

What Impact Will Generative AI Have on Jobs (and Incomes)?

Over the next 20 years...



Two widely held views in the U.S. today

1. **Techno-optimism**: AI will result in productivity increases so large that no one needs to work again
 - Share gains through universal basic income, etc.
2. **Extreme techno-pessimism**: rapid automation will create mass unemployment, almost no one gets a job
 - Without boosting marginal productivity by much

Our baseline scenario, 10-20 years

- US productivity growth remains on trend
- Job market polarizes further, and income gaps widen
- Global inequality increases within and across countries

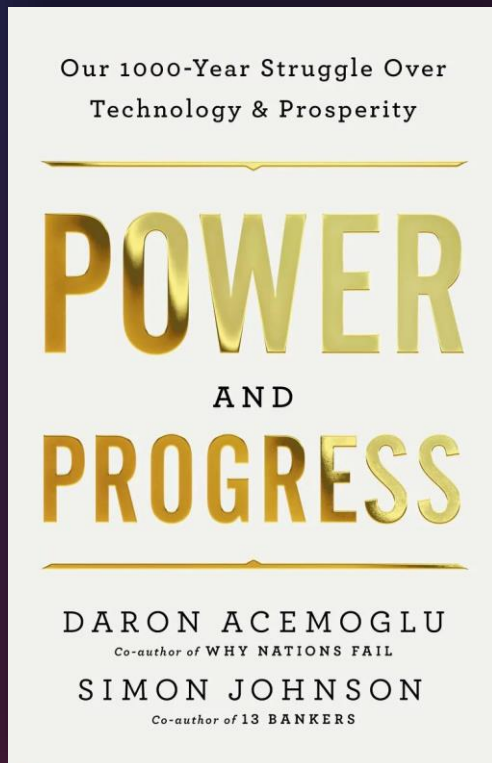
But it doesn't have to be this way

- AI today offers a major choice: pro-worker, or not
- Who decides which path to take and on what basis?



This image was generated using Midjourney AI

“We Will All be Gods” → Good Jobs for Whom?



Based on analysis and ideas from:

Power and Progress: Our Thousand-Year Struggle Over
Technology & Prosperity

By Daron Acemoglu & Simon Johnson

With support from the MIT Shaping the Future of Work Initiative, co-directed by Daron Acemoglu, David Autor, and Simon Johnson.

With a consistently top-ranked PhD program and five faculty named Nobel laureates since 2010, MIT's Department of Economics has played a leading role in economics education, research, and public service for more than a century.

Baseline: Since 1980s, Companies Focus on Using Automation to Cut (Labor) Costs



Job market polarization since ~1980

- Broadly shared wage growth since WWII
- But growing divergence in last 40 years
- Labor is a cost to be minimized (Friedman)

AI could exacerbate this divergence

- Skill-biased technologies drive job-market polarization
- AI could easily continue these polarizing trends (e.g., no more “cut and paste” jobs)
- “Employment transitions” in the US would run at pre-COVID rate (Europe is slower to adjust)

Risks for misinformation, social media

- Impact on democracy, mental health, etc.

The change in real (log) weekly earnings, since 1963
Working age adults, ages 18–64

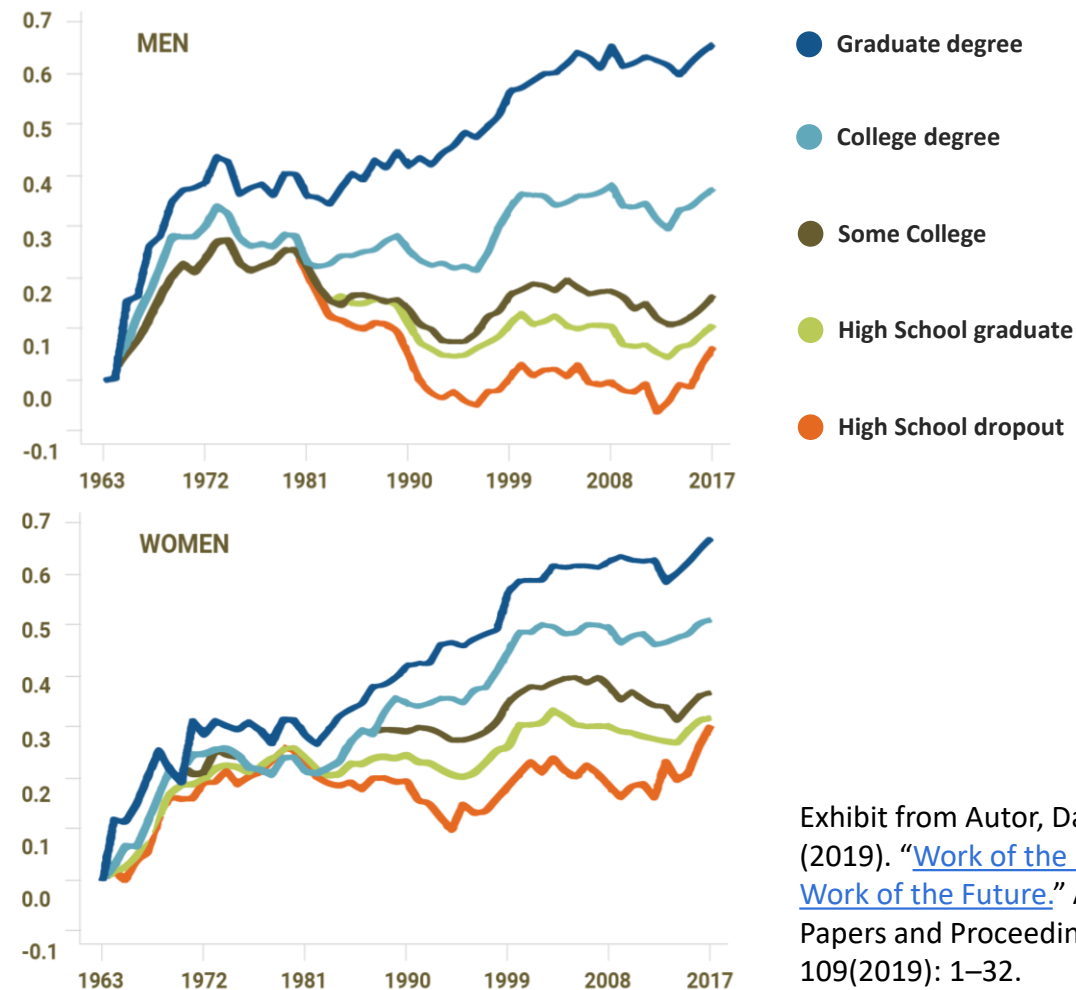


Exhibit from Autor, David. (2019). “[Work of the Past, Work of the Future.](#)” AEA Papers and Proceedings. 109(2019): 1–32.

