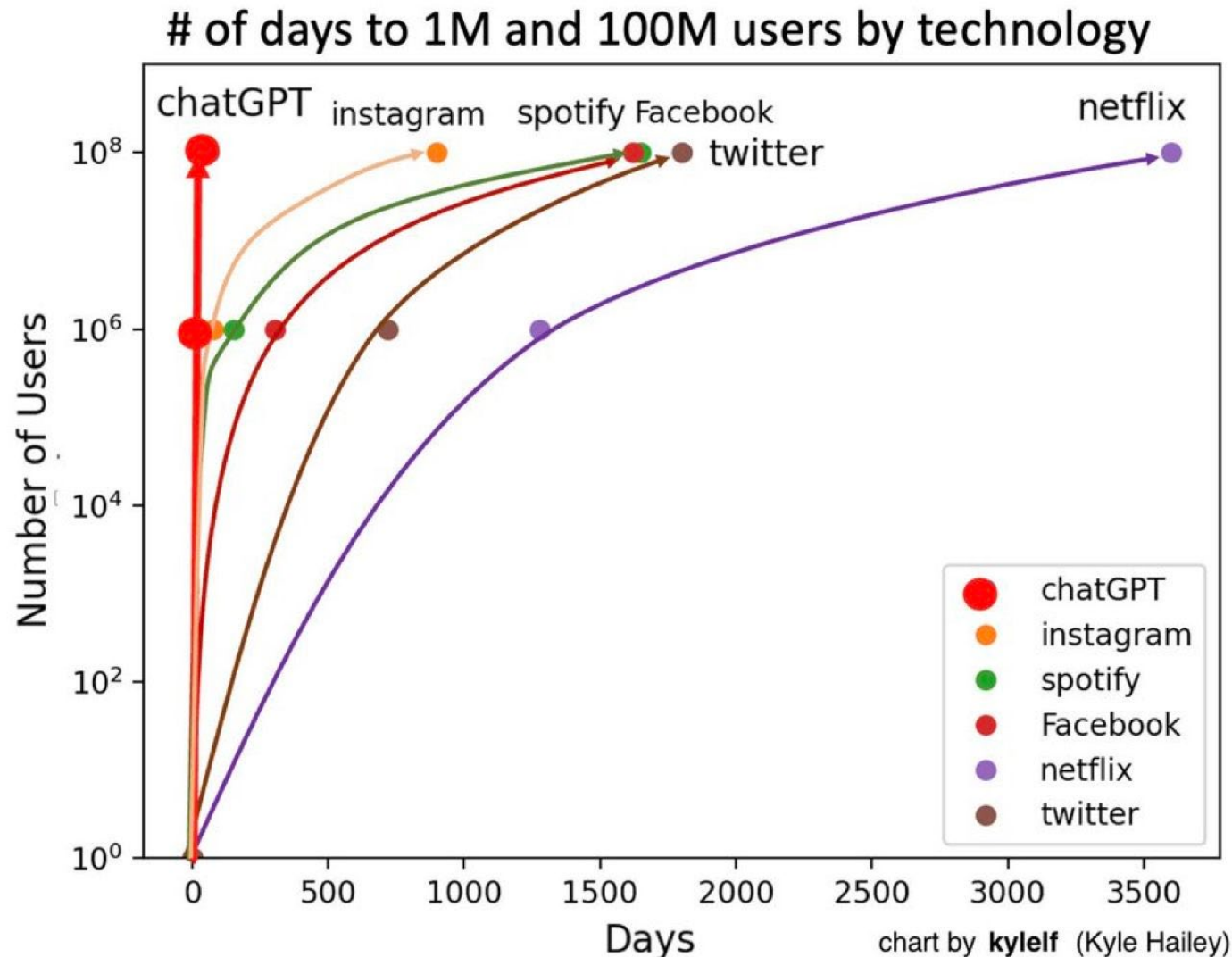
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