poid Programme on Innovation and Diffusion

AI, Productivity and Labour Markets

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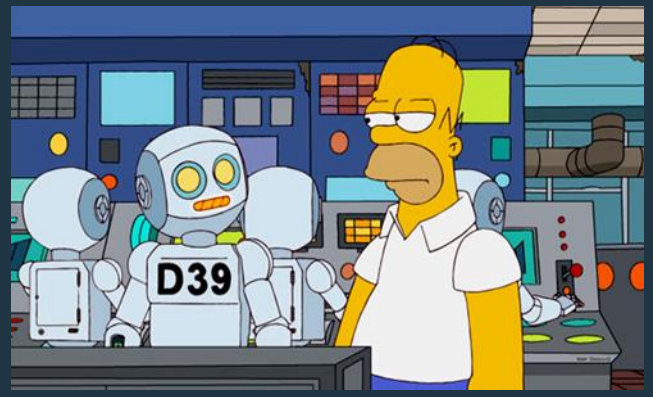
Clark Centre, October 2023



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AI Background

- AI-powered technologies perform a range of tasks: retrieving information, coordinating logistics, providing financial services, translating complex documents, writing business reports, preparing legal briefs, diagnosing diseases, etc.

- Generative AI (or “foundation models”) a form of deep learning (multi-layered in neural networks). Processes huge volume of unstructured data trained on open web

- **ChatGPT** took 60 days to reach its 100 millionth user; TikTok about 9 months & Instagram 2 years to reach the same milestone.

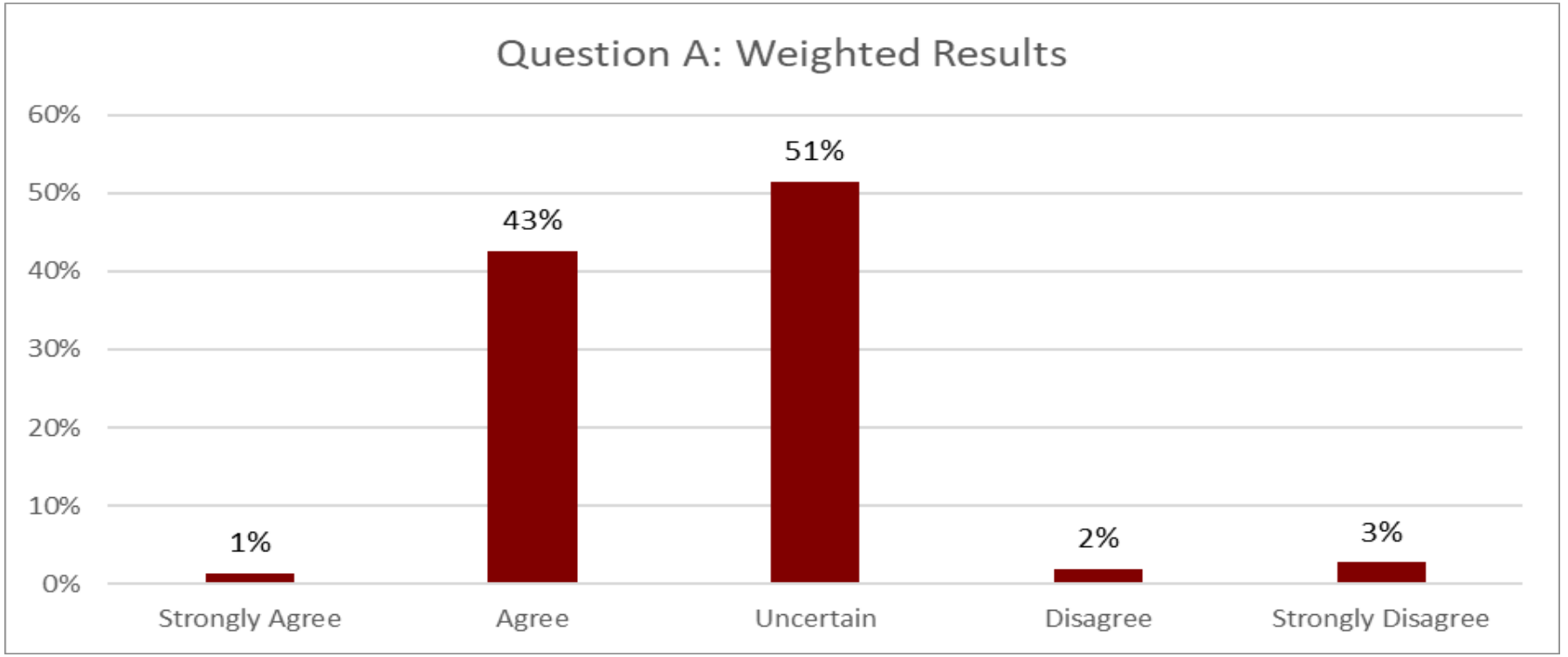
- Excitement about AI impact on productivity growth, but fears of impact on workers (and other existential risks….)