One Consequence Is Falling Labor Share of Income Over Five Decades



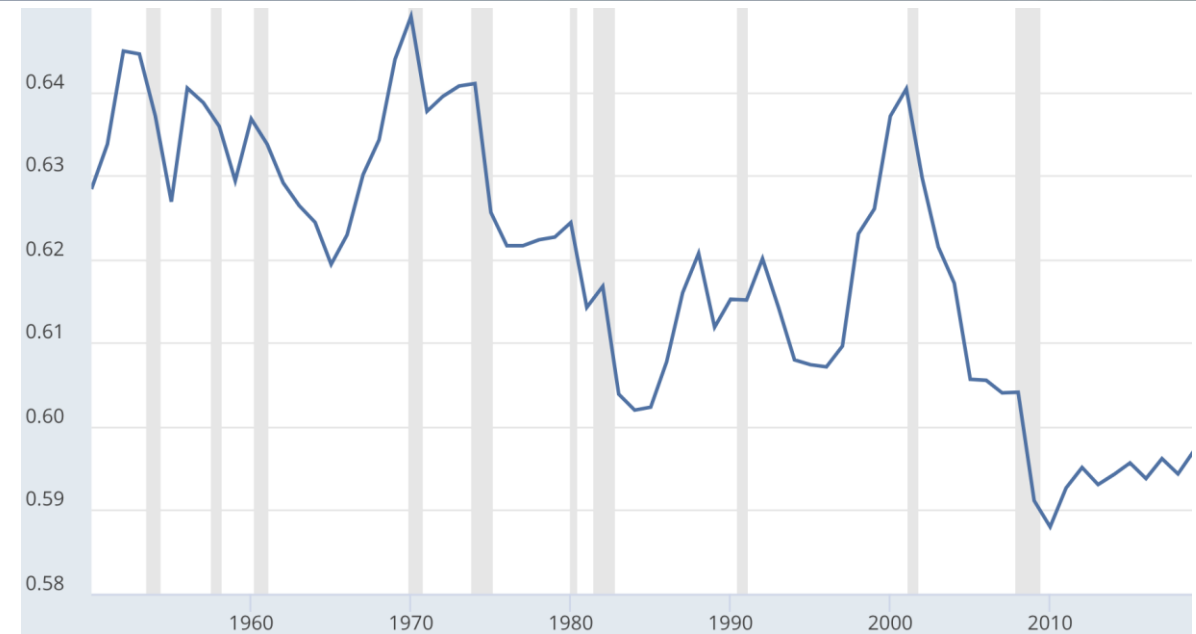
Long-Run Trend Down (with Interruptions)

- Labor share of income (GDP) has fallen in many developed nations.
- Automation, globalization, and deregulation have benefited capital.
- Spikes 1965–1970 (countervailing powers) and 1996–2001 (ICT, service sector rising).
- Differential effects of anti-recession policy (e.g., corporate tax cuts, bailouts, interest rate policy)?

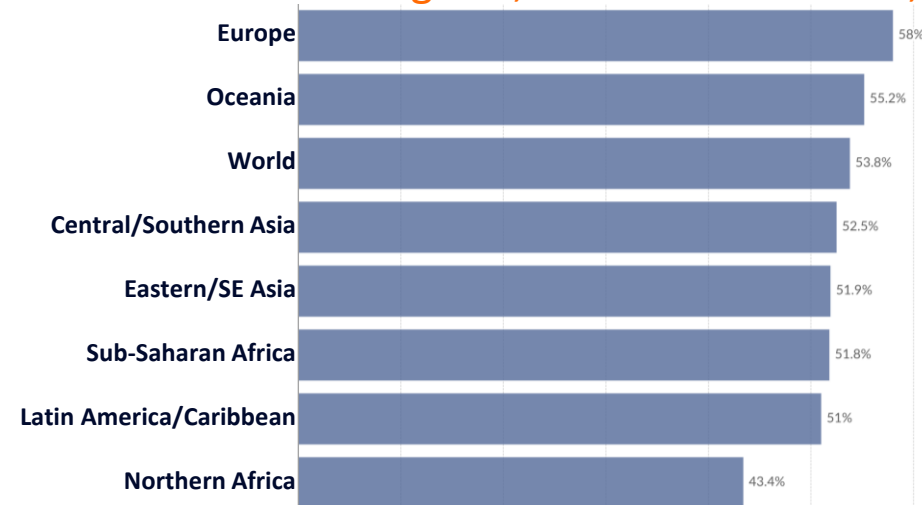
Yet, the U.S. labor share is still “high” (slightly)

- Other regions around the world are lower.
- Specific features of the U.S. labor market: large services economy, highly educated workforce, low dependency ratio, high working-age proportion, worker power, etc.

United States, Labor Share of GDP, 1950–2019



Other World Regions, Labor Share of GDP, 2020



(top) Federal Reserve Economic Data (FRED), "Share of Labour Compensation in GDP at Current National Prices for United States." (bottom) Our World in Data, data from UN Statistics Division

Additional Concern: What Happens to Global Inequality?