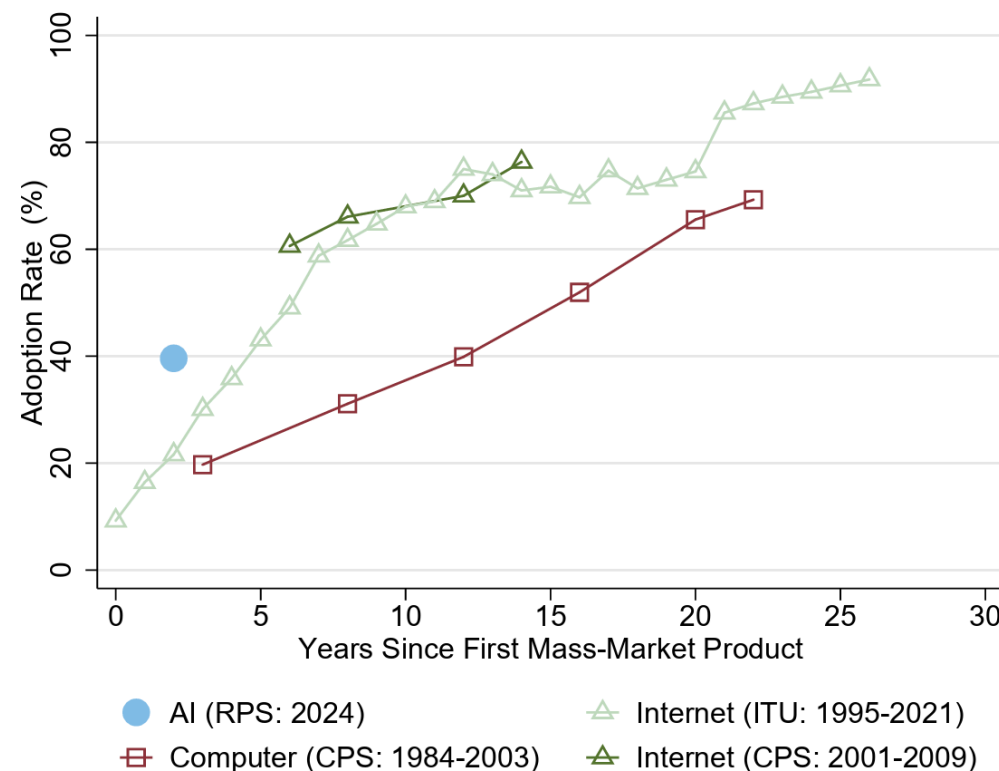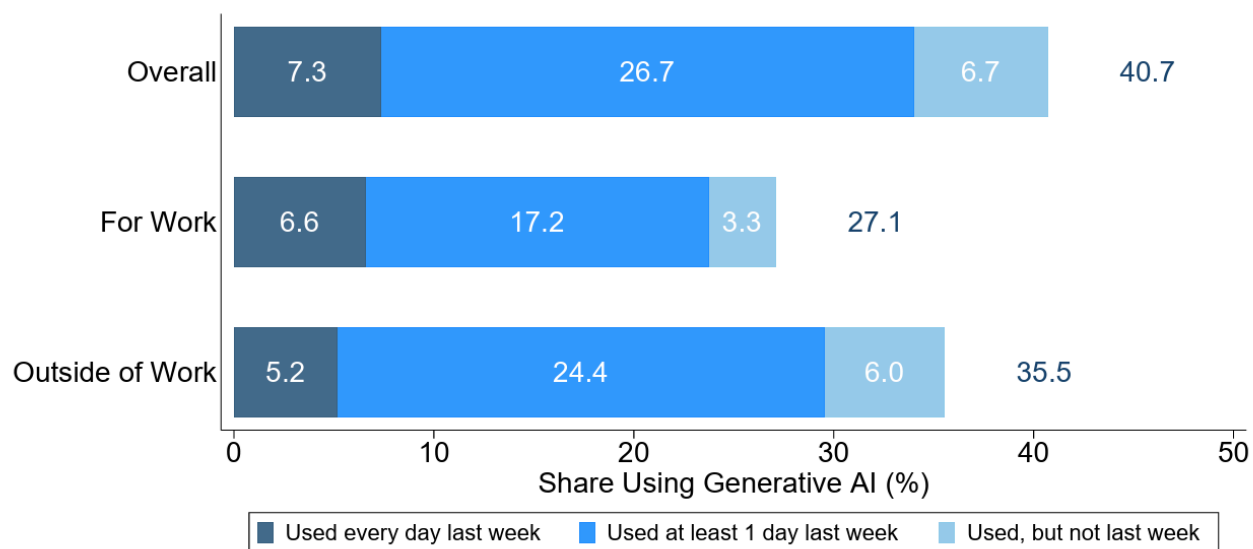**Information industry as share of GDP, %**

