

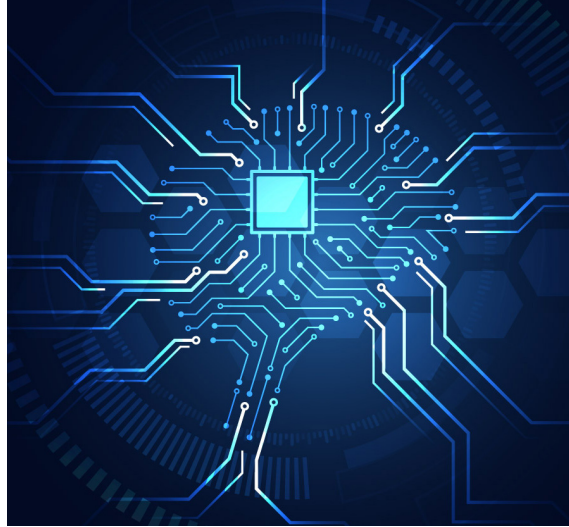
May 13, 2024

## **Special Edition Economic Insight: A Closer Look: Artificial Intelligence: Helpful or Harmful to Workers and Businesses?**

Economic  
**INSIGHT**

### **WHAT IS ARTIFICIAL INTELLIGENCE (AI)?**

While the earliest notable work in the field of AI dates back to the 1930s, it is only in the past few years that AI has captured public attention. However, what is it really? We rely on various technologies every day, including computers and smartphones, so what makes AI different or revolutionary?



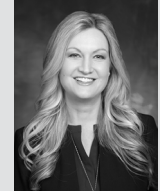
In order to understand AI and its potential impact on the labor market, productivity and more broadly, the economy, it is important to first define the various terms and components associated with AI.

Broadly, AI is the development of machines to perform functions that imitate human behavior, such as using a website's chatbot to ask a question. Machine learning, meanwhile, is a subcategory of AI that uses algorithms to learn insights and recognize patterns. A common example of machine learning is when a music service recommends new songs to a listener based off previously played songs. A narrower subset of machine learning, called deep learning, goes a step further, using neural networks that function like a human's brain to analyze data. Examples of this include self-driving cars and facial recognition. Finally, within deep learning, there is a component called generative AI. This branch of AI has perhaps garnered the most media attention. Generative AI autonomously makes predictions and creates new data, rather than using structured, labeled data to predict outcomes. ChatGPT is a popular example of generative AI.

### **LABOR MARKET IMPACT**

As with any technology, AI poses sizable benefits, but not without risk and consequences both to businesses employing such technology as well as the workers potentially displaced.

According to a report from the International Monetary Fund (IMF), roughly 40% of current global employment faces exposure to AI with nearly 60% of jobs in advanced economies. Technology has been disruptive to the labor market in the past; however, lower skilled jobs have historically been disproportionately impacted. AI, meanwhile, has the potential to displace both low-skilled and high-skilled workers.



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<sup>1</sup> Link to report: <https://www.britannica.com/technology/artificial-intelligence/Alan-Turing-and-the-beginning-of-AI>

<sup>2</sup> According to the U.S. Census Bureau, as of 2016, 89% of household surveyed by had a computer (includes smartphones). Link to report: <https://www.census.gov/content/dam/Census/library/publications/2018/acs/ACS-39.pdf>

## Jobs in U.S. that are likely to have high, medium, or low exposure to AI

Low Exposure	Medium Exposure	High Exposure
Barbers	Chief Executives	Budget Analysts
Child Care Workers	Veterinarians	Data Entry Keyers
Dishwashers	Interior Designers	Tax Preparers
Firefighters	Fundraisers	Technical Writers
Pipe Layers	Sales Managers	Web Developers