Productivity Growth: Potential Impact of AI

- McKinsey (2023) predictions
  - AI increases labour productivity growth by an extra 0.1pp to 0.6 pp per year through 2040
- Goldman Sachs (2023) baseline predictions
  - 1.5 pp per year over next decade
- “Singularity” – AI moves to AGI: no need for human work

AI and Productivity Growth: Combined Results

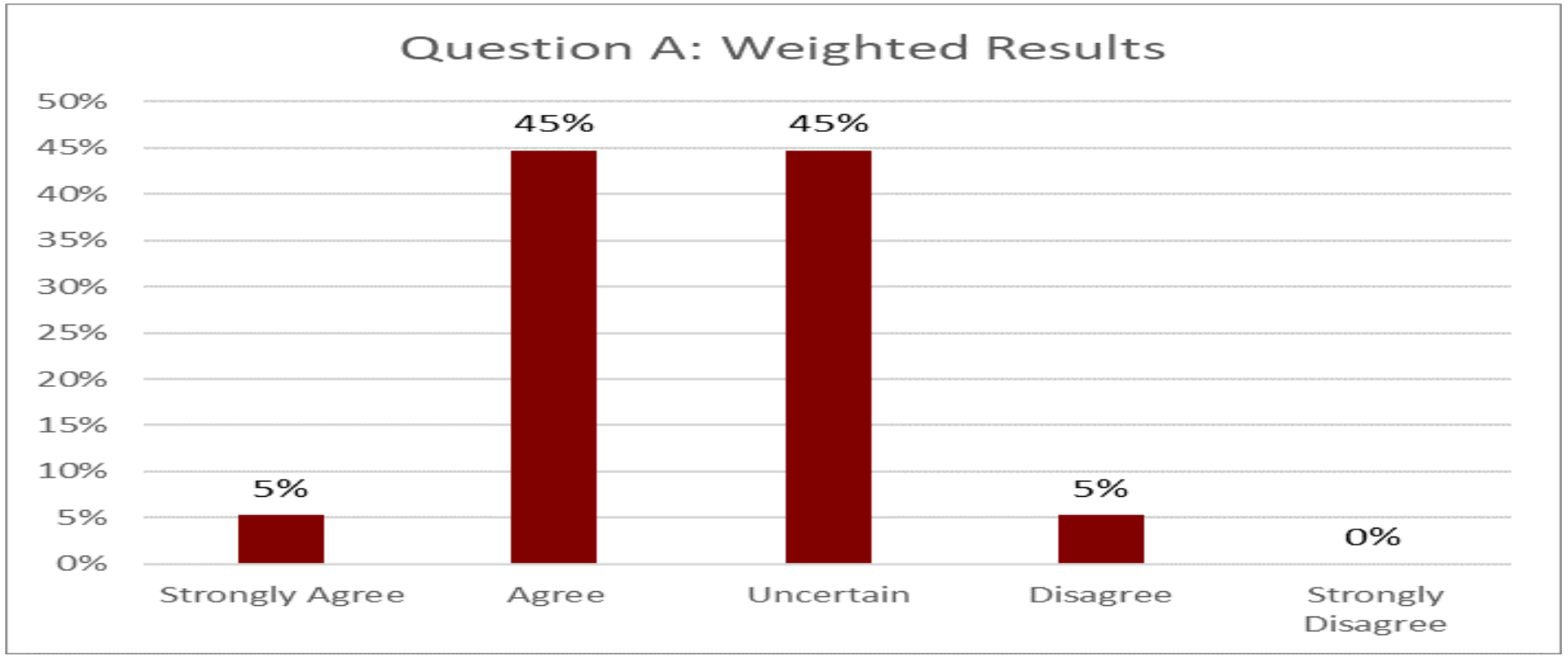
Use of artificial intelligence over the next ten years will lead to a substantial increase in the growth rates of real per capita income in the US and Western Europe over the subsequent two decades.



https://www.kentclarkcenter.org/surveys/ai-and-productivity-growth/
https://www.kentclarkcenter.org/surveys/ai-and-productivity-growth-2/
April 27 2023

AI and the Labour Market: Combined Results

Use of artificial intelligence over the next ten years will have a negative impact on the earnings potential of substantial numbers of high-skilled workers in advanced countries.



https://www.kentclarkcenter.org/surveys/ai-and-the-labor-market/
https://www.kentclarkcenter.org/surveys/ai-and-the-labor-market-2/
September 21, 2023