ChatGPT: two months to reach 100 million users

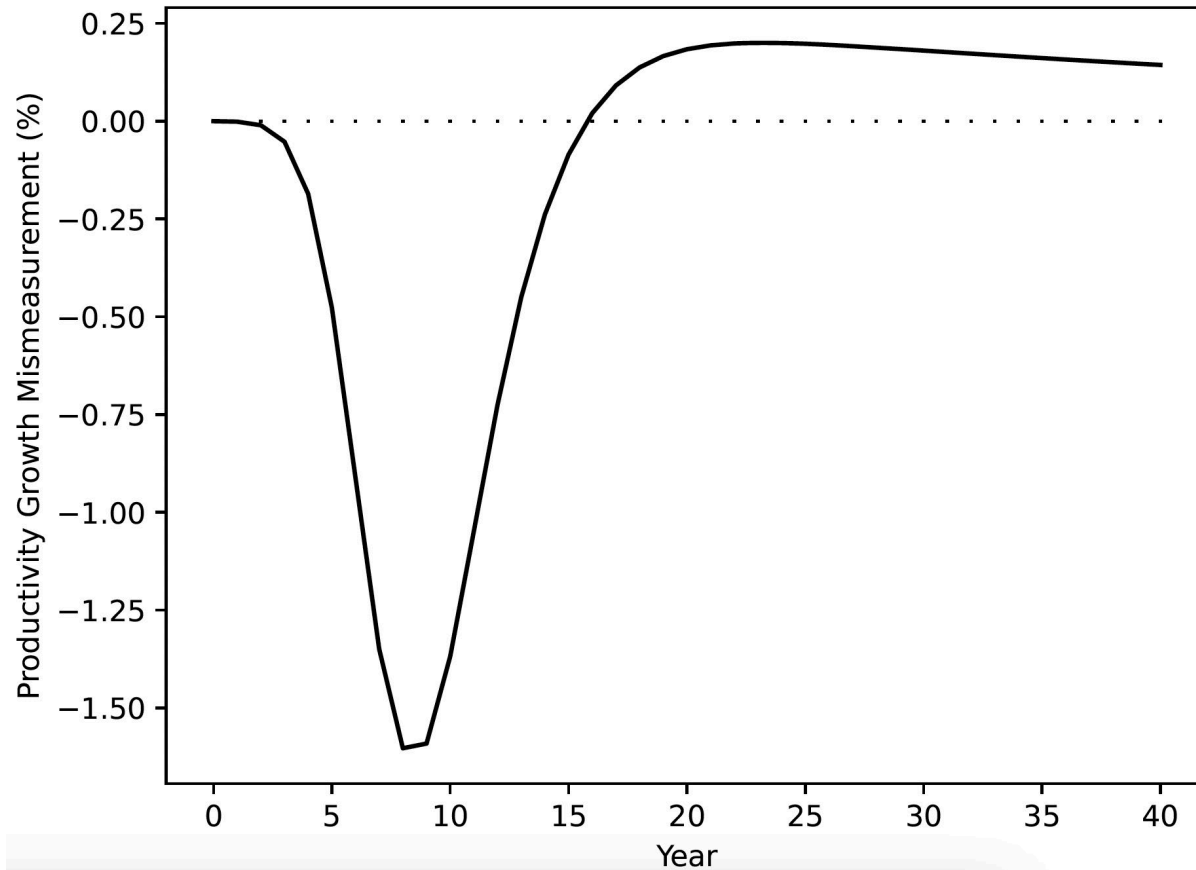# of days to 1M and 100M users by technology

Today: used weekly by 10% of the world's population! (750 million users)
- Chatterji et al. (2025)

Rapid Adoption of gen AI (Bick, Blandin and Deming (2025))

40% of US adult population regularly uses gen AI

Productivity impact

Rock, Brynjolfsson and Syverson (2021)

- Productivity benefits yet to be seen
- Projections for future:
  - Acemoglu: no more than a 0.71% increase in total factor productivity over 10 years (0.07 pp annually)
  - Tyler Cowen: 0.5 pp annually
  - Goldman Sachs: 1½pp annually

Productivity vs. benefits/ welfare

- How do we reconcile the massive quick adoption with modest predictions about impacts on productivity?
- Productivity/ GDP etc. measure production and are not meant to measure welfare
  - They may be correlated often but the association breaks down with digital goods (zero marginal cost, often available for *free* to consumers)
- We need to directly measure consumer welfare if we want to better understand how people are actually doing
- For technological innovations, majority of welfare gains seem to go to consumers
  - In the 20th century: 97% to consumers, 3% to firms (Nordhaus 2004)