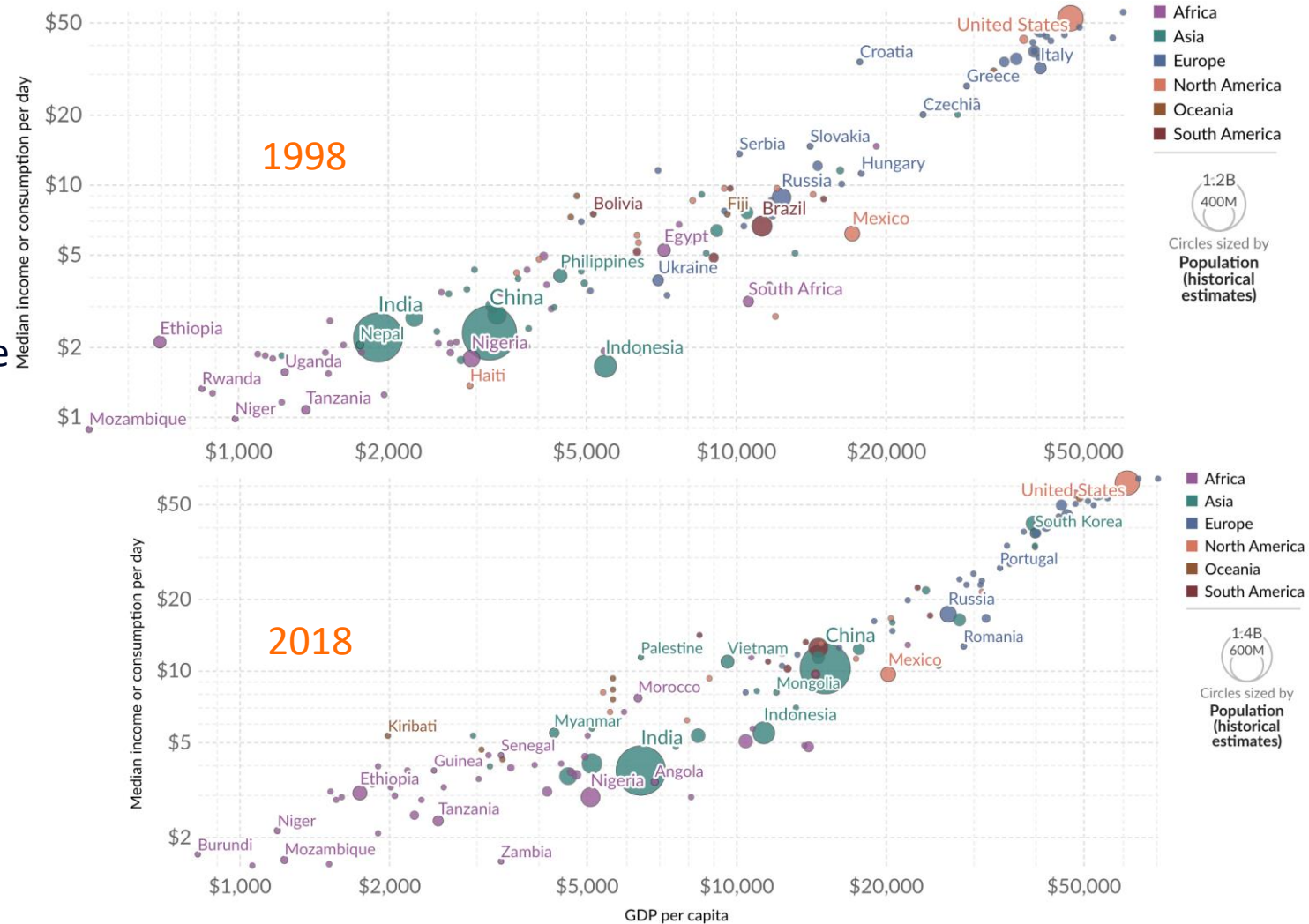


Threat to emergent middle-class

- China, India, and others have made significant gains in recent years, based on repetitive tasks
- If negative impacts of AI prevail, the emergent global middle class and low-wage workers will bear the cost
- Concern for white collar jobs (Indian services), but AI also coming soon to manufacturing
- This will deepen existing inequalities and contribute to the instability of local labor markets and global politics

Exhibits from Our World in Data, using the World Bank Poverty and Inequality Platform (2022), compiled from multiple sources.

Median income versus GDP per capita in 1998 and 2018



History Shows Another Path Is Possible: “The Productivity Bandwagon”



At the 1851 Great Exhibition in London, the U.S. displayed almost no industrial achievement.

But by 1890, the U.S. was the world’s largest manufacturing power.

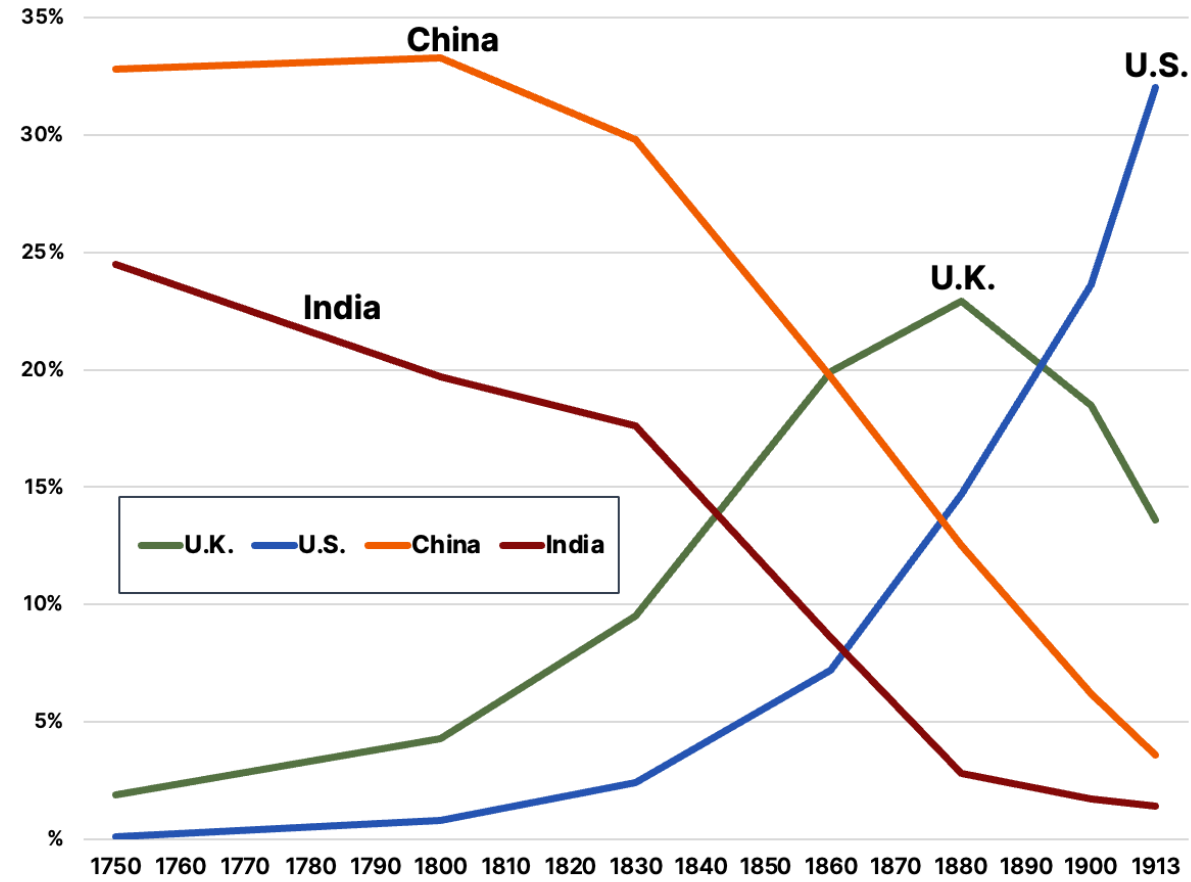
How did this happen? Worker Augmentation

- The “American System of Manufacturing”
- Machines boosted productivity of workers (e.g., immigrants) without much formal education
- New tasks requiring expertise: autos from 1900

With positive global implications

- American technology (e.g., sewing machines, farm equipment, automobiles) spread around the world
- Higher wages made possible by higher marginal productivity (+ unions, eventually)

Share of Total World Manufacturing Output



Data from Bairoch, Paul. (1982). "International Industrialization Levels from 1750 to 1980." *Journal of European Economic History*. 2: 268-333.