Source: Pew Research Center

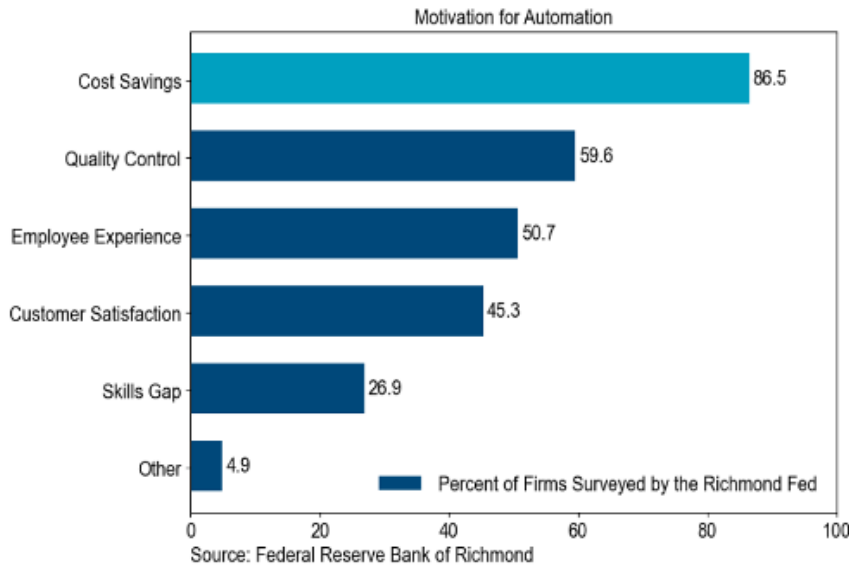
Additionally, according to the Pew Research Center, one-fifth of all workers are considered to have high exposure with positions that can be performed entirely by AI. Examples include occupations that are tasked with analyzing or obtaining information, such as budget analysts, tax preparers, and web developers. AI does have some limitations performing physical labor, so positions such as nannies, barbers, and firefighters have low exposure. Positions such as executives, interior designers, and sales managers are considered to have a medium exposure

### COST SAVINGS LIFELINE

AI has served as a cost savings lifeline for businesses, helping to offset the elevated cost of labor. Labor costs can account for as much as 70% of a company's budget. The Employment Cost Index (ECI), for example, rose to 1.2% in Q1, the largest gain in a year.

Reeling from the weight of higher costs and prices, 51% of CFOs said they have implemented software or technology in the last 12 months to automate tasks, with 87% noting cost savings being the primary

motivation, according to the Fed's latest Q1 CFO Survey. In California, for example, amid the recent minimum wage hike, there have been numerous reports of fast-food chains looking into replacing human labor with AI. To be fair, self-service ordering kiosks and



<sup>3</sup> Link to report: <https://www.imf.org/en/Blogs/Articles/2024/01/14/ai-will-transform-the-global-economy-lets-make-sure-it-benefits-humanity>

<sup>4</sup> Link to report: [https://www.richmondfed.org/research/national\\_economy/cfo\\_survey/data\\_and\\_results/2024/20240327\\_data\\_and\\_results](https://www.richmondfed.org/research/national_economy/cfo_survey/data_and_results/2024/20240327_data_and_results)

### GLOSSARY

**AI** – Artificial Intelligence

**ECI** – Employment Cost Index

**GDP** – Gross Domestic Product

**PwC** – PricewaterhouseCoopers

**QoQ** – Quarter over Quarter

**SAG-AFTRA** – Screen Actors Guild-American Federation of Television and Radio Artists

**UAW** – United Automobile Workers

other technologies have been commonplace in major fast food chains for a while now; however, the recent wage increase – and broadly wage pressures – has spurred more business owners to speed up the transition away from human labor and toward AI.

Of course, while beneficial in the longer run, the upfront cost of implementation can be prohibitive for some businesses. According to the survey, of the CFOs that responded in the affirmative of adopting technology, the majority came from large firms.