Especially important for chatGPT
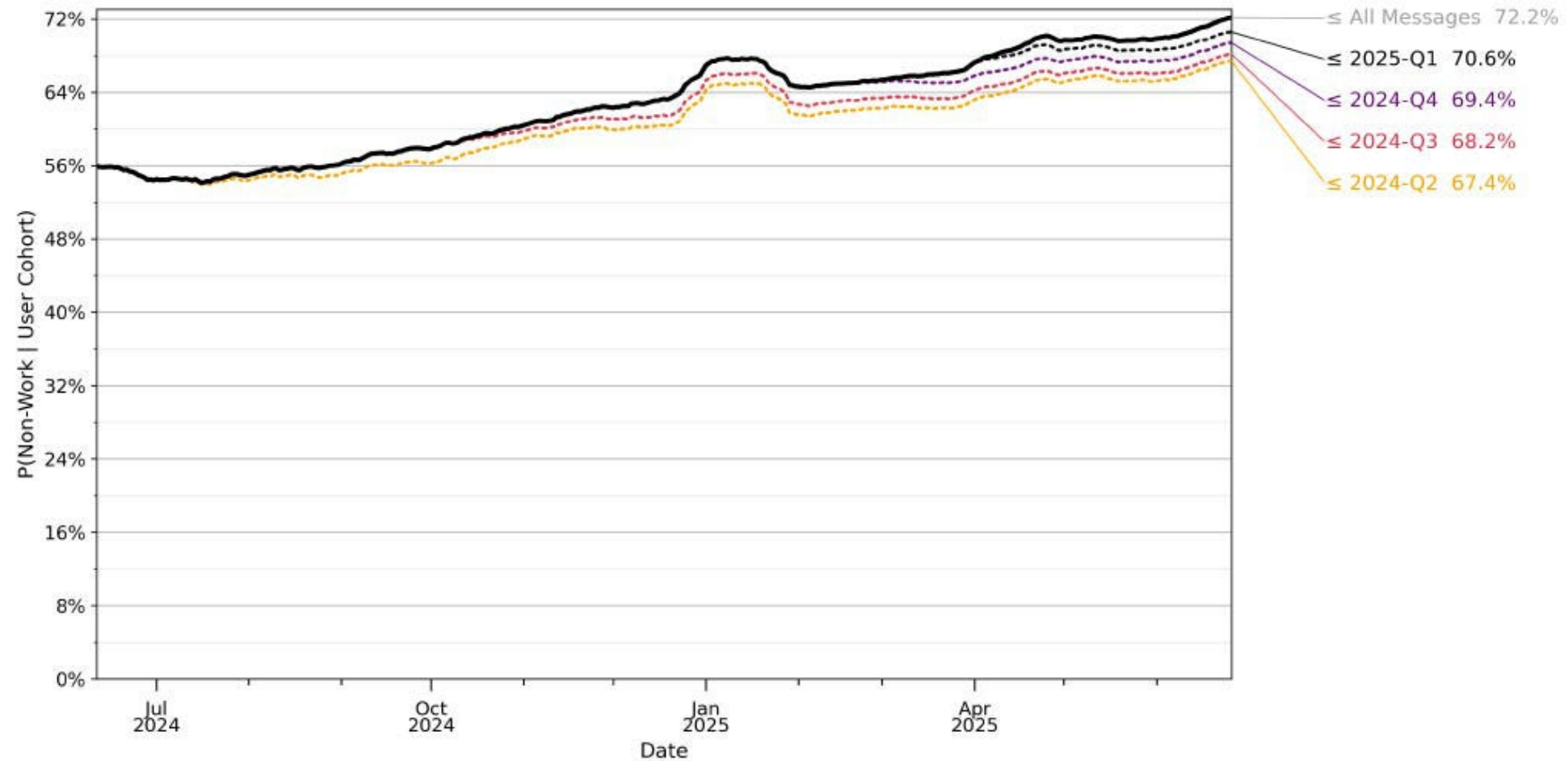
Ref: Chatterjee et al. (2025)

Our Approach

- Estimate consumer welfare directly using large scale online choice experiments instead of inferring it from measures of production
  - With incentive compatibility
    - Incentive-compatible design mitigates concerns of hypothetical bias