OUTLINE OF TALK

AI and Productivity

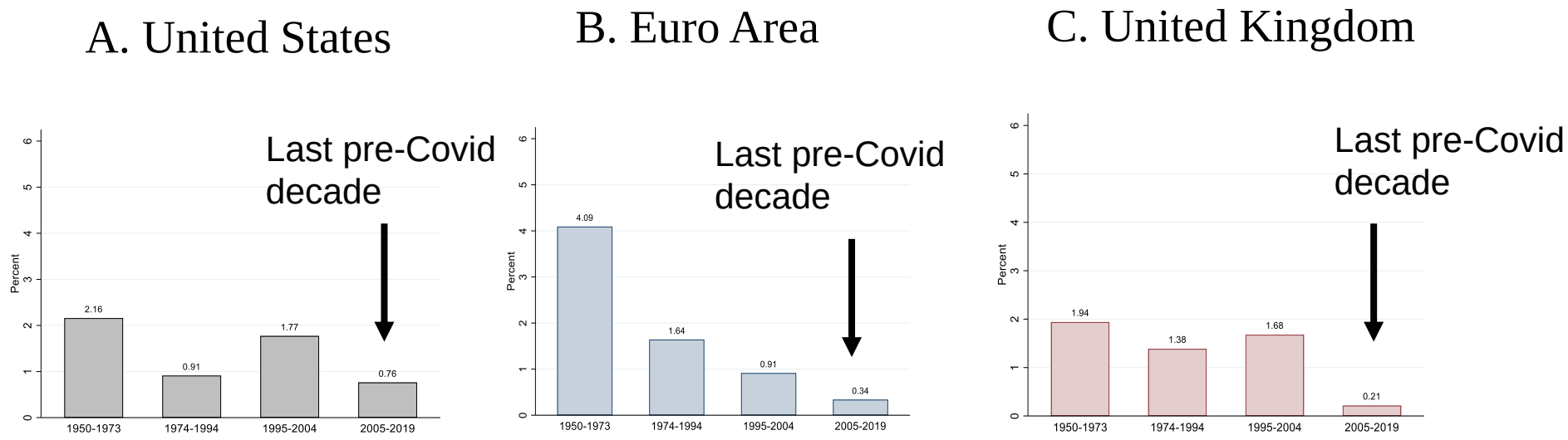
AI and Labor Markets

AI and Productivity: Lessons from past

- Waves of technology always accompanied by huge hype (“New Economy” of Internet bubble; “White Heat of the Technological Revolution”)
  - But often disappointing when we look at productivity & wage growth

- Measured productivity growth has slowed, not accelerated, over last 15 years

Productivity Slowdown since Global Financial Crisis

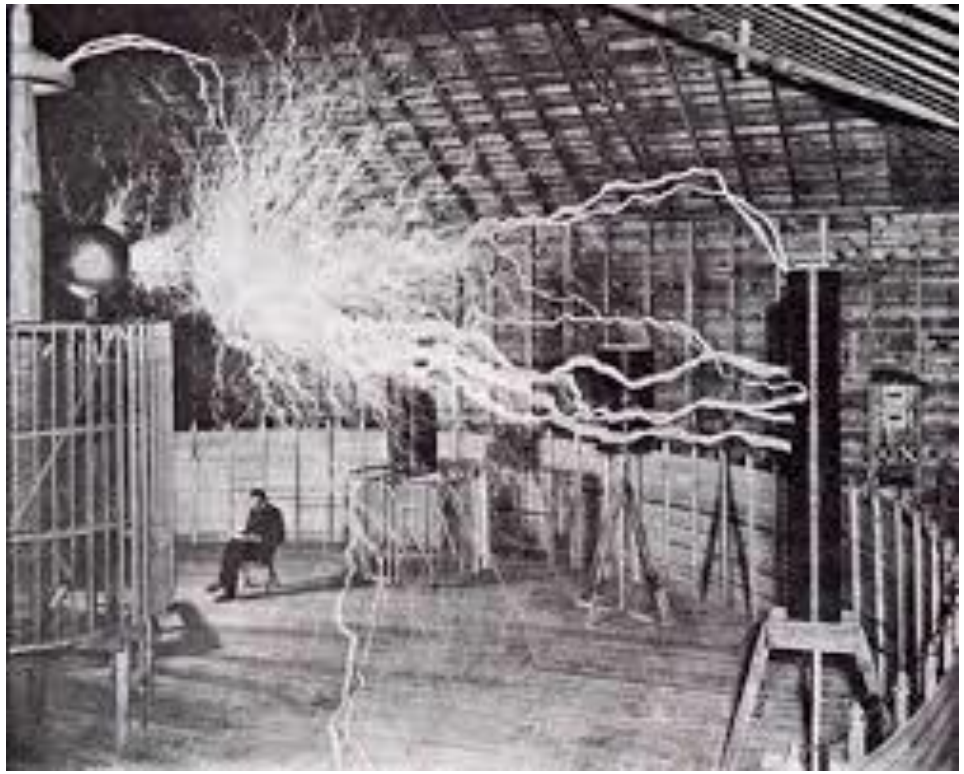


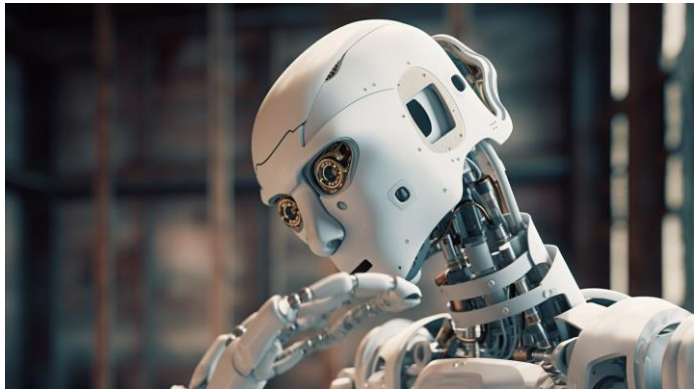
Source: Data updated from Bergeaud, Cette, and Lecat (2016). Data available at: http://www.longtermproductivity.com/