When the Productivity Bandwagon Delivers Shared Prosperity: New Tasks and Cross-Sectoral Impact



A Middling Sort of Revolution

- In the 1800s, engineers emerged from middle-class (skilled craftspeople).
- Among their accomplishments: improved steam engines, locomotives, and building the new railways.
- These created new, high-skill, high-pay jobs for the working class (ticket takers, engine drivers, firemen).
- Importantly, railroads had many uses and affected a broad cross-section of the economy (goods and commerce, travel and tourism).



Archimedes Passenger Train, Euston Station, 1880s



George Stephenson's Rocket, 1829

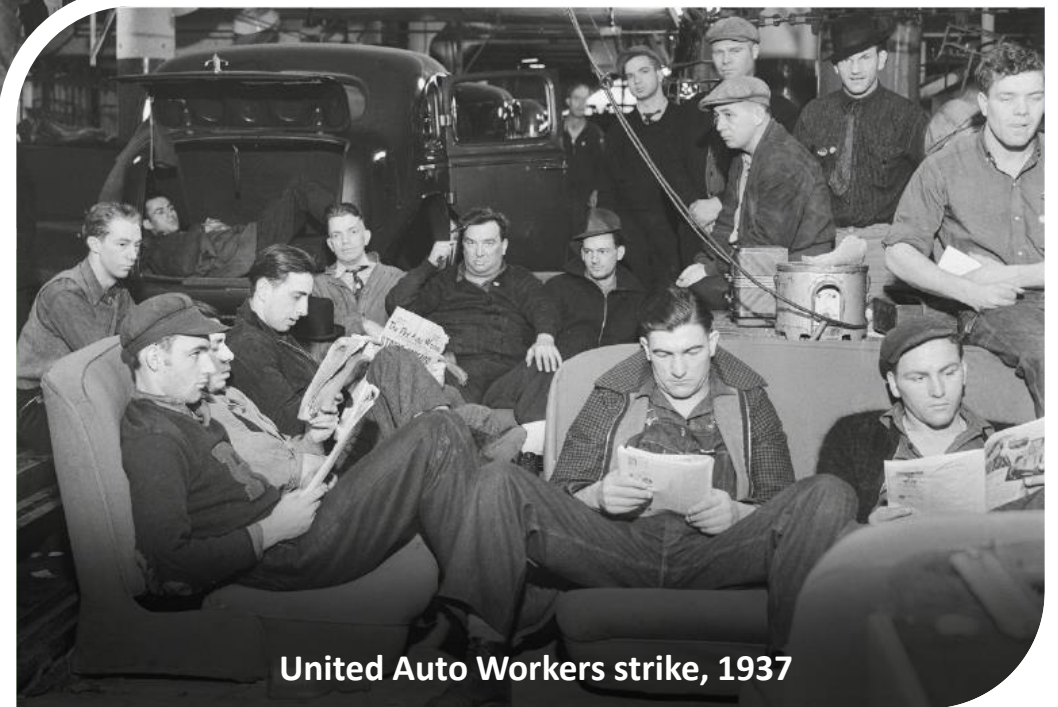
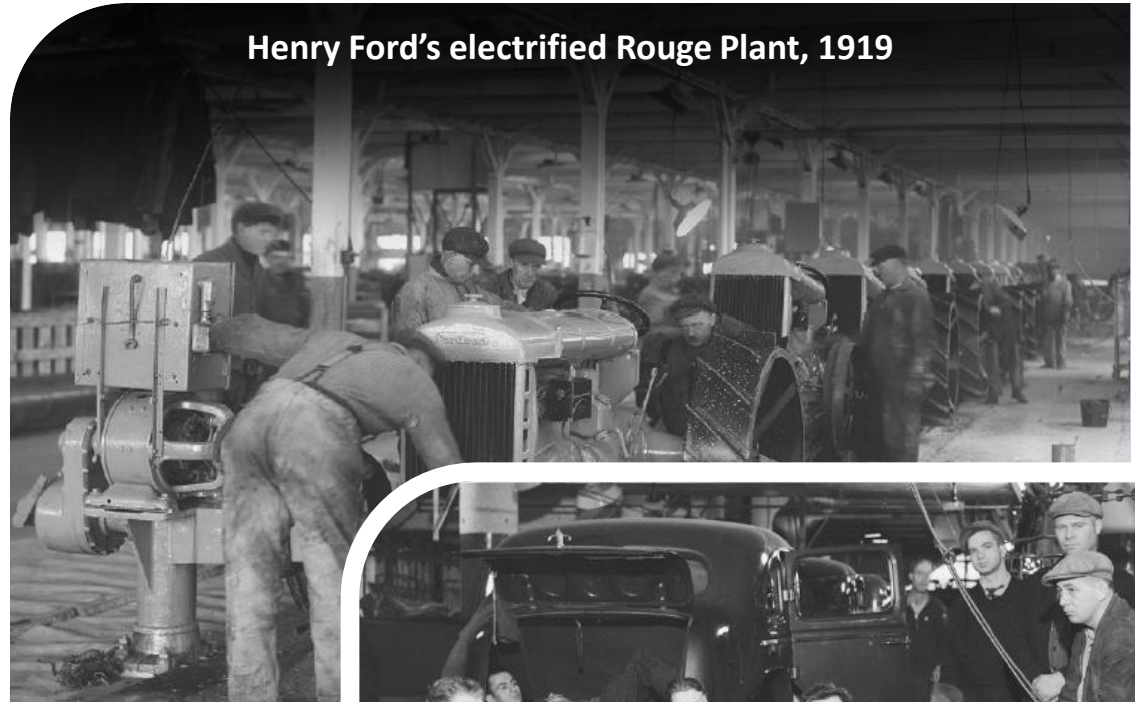
When the Productivity Bandwagon Delivers Shared Prosperity: New Tasks and Worker Power



Lessons from the US automobile industry

- Electrification and the modern factory dramatically boosted marginal worker productivity in new tasks.
- Labor organizations became stronger, bolstering sharing of productivity gains and worker voice.

