Discussion of IMF SDN on "Digitalization during the Covid-19 Crisis" by Jaumotte et al.

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Main Take-Away: COVID-19 and Digitalization

COVID-19 acted as a catalyst for the adoption of digital technologies
→ what can we learn from the "natural experiment"

- The SDN carefully documents effects on digitalization
  - reduced gap between more- and less-digitalized advanced countries
- considers resulting productivity effects
- identifies structural effects on the labor market:
  - no permanent shift in labor demand
  - some indications of permanent supply effects:
    work-from-home ↑, male labor market participation ↓

Framing: Digitalization as a "Silver Lining"

Increased digitalization = "silver lining" of COVID-19

Authors' Hypothesis: this is desirable because of positive efficiency & distributive effects

Question: how do we square this with the invisible hand?

In other words, why did businesses need a pandemic to do what's good for them?

→ Argument relies on uninternalized externalities or internalities
→ Identifying these is helpful for industrial policy more generally

Focus on Productivity

$$Productivity = \frac{Output}{Factor\ Inputs}$$

- During COVID pandemic, lots of effects on both numerator and denominator, e.g., labor hoarding, stark demand fluctuations, etc.
- Productivity measures most useful when markets are in equilibrium, esp. as an indicator for long-run productive potential
- We are yet to see the long-run productivity effects of COVID

The Road Ahead

Concern of the 2000s/2010s – the beginning of the "Digital Age:"

- workers who are non-digitized, lesser-educated may be left behind by technological advances

→ the opposite happened during the recovery from COVID

New Concern of 2023 – the "Age of Generative AI:"
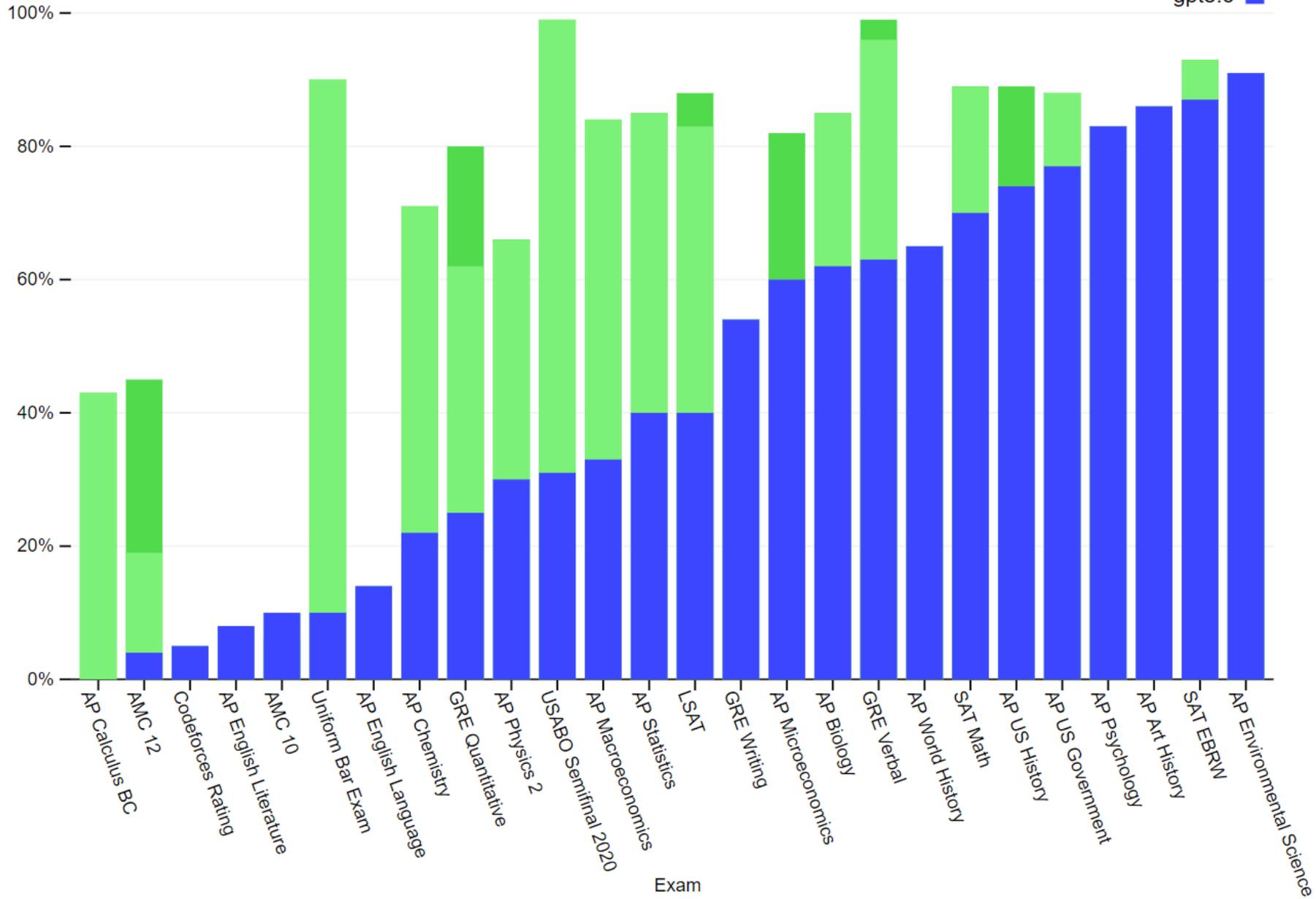
- cognitive workers suddenly seem at greatest risk of automation

