

Work from home, AI, and the labor market: What's next?

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The American Worker Project focuses on the evolution of work from past to present, including a look at how working arrangements have changed over time. I'm here to talk about the future. Specifically, I make three predictions for U.S. labor markets.

1. Work from home (WFH) is here to stay. Over the next five years, I anticipate a modest rise in the WFH rate.
2. Artificial Intelligence (AI) will not drive large-scale job losses over the next ten years.
3. To the extent that AI displaces some jobs (while creating others), it will bring less economic hardship and dislocation than suggested by U.S. experience with the loss of manufacturing jobs.

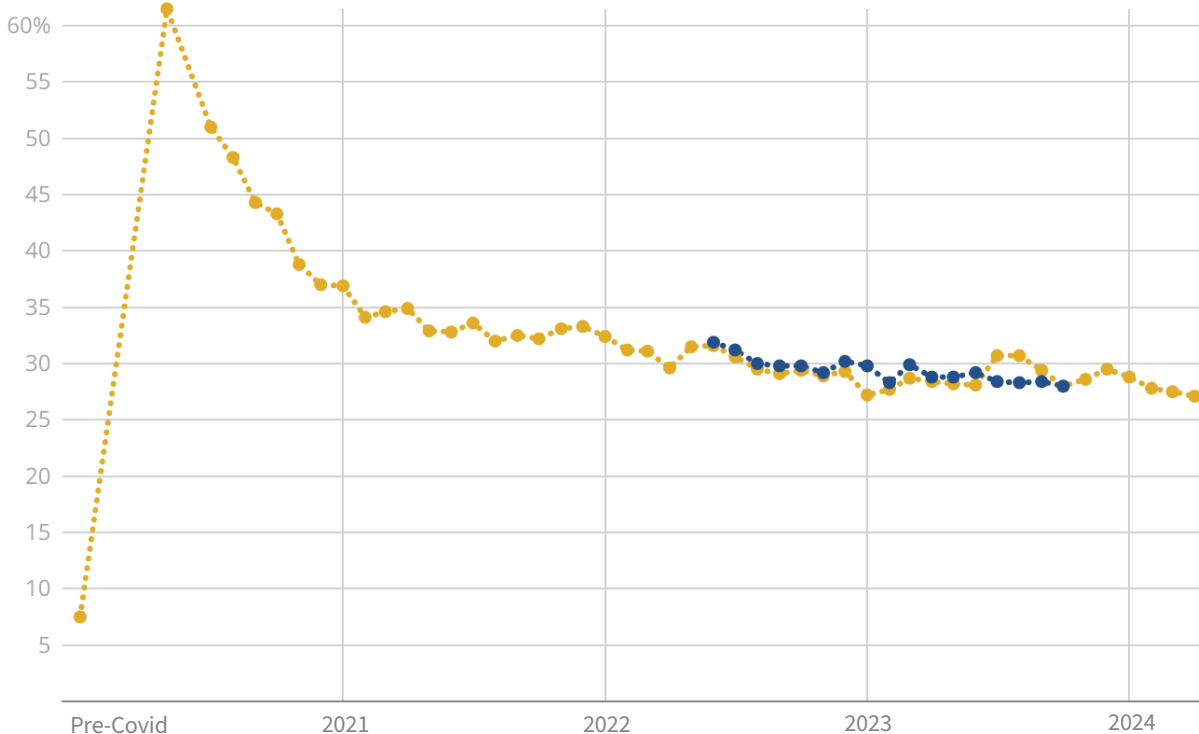
Let's consider each prediction in turn.

Working from home is here to stay.

Covid-19 instigated a major shift in how Americans work and live. Paid workdays at home shot above 50 percent of all workdays in spring 2020 (Chart 1), driven by contagion fears and