PNAS

Single Binary Discrete Choice (SBDC) Experiments

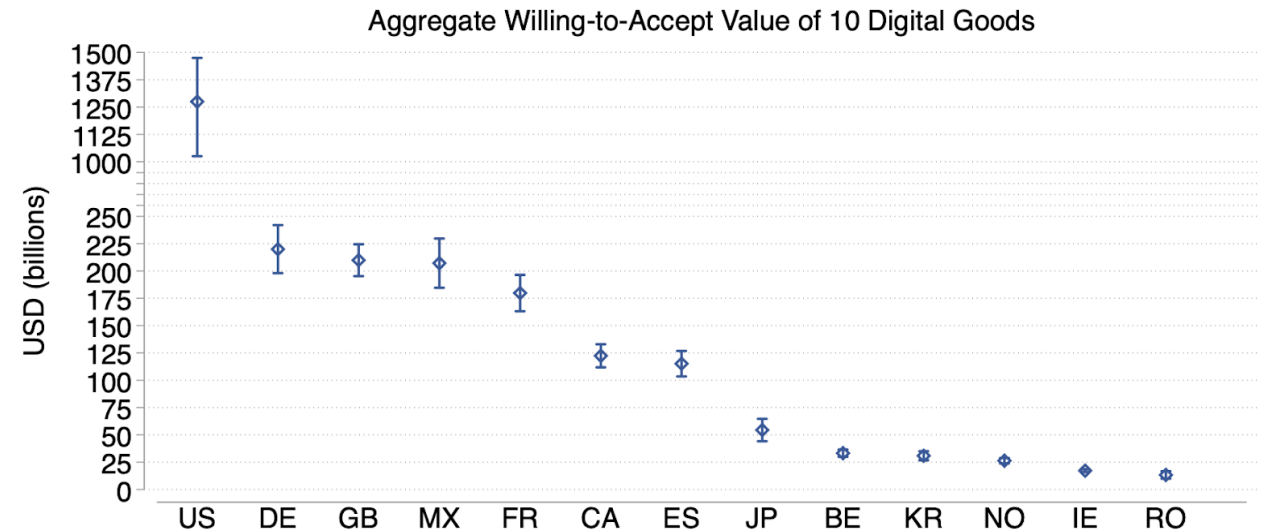Ask consumers to make a single choice among two options:

❑ Keeping the good

❑ Give up the good and receive $W in return

- Prices $W randomized across consumers
  - Aggregation of data leads to demand curves
- Can be done with an incentive compatible design
  - Important to avoid hypothetical bias
    - For FB, incentive compatible valuations are 3.5X hypothetical valuations

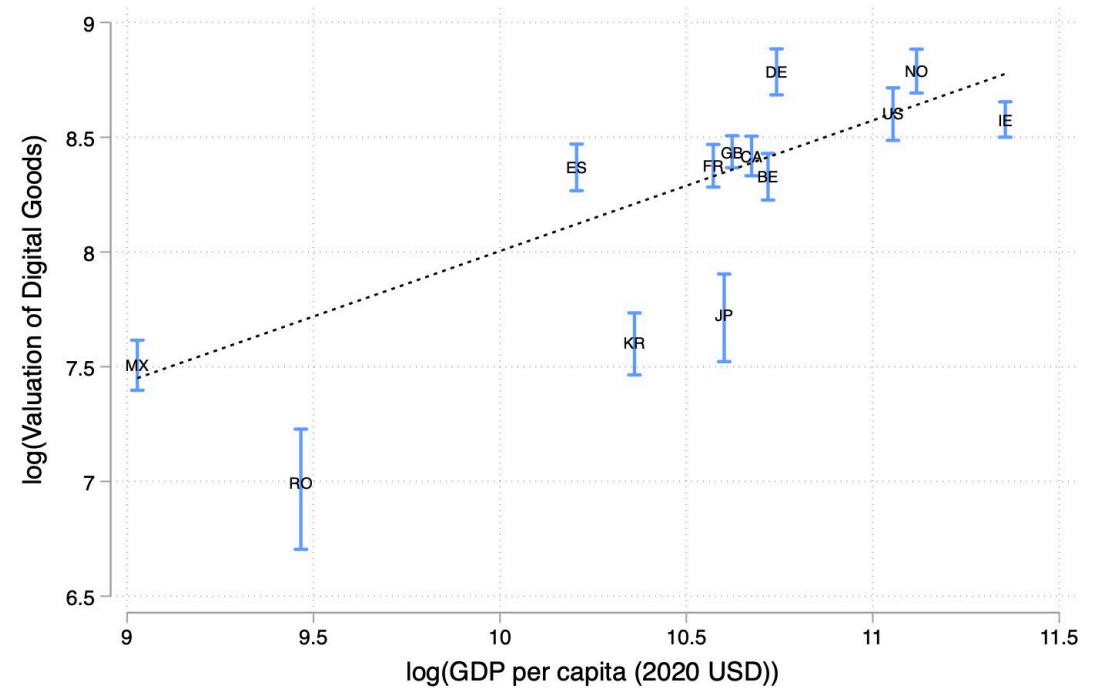# Welfare gains from digital goods across countries