→ "ChatGPT is taking my job"

Exam results (ordered by GPT-3.5 performance)

Estimated percentile lower bound (among test takers)

Legend:
- gpt-4
- gpt-4 (no vision)
- gpt3.5

Exams (x-axis): AP Calculus BC, AMC 12, Codeforces Rating, AP English Literature, AMC 10, Uniform Bar Exam, AP English Language, AP Chemistry, GRE Quantitative, AP Physics 2, USABO Semifinal 2020, AP Macroeconomics, AP Statistics, LSAT, GRE Writing, AP Microeconomics, AP Biology, GRE Verbal, AP World History, SAT Math, AP US History, AP US Government, AP Psychology, AP Art History, SAT EBRW, AP Environmental Science

Digitalization as a Steppingstone for Automation

Digitalization as a Steppingstone:

traditional job → work-at-home job → automated job

once a job has become "virtual," cognitive automation may be easier to accomplish going forward

Generative AI Capabilities for Cognitive Workers

1. Ideation

2. Writing

3. Background research

4. Coding

5. Data analysis

6. Math

→ see my NBER Paper #30957 on "Language Models and Cognitive Automation for Economic Research"

Category	Task	Usefulness
Ideation	Brainstorming	3
	Evaluating ideas	2
	Providing counterarguments	3
Writing	Synthesizing text	3
	Editing text	3
	Evaluating text	3
	Generating catchy titles & headlines	3
	Generating tweets to promote a paper	3
Background Research	Summarizing Text	3
	Literature Research	1
	Formatting References	3
	Translating Text	3
	Explaining Concepts	2

| Category	Task	Usefulness
Coding	Writing code	2
	Explaining code	2
	Translating code	3
	Debugging code	2
Data Analysis	Extracting data from text	3
	Reformatting data	3
	Classifying and scoring text	2
	Extracting sentiment	2
	Simulating human subjects	2
Math	Setting up models	2
	Deriving equations	1
	Explaining models	1