Henry Ford's electrified Rouge Plant, 1919

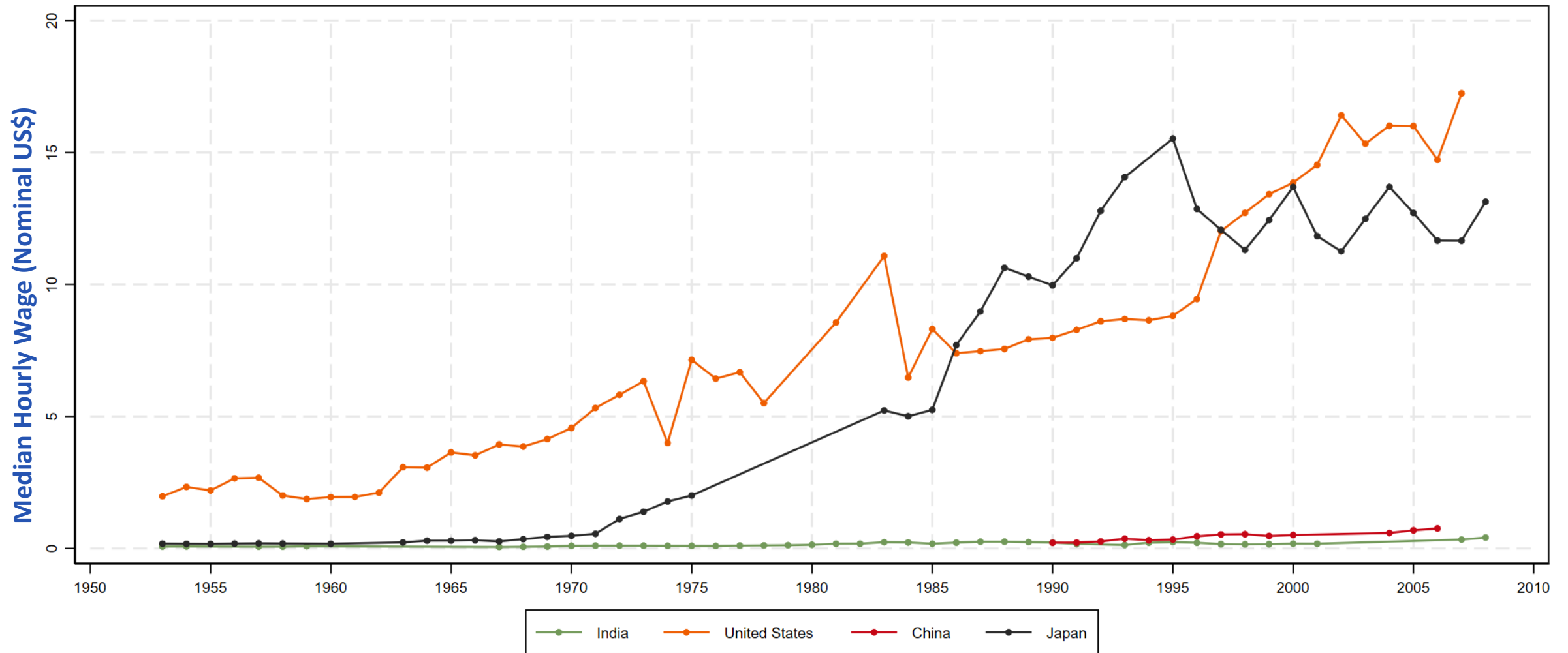


United Auto Workers strike, 1937

US Wages in Comparative Perspective, from 1950s



Median Nominal (US\$) Hourly Wage for Low-Skilled Workers, at Market Exchange Rate



Data from Freeman, Richard B. and Remco H. Oostendorp. 2020. "Occupational Wages around the World (OWW) Database." NBER Public Use Data Archive. Low-skilled occupations defined using ISCO-88 from the International Labour Organization. Codes beginning with 8 and 9 are classified as low-skilled.

What Will AI Do? Next 10–20 Years...



It will displace labor through automation

- Replace workers with machines and algorithms, average productivity per worker increases
- But this does not necessarily increase wages (e.g., British Industrial Revolution, 1780–1840)

And create new tasks, requiring expertise

- More than 60% of U.S. jobs in 2018 did not exist in 1940 ([Autor et al., 2022](#))
- This new task creation process was fast enough to underpin shared prosperity, 1940–80
- **But since 1980, new tasks have not kept up with the loss of good jobs due to automation**