These 10 digital goods generate a total of $2.5 trillion in welfare across these countries

- Ranging from $13 billion in Romania to $1.29 trillion in US

Aggregate Willing-to-Accept Value of 10 Digital Goods

Ref: The digital welfare of nations: New measures of welfare gains and inequality, working paper (2025)

Welfare gains as a % of GDP

Annual Aggregate Value of 10 Digital Goods as Percent of GDP/capita
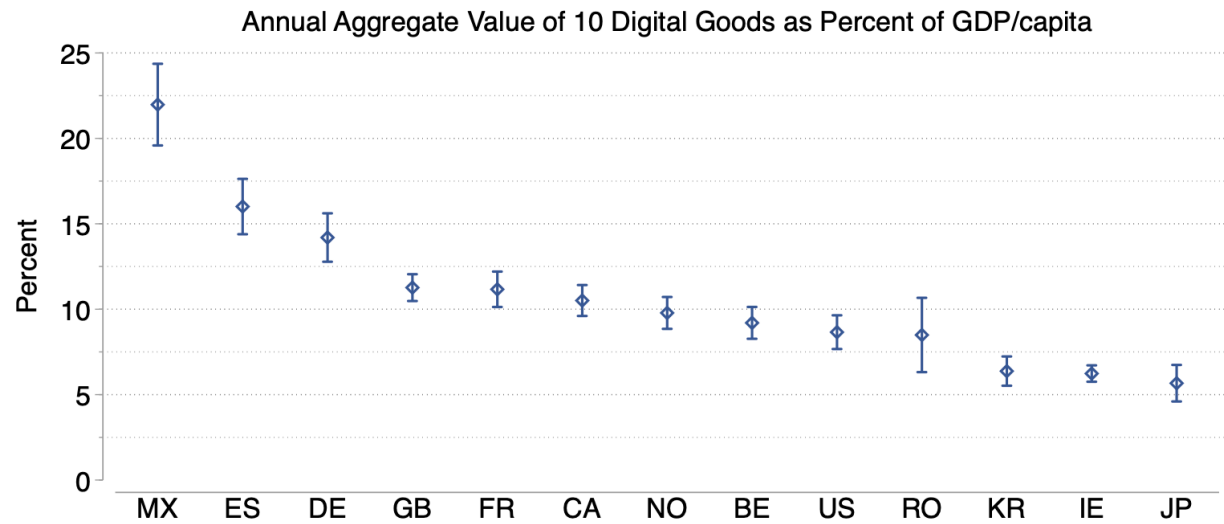
Takeaway: Digitization reduces welfare inequality across countries.

A 1% increase in a country's GDP per capita is associated with a 0.68% increase in users' valuation of the 10 digital goods relative to GDP per capita. (β = 0.68, p-value = 0.002).

Accounting for the <u>benefits</u> from digitization

- We introduce a new metric, we call "**GDP-B**" (B=benefits) to account for the benefits of *free* goods and *new* goods

GDP-B: Accounting for the Value of New and Free Goods

Accounting for the <u>benefits</u> from digitization

- Between 2004-17, including the gains from Facebook alone adds 0.05 to 0.11 percentage points to GDP-B growth per year in the US

- Improvements in smartphones (e.g. Camera) adds 0.63 percentage points growth per year in the US

	Average per year
Users Service	10 million
WhatsApp	1.37
Facebook	0.18
Maps	0.11
Instagram	0.02
Snapchat	0.02
LinkedIn	0.01
Skype	0.00
Twitter	0.00