Useful Capabilities for Cognitive Workers

1. Ideation
2. Writing
3. Background research
4. Coding
5. Data analysis
6. Math

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Training compute (FLOPs) of milestone Machine Learning systems over time
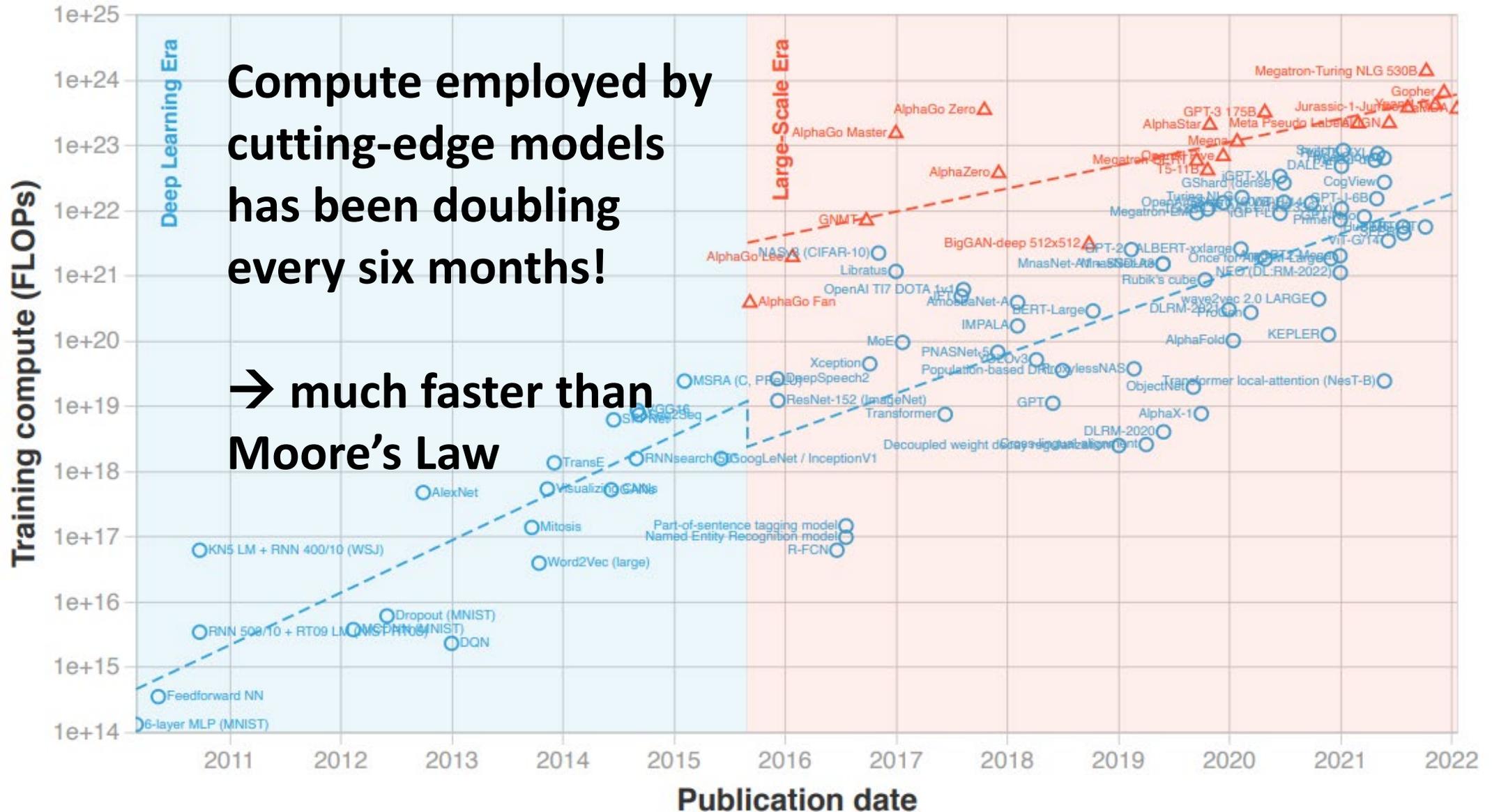
Compute employed by cutting-edge models has been doubling every six months!

→ much faster than Moore's Law