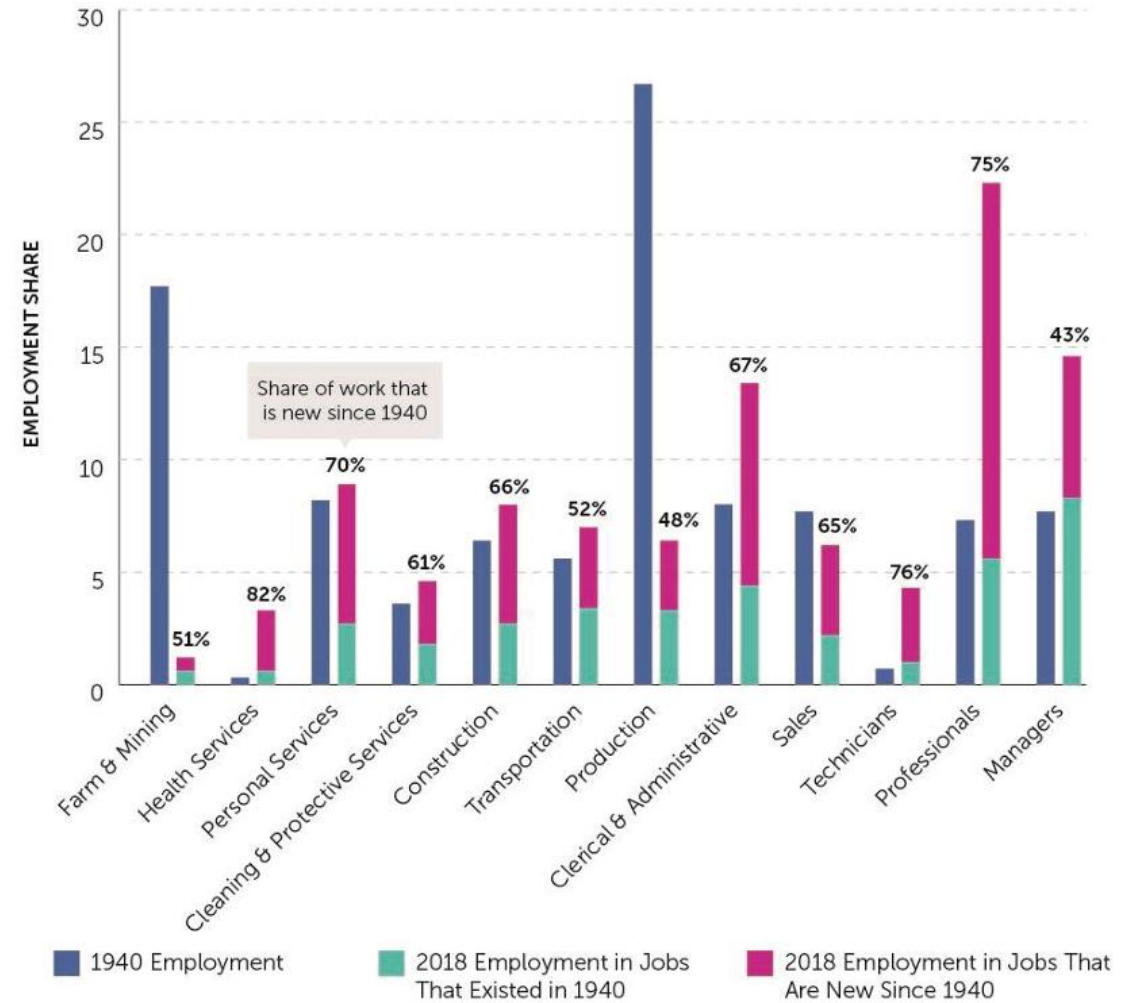


Exhibit from Autor, David. (2022). [“The Labor Market Impacts of Technological Change: From Unbridled Enthusiasm to Qualified Optimism to Vast Uncertainty.”](#) NBER Working Paper No. 30074.

Latest Research: Could Use AI To Upskill Labor



Solves skill and information asymmetries

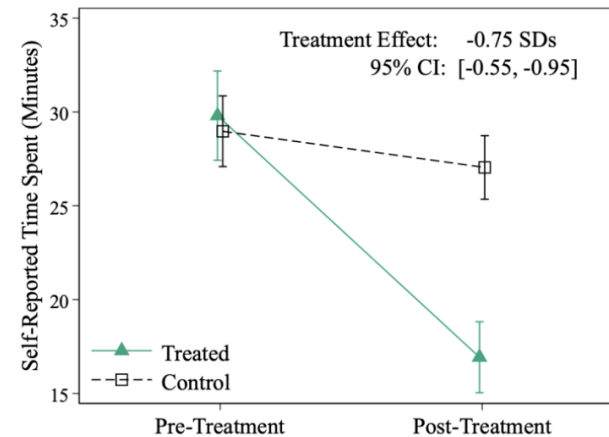
Provides expert advice

- Distills a vast amount of information to present concise summaries and suggestions;
- This could be especially beneficial for workers with less formal education, leveling them up
- Is this what will happen?

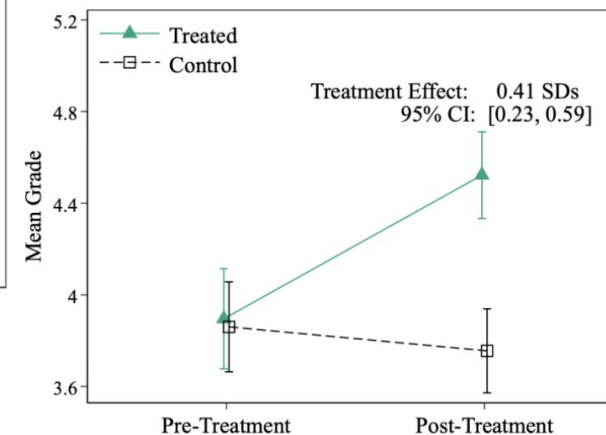
Preliminary evidence confirms the potential

- ChatGPT aids in writing ([Noy & Zhang, 2023](#))
- Improved info provision and productivity in customer service ([Brynjolfsson et al., 2023](#))
- GitHub Copilot doubles coding speed for skilled software engineers ([Peng et al., 2023](#))

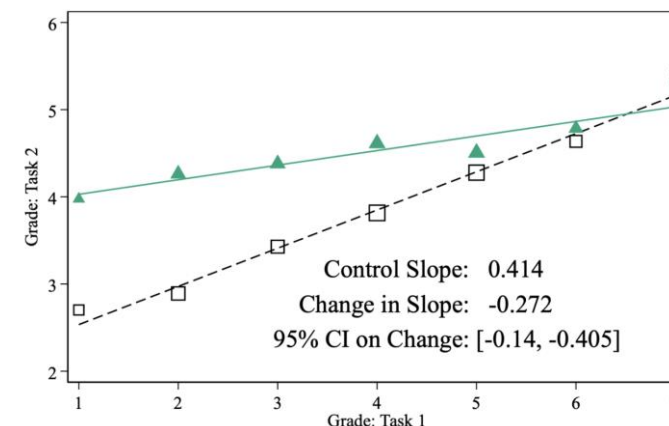
ChatGPT reduces time to complete writing tasks...



...improves grades...



...and lessens grade inequality



Exhibits from Noy, Shakked and Whitney Zhang. (2023). "Experimental Evidence on the Productivity Effects of Generative Artificial Intelligence." *Science*. 381(6654): 187–192



New Task Creation: Skill Gaps and Mismatches Can Slow Growth

In Theory

- Mismatch slows adjustment of labor demand, drives inequality, reduces productivity gains—because skills for new complementary tasks are scarce ([Acemoglu & Restrepo, 2018](#)).

In Practice (so far...)

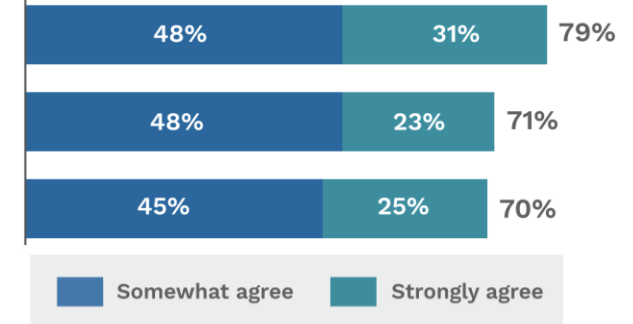
- [LinkedIn \(2023\)](#) estimates skillsets required for our jobs will change by up to 65% by 2030.
- [AWS \(2024\)](#) finds that employers and employees both see significant skills barriers.
- [Deloitte \(2024\)](#) notes that firms with higher AI expertise are faster implementing new tools—performance effects likely to be compounded.

(top) AWS, 2024. “Accelerating AI Skills.” (bottom) Deloitte, 2024. “State of Generative AI in the Enterprise, Quarter Two Report.”