Notes: Shown is the average annual TFP growth in the US (panel A), Euro-area (panel B), and UK (panel C). Insufficient data for whole EU, so we use Euro-area, represented by Germany, France, Italy, Spain, Netherlands, and Finland.

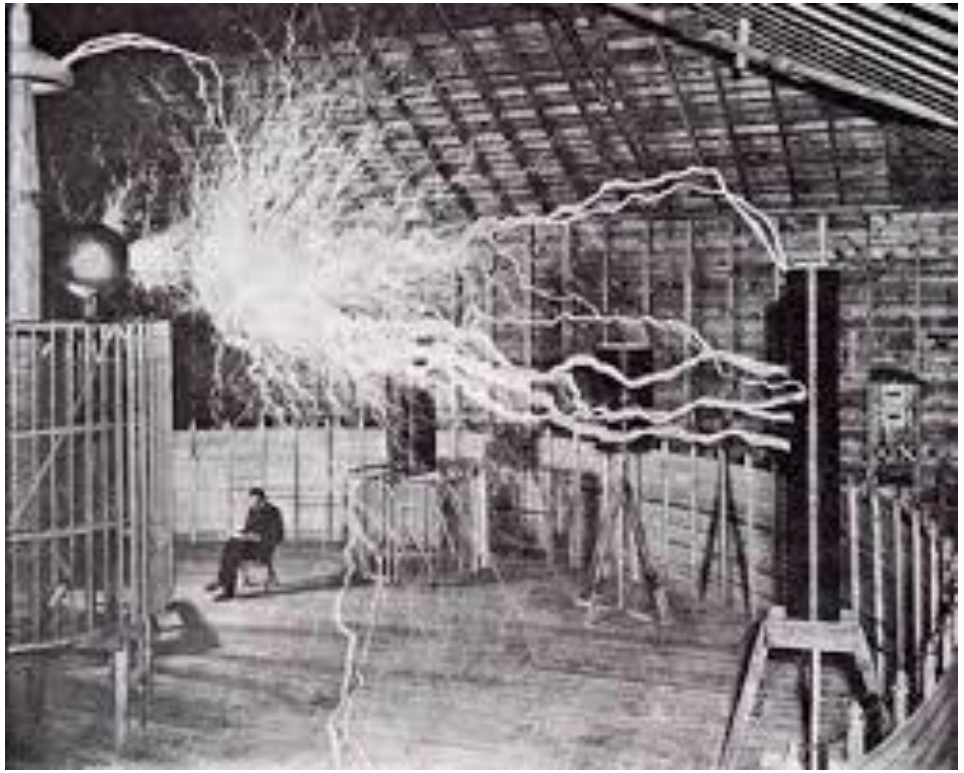
Lessons from past

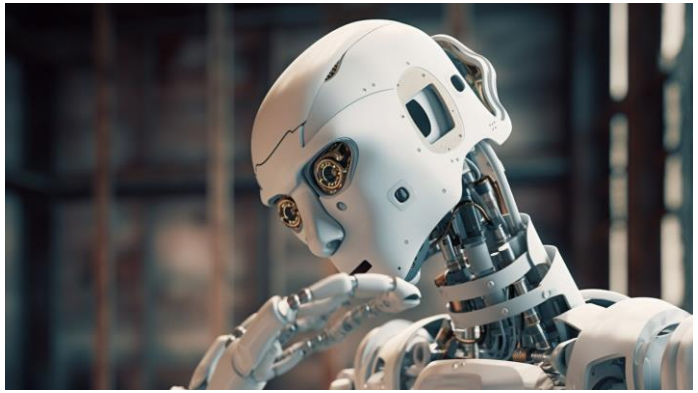
- Examples of earlier GPTs: Electricity and Computers
  - Took decades for these to show up in the productivity numbers
  - **Learning** how to effectively new technology takes time
  - Productivity growth drives income growth. But division of this surplus depends on institutions and policies





Technology, management & complementarities





- Can also work poorly
- AI has improved aspects of healthcare (radiography), but not always….