GDP-B growth for Netherlands
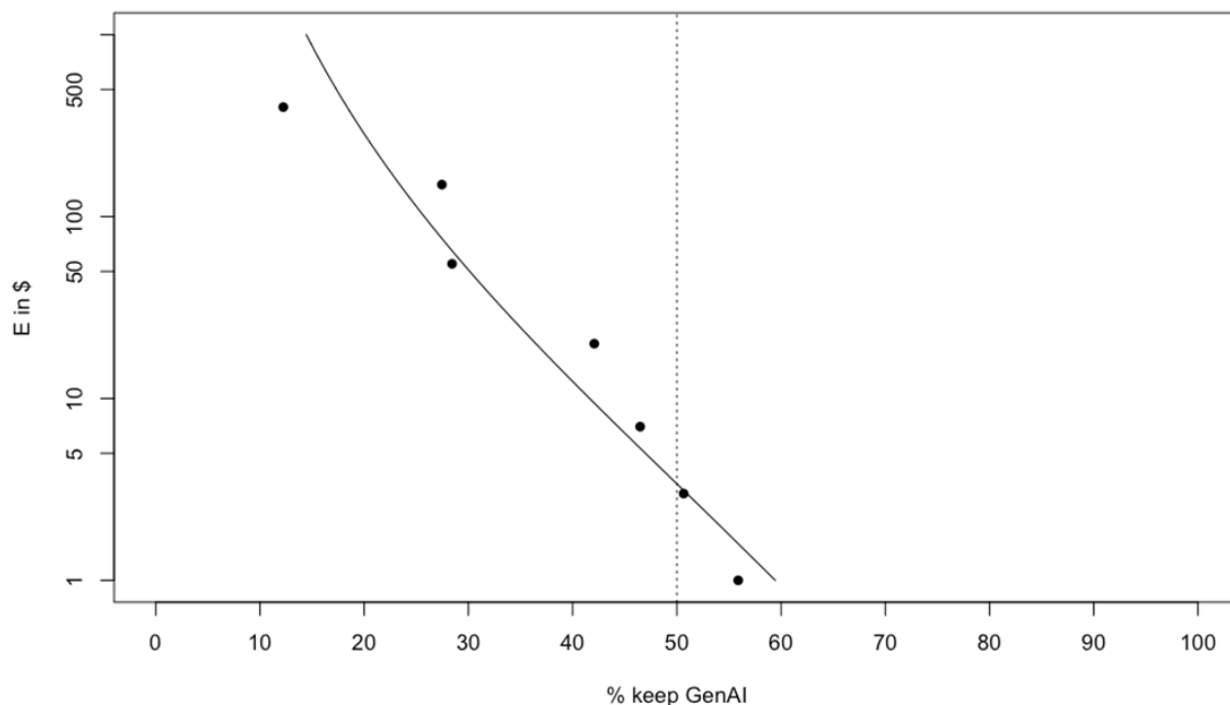
How much are people already benefiting from GenAI?

- What is the willingness to accept (WTA) to give up all genAI tools (ChatGPT, Gemini, Claude etc.) for 1 month?

- Survey users of GenAI tools end of 2024
  - N = 2,000, representative of the US internet population (age, gender, education, region)

GenAI Usage

ChatGPT	84.5%
Gemini	51.1%
Copilot	31.1%
Grok	19.6%
Claude	12.5%
Perplexity	8.5%
Midjourney	5.8%

How much are people already benefiting from GenAI?

- Among adopters (40% of the population), average valuation = $98/month
  - This is the extra value they get on top of what they pay (0 if free version, $$ for paid versions)

Demand curve for genAI tools for adopters

Prefer to keep GenAI:

$1	55.9%
$3	50.6%
$7	46.5%
$20	42.1%
$55	28.4%
$150	27.5%
$400	12.2%

How much are people already benefitting from GenAI?

- Total consumer welfare created by GenAI tools in 2024 in the US:

    82.3 M US AI users * $98/ month * 12 = **$97 billion/ yr**

- OpenAI US revenue in 2024 ~ $1 billion
    - Other tools: Gemini, Claude, Meta etc., total US revenue in 2024 ~ **$7 billion**

- **~93%** of welfare gains from gen AI went to consumers in 2024

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AI's Overlooked $97 Billion Contribution to the Economy

The AI 'dividend' may not be evident yet in estimates of gross domestic product but it's making life better and more productive.

By Avinash Collis and Erik Brynjolfsson
Aug. 3, 2025 at 3:54 pm ET

Summary

1. GDP, developed in 1930s, remains the de facto metric of economic growth and widely used as a proxy for economic well-being.

2. Conceptually, consumer surplus is a better metric of economic well-being.

3. Online choice experiments have the potential to reinvent and significantly supplement the measurement of economic welfare.