Barriers

- Lack of knowledge of how to implement an AI workforce training program
- Unsure of employees’ AI skill needs
- Lack of time for workers to pursue AI training outside of core work responsibilities

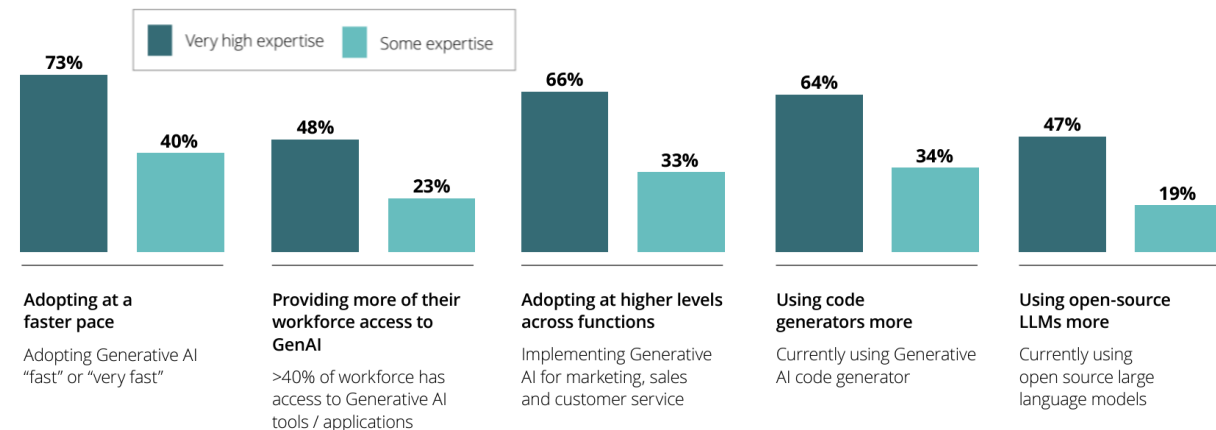
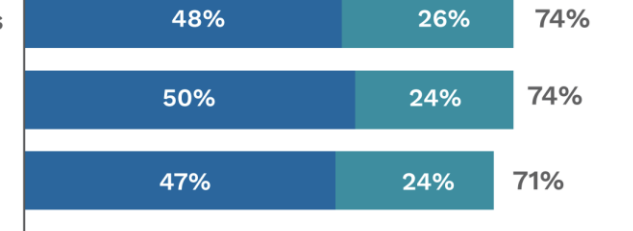
Employers



Barriers

- Lack of knowledge of relevant career paths
- Lack of knowledge of available AI skills training programs
- Lack of knowledge of the AI skills needed

Workers

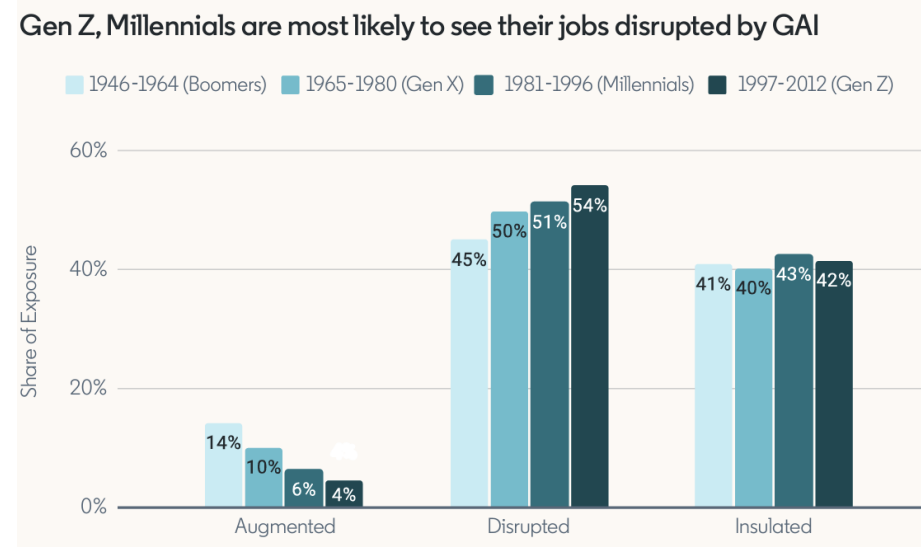
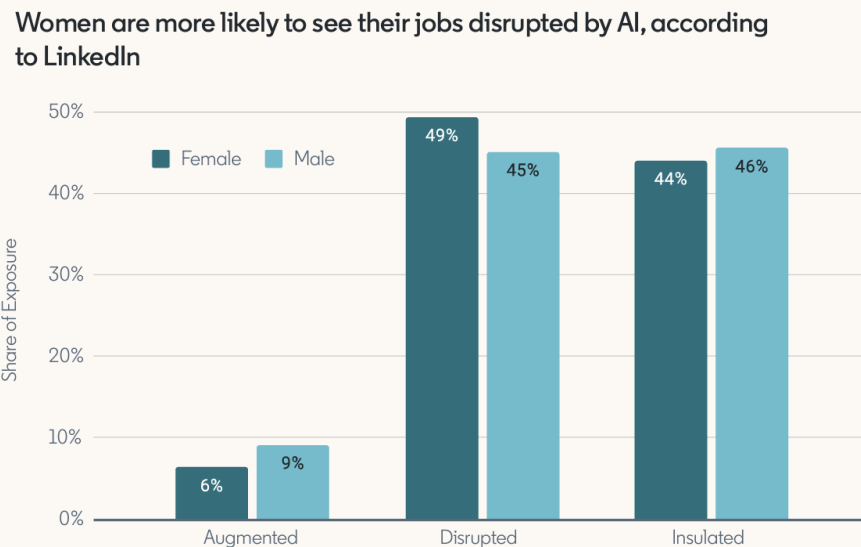
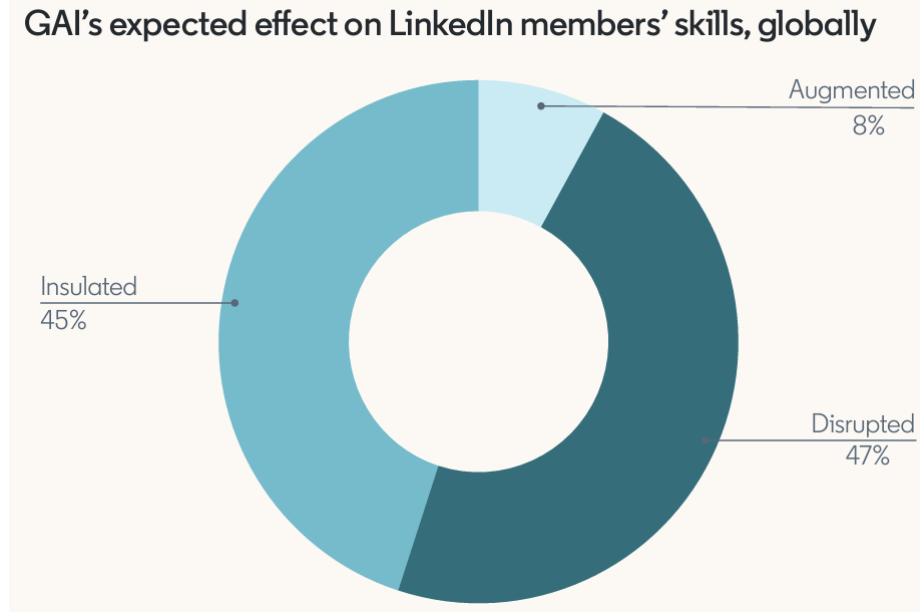


Where In the (Working) World are the Skill Mismatches?