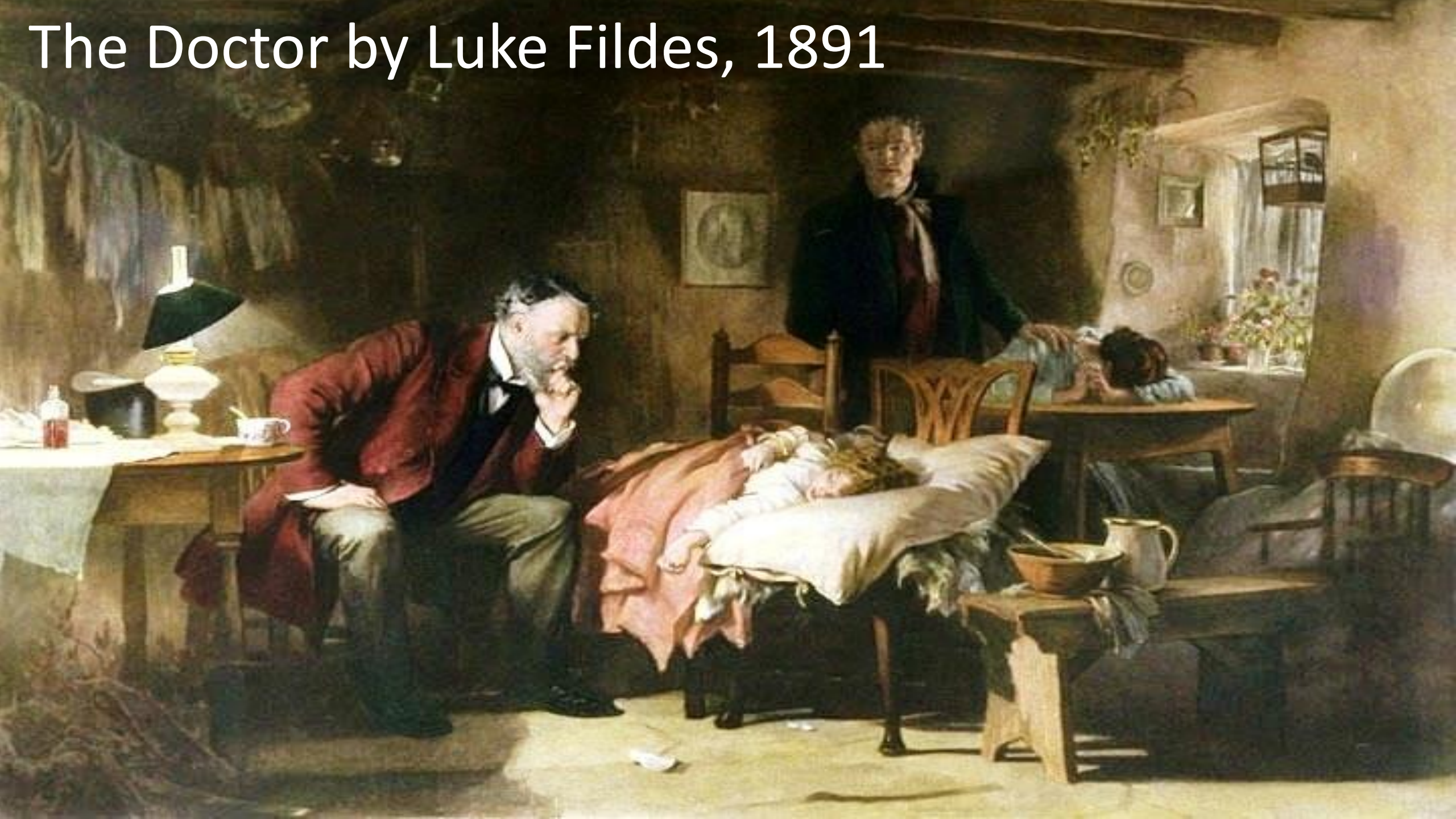
Lessons from past

- Key aspect of learning:
  - The impact of GPTs depend not just on adopting tech, but also on the organizational/managerial changes needed to make best use of the tech
  - **Examples:** electricity and 24/7 “Fordist” factory production line; digitization and decentralizing decisions