4. Digital goods generate significant amounts of consumer welfare and reduce welfare inequality within and across countries.

We need a dashboard of metrics instead of 1 single number

How should we measure the digital economy? *Harvard Business Review,* Nov-Dec 2019
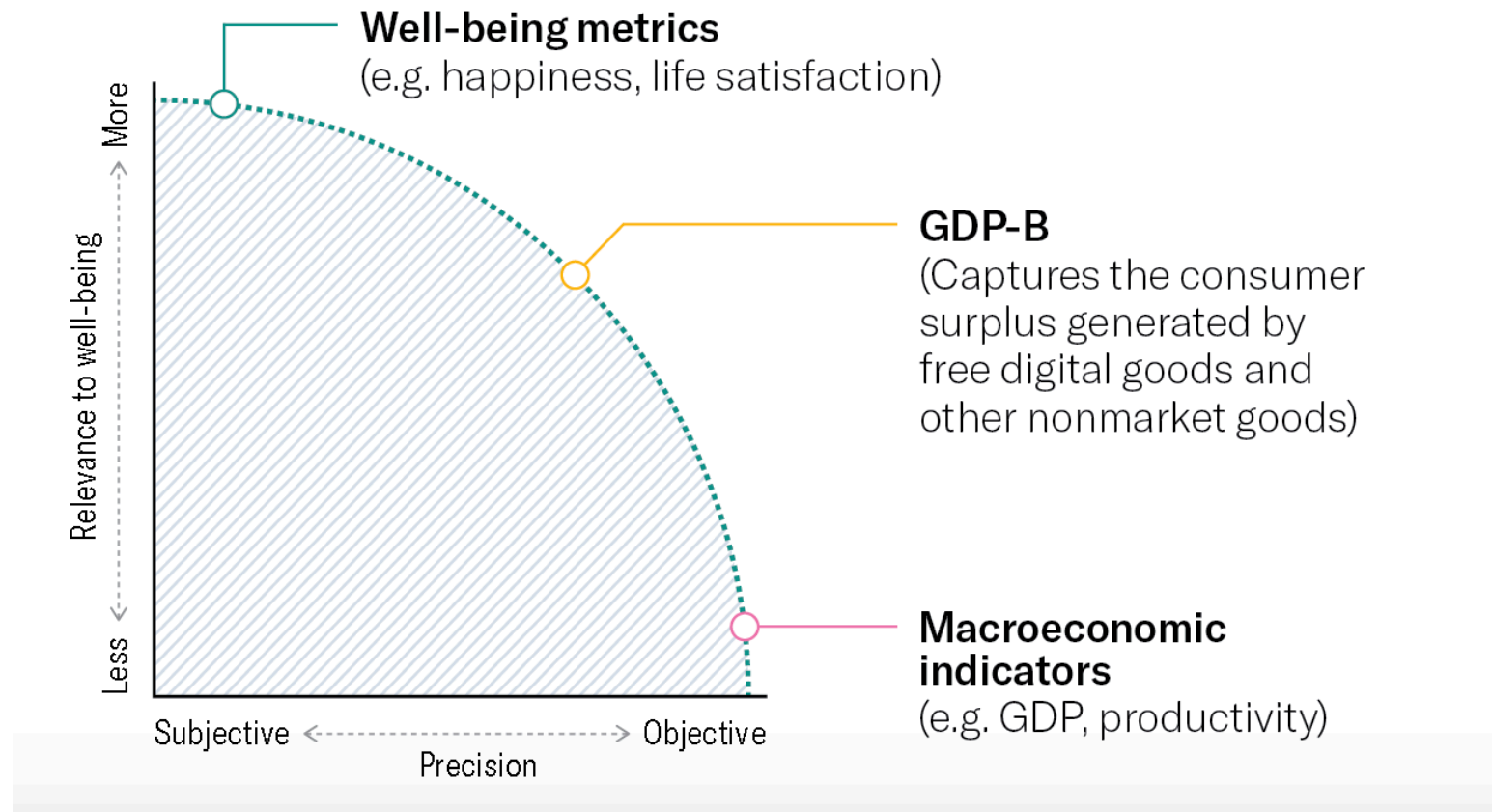
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The Digital Welfare of Nations: New Measures of Welfare Gains and Inequality

Using massive online choice experiments to measure changes in well-being

How Should We Measure the Digital Economy?
by Erik Brynjolfsson and Avinash Collis

GDP-B: Accounting for the Value of New and Free Goods