Women and Younger Workers Most At-Risk Research from LinkedIn on Exposure of Skills to Generative AI

- 55% of workers' skills are likely to be affected.
- Women's skills appear (33%) less likely to be augmented and (9%) more likely disrupted.
- Gen Z's and Millennials' skills are also more exposed to Generative AI.



Exhibits from LinkedIn Economic Graph Research Institute, 2023, "Future of Work Report: AI at Work."



But Not Everyone is Convinced

Issues with Growth Assumptions

- Task exposure may be lower than anticipated, or work automation may not be worthwhile.
- Cost savings and process improvement may be slow, with underwhelming aggregate impact.
- Labor displacement is sticky: it's not inevitable that freed-up labor is productively reemployed.

Alternative Outcome Beliefs

- AI and generative AI could be incremental technologies in macroeconomic terms.
- Displacement effects could mean further reductions in the labor share of income and lost opportunities for people with “basic cognitive skills”.

“You can see the computer age everywhere but in the productivity statistics.”

Robert Solow, 1987 Nobel Prize in Economics

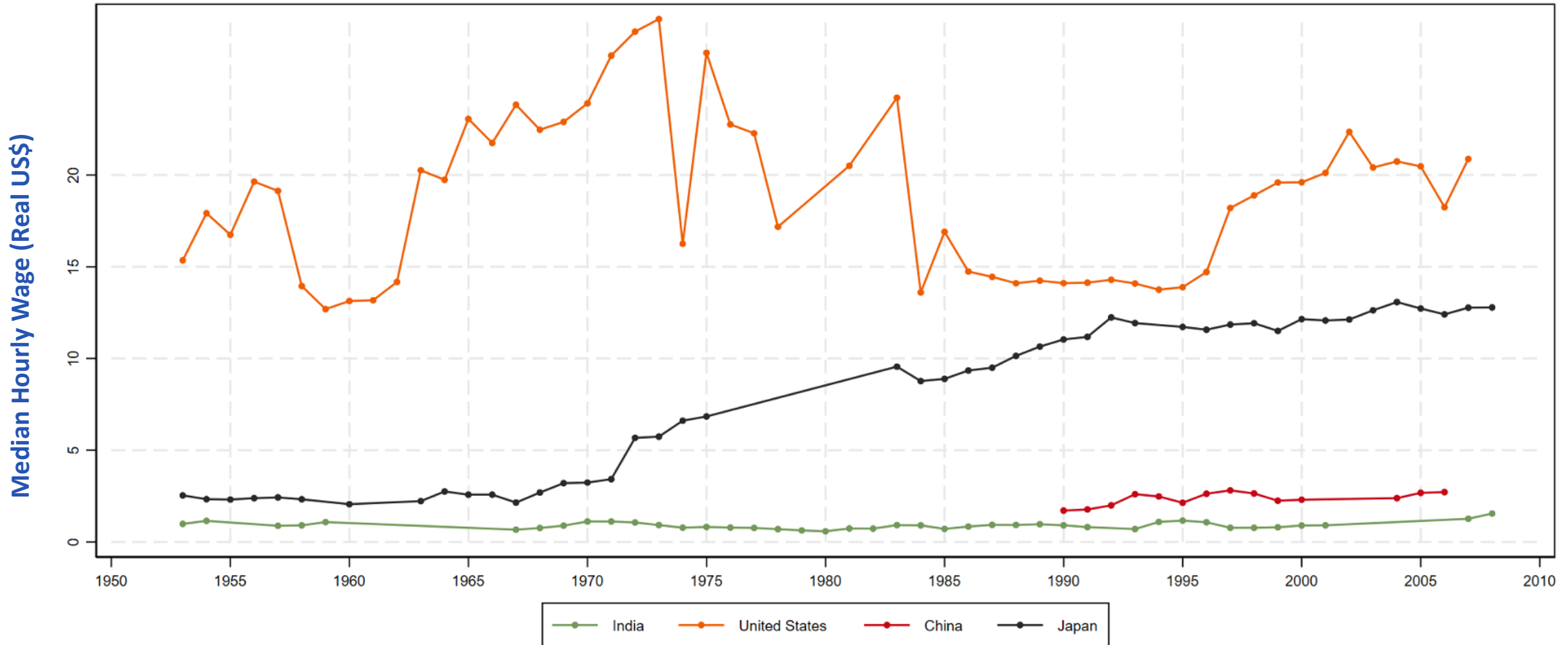
“AI is just that new thing that’s going to get us that 1% to 1.5% productivity growth that we’ve been getting for decades...”

John Williams, President of the New York Fed

Global Considerations: China Has Become More Productive, But Chinese Real Wages Have Not Converged (Contrast with Japan)



Median Real (US\$) Hourly Wage for Low-Skilled Workers



Data from Freeman, Richard B. and Remco H. Oostendorp. 2020. "Occupational Wages around the World (OWW) Database." NBER Public Use Data Archive.

Low-skilled occupations defined using ISCO-88 from the International Labour Organization. Codes beginning with 8 and 9 are classified as low-skilled. Nominal wages in local currency units converted to US\$, then inflation-adjusted using consumption price levels from Penn World Tables (base year 2017).

Policy Could Support The Worker-Friendly Version of AI



Choosing a Pro-Worker Path for AI

Areas with potential consensus

- **DARPA-type Grand Challenges:** education, healthcare, government services, consumers
- **OSHA Protections:** standards for workplace surveillance: safety vs. privacy
- **OSTP:** build AI expertise all levels of government

Needs strong, widespread buy-in

- Shift corporate norms: worker-augmentation over burdensome surveillance or outright replacement
- Workers articulate needs (e.g., better training) to make use of new breakthrough technology

But democracy is in danger: digital ads...

- Misinformation and disinformation



This image was generated using ChatGPT and DALL-E

See also, Acemoglu, Daron, David Autor and Simon Johnson. (2023). "[Can We Have Pro-Worker AI? Choosing a Path of Machines in Service of Minds.](#)" MIT Shaping the Future of Work Initiative, policy memo.

Our 1000-Year Struggle Over
Technology & Prosperity

POWER AND PROGRESS

DARON ACEMOGLU
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