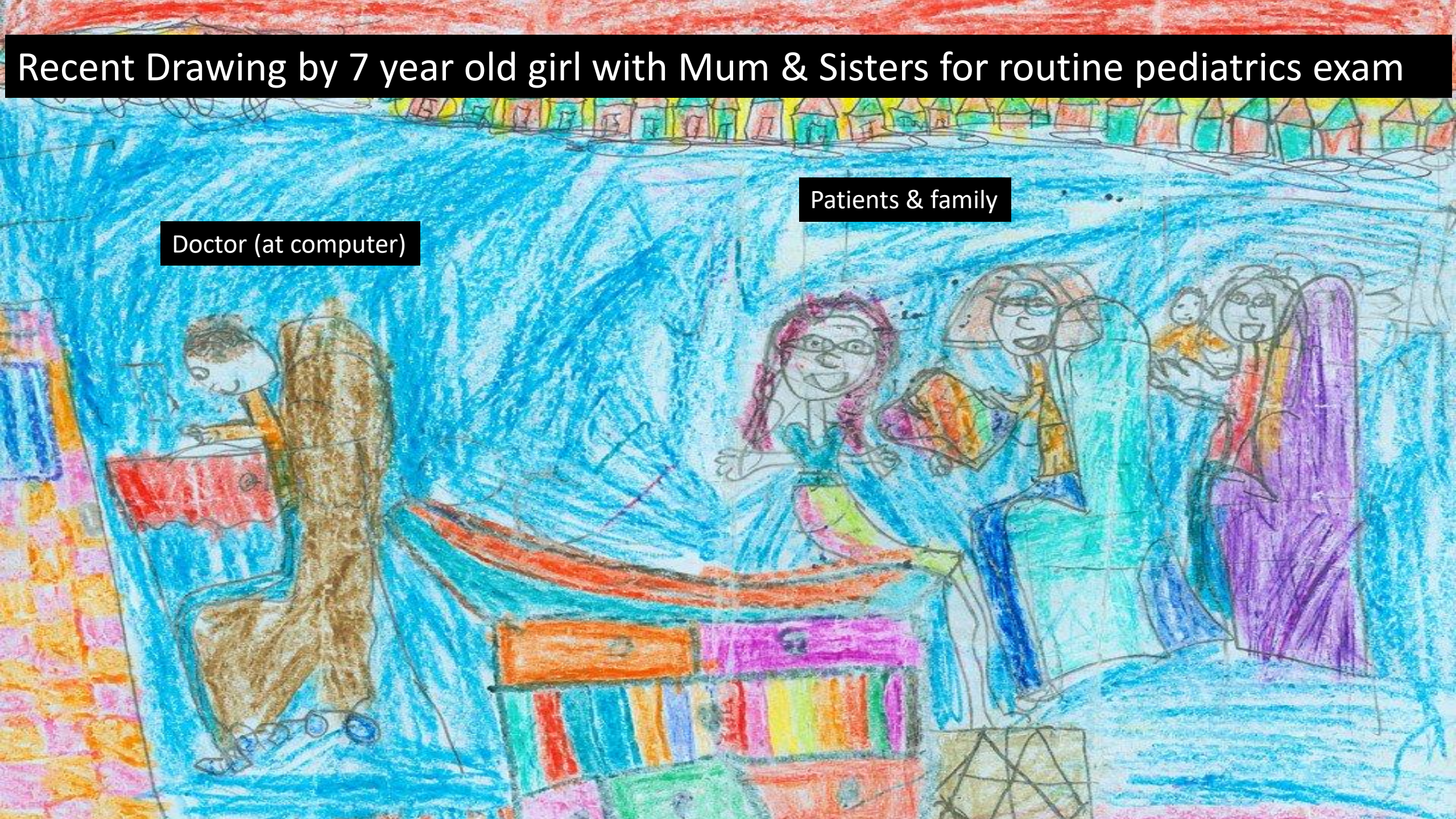
- Is AI different?
  - Digital makes diffusion easy – lower frictions (e.g. ChatGPT)
  - But business dynamism has been slowing since ~2000

- Example of healthcare of “Digital Doctor”

The Doctor by Luke Fildes, 1891



Recent Drawing by 7 year old girl with Mum & Sisters for routine pediatrics exam



OUTLINE OF TALK

AI and Productivity

AI and Labor Markets

Labor Markets: Perennial fear of tech unemployment

AUTOMATION IN BRITAIN STIRS UNREST IN LABOR

Workers See 'Robot Revolution' Depriving Them of Jobs

THE NEW YORK TIMES, SUNDAY, FEBRUARY 26, 1928. XX 3

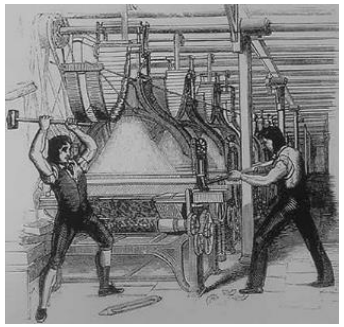
MARCH OF THE MACHINE MAKES IDLE HANDS

Prevalence of Unemployment With Greatly Increased Industrial Output Points to the Influence of Labor-Saving Devices as an Underlying Cause

By EVANS CLARK.

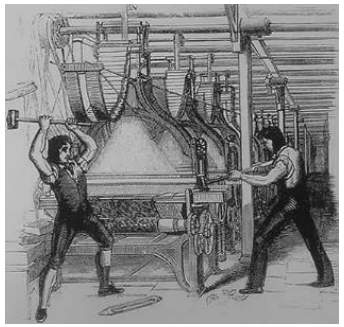
A FEW days ago the General Motors Corporation reported the largest peace-time earnings ever made by a single concern in the history of America. Three days later Governor Smith made public a report from the New York Industrial Commissioner which called public attention to serious unemployment throughout the State; not since the depression of 1921, it was disclosed, have conditions been as bad.