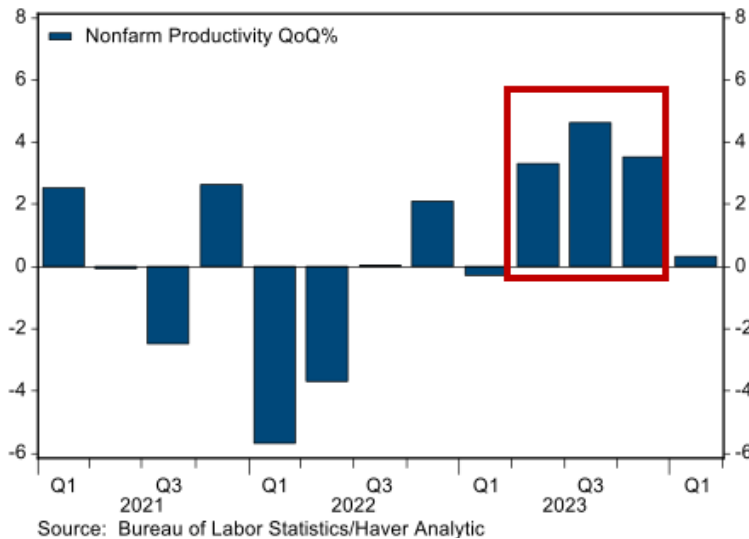
## PRODUCTIVITY IMPROVEMENTS

With the potential to displace some jobs, on the flip side, AI can also potentially assist in making current employees more productive. According to a study by Boston Consulting group, the use of generative AI can improve a worker’s performance by as much as 40% by automating manual and repetitive tasks.

According to a separate study by PwC, labor productivity improvements will drive overall gains in global GDP, accounting for 55% of the gains up until 2030. In 2030, however, 58% of global GDP

gains will come from consumption-side impacts as consumers utilize higher quality and more personalized products and services, freeing up time and leading to greater consumption in other products. This creates a cycle of “better products and hence more consumption.” On a nominal basis, AI could contribute nearly \$16 trillion to the global economy in 2030, with \$6.6 trillion coming from increased productivity and more than \$9 trillion coming from consumption-side effects.

Since the boom in the late 1990s, U.S. productivity has languished at an average of 1.2%. Already, however, with early investments in AI, productivity has ticked higher in 2023, up an average 2.8%.



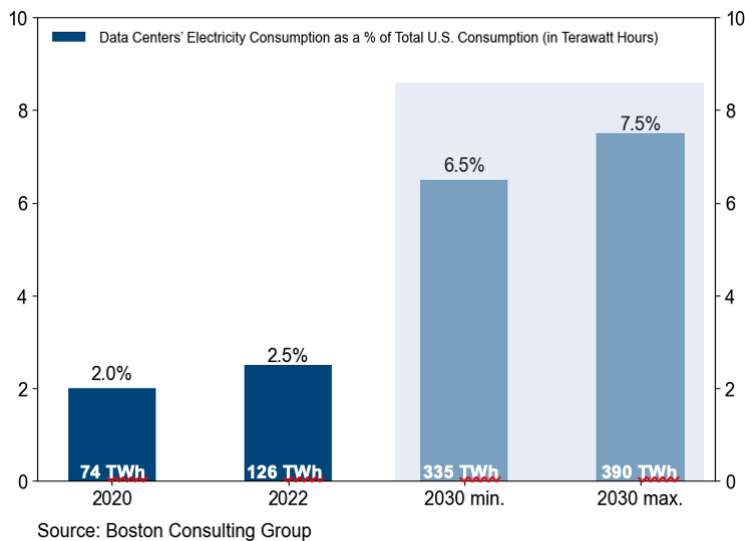
## LIMITATIONS AND DRAWBACKS OF AI

While there are many potential benefits of AI, there are also notable limitations at this point of its development. For example, there can be bias embedded in data since humans are not entirely removed from the process, choosing the data algorithms use. This in turn can lead to disordered results.

Additionally, given the rapid speed in which AI has been, and continues to be, integrated into businesses, legislation has struggled to keep up to build a regulatory framework that protects data privacy and security with regard to sensitive information.

<sup>5</sup> Link to Essay: <https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf>

There is also an environmental impact and a potential strain on our electrical grid given the massive energy required by data centers. According to the Boston Consulting Group, the share of U.S. electricity consumption from data centers will potentially triple by 2030 from 126 terawatt hours to 390 terawatt hours.



That equates to the electricity usage of 40 million U.S. homes!

AI also has the potential to further drive economic inequality. Even as a potential driver of productivity or broader economic growth, the adoption of AI will continue to result in job destruction and displacements, expectedly growing the divide between those utilizing AI in their positions and those being replaced by it. Understandably, the major worker strikes that occurred last year – the United Automobile Workers (UAW) and the SAG-AFTRA and Writers Guild of America – though from very different industries, centered on technology automation and the use of AI.

## CONCLUSION

Still in the relatively early stages of development, AI will continue to reshape the future of the labor market, businesses investment, and our global economy. While the benefits are not yet completely understood, the limitations and unintended consequences are equally important to recognize. Though AI has the potential to boost productivity and consumption, AI can never fully replace human intellect or creativity ... or can it?

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