The people of the United States—in the shadow of a Presidential election—are presented with a social



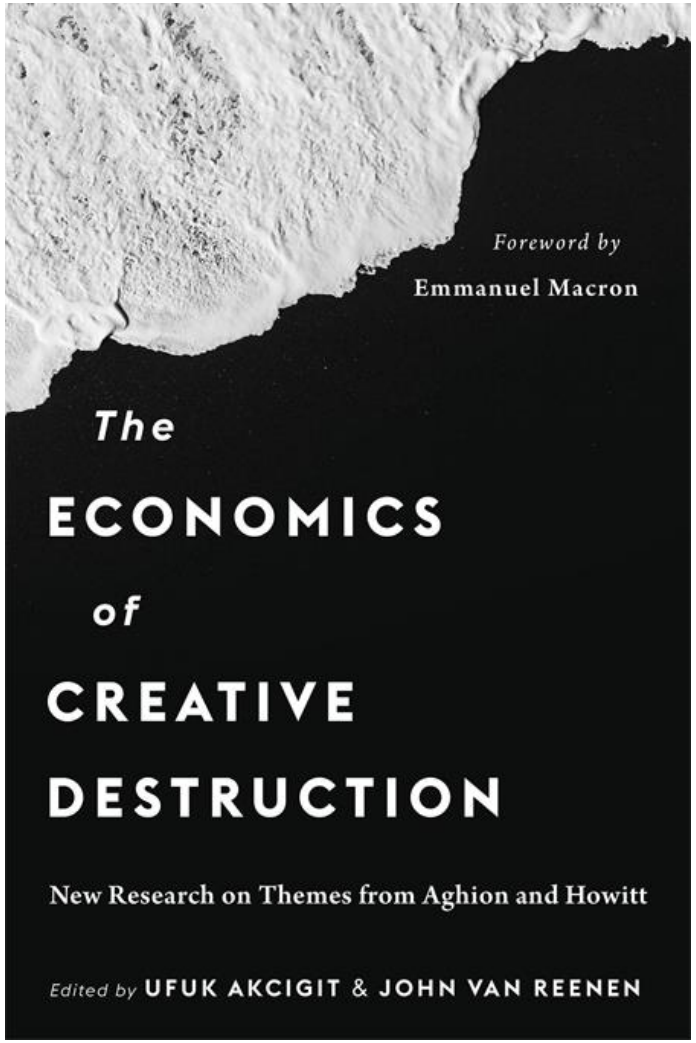
Labor Markets: Perennial fear of tech unemployment

- Over many centuries unemployment has been untrended. Historically low levels of unemployment today in many advanced countries



Labor Markets: Do not fear mass unemployment

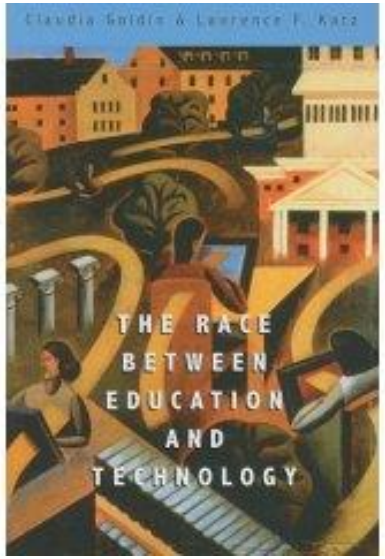
- Innovation = Creative destruction. Many jobs lost, but many new ones too



Labor Markets: It's Quality, not quantity of Jobs

- Last 100 years is a story of increasing demand for more skilled workers: supply up, skill premium stable or rising.
  - Technology (SBTC) the major part of this

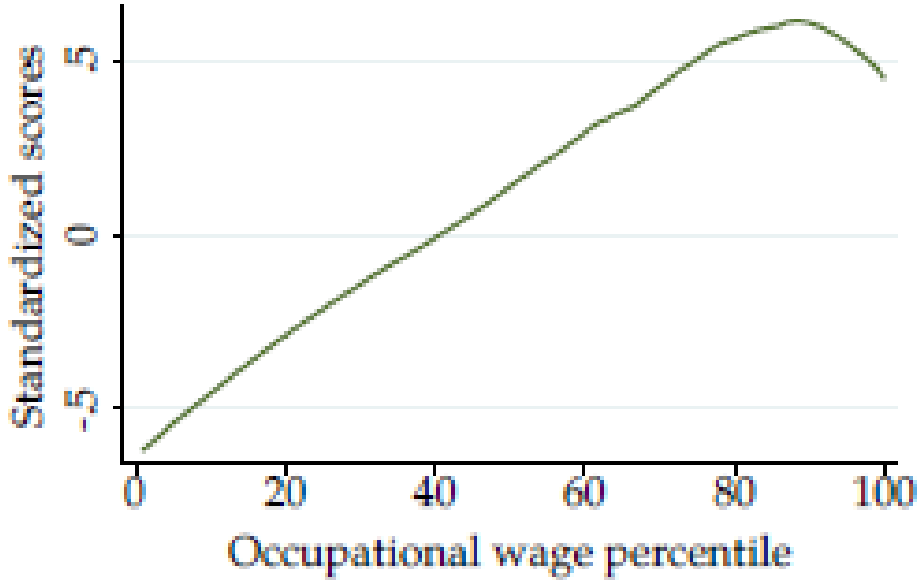
Jan Tinbergen



Is AI different?

- AI replaces tasks that are further up skill distribution compared to say robots (low skill) or software (middle skill).
- More downward pay pressure for occupations who had been protected

Impact of AI on occupations (ranked by wages)



(a) Smoothed scores by occupational wage percentile

Source: Webb (2020, Figure 7)

Summary

- A lot of concern with AI comes from it being “too successful”, but what if AI is much less successful than predicted – smaller effect on productivity & labor market in near term

- Is AI different?
  - Maybe – more features of cognitive human skill, rapid improvements. Could drive fast productivity and reduce graduate premium
  - But my best guess is impact will be more incremental

- Ultimate impact of AI (like other technologies) is not deterministic. Depends on:
  - Policies & institutions
  - Firm organization & management

Back Up

Productivity Growth: Potential Impact of AI

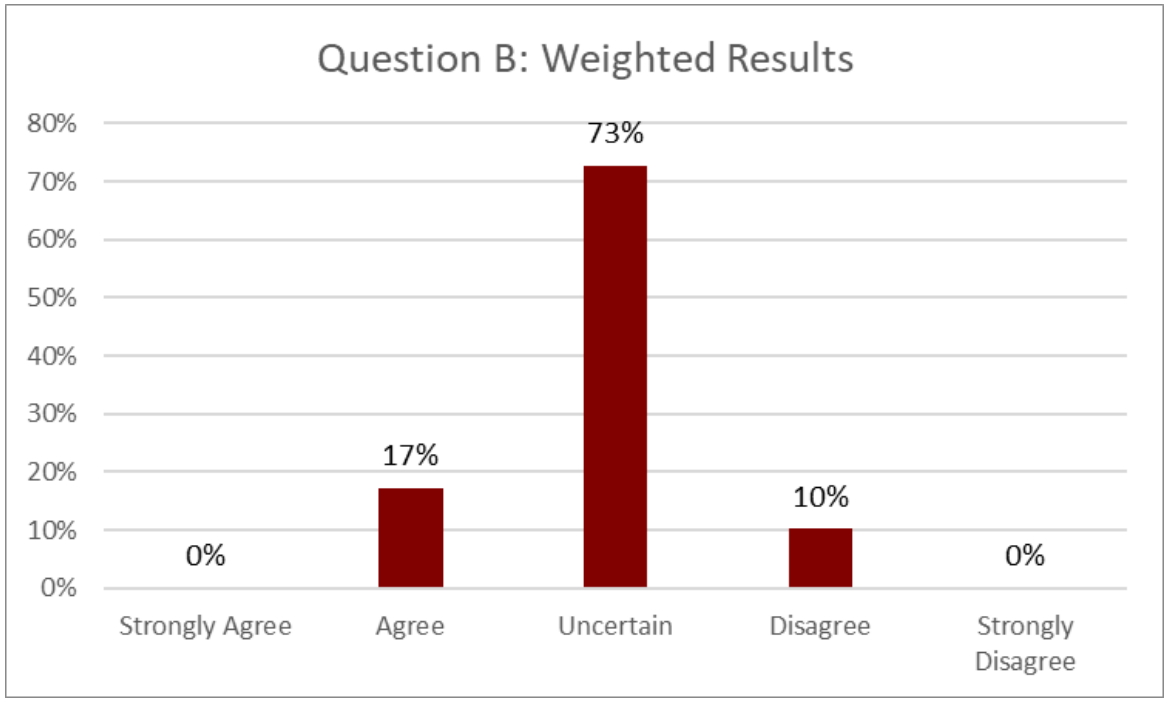
- McKinsey (2023) predictions
  - AI increases labour productivity growth by an extra 0.1pp to 0.6 pp through 2040

- Some major areas:
  - Sales & marketing (strategy/personalization, info/comparisons/try-ons, retention)
  - Software engineering (handling data, coding, testing, maintenance)
  - Customer operations (customer self-service, chatbots, AI assistants, summary of conversations)
  - Product R&D (research analysis, virtual design, simulation and testing)

- “Singularity” – AI moves to AGI: no need for human work

AI and Productivity Growth: Combined Results

Question B: Use of artificial intelligence over the next ten years will have a substantially bigger impact on the growth rates of real per capita income in the US and Western Europe over the subsequent two decades than the internet has had over the past two decades.



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AI and skills (Clark Survey)

“Use of artificial intelligence over the next ten years will have a negative impact on the earnings potential of substantial numbers of high-skilled workers in advanced countries.” (US/EU)

- Strongly Agree or Agree (32%/34%)
- Uncertain (39%/28%)
- Strongly Disagree or Disagree (7%/4%)
- Did not answer (22%/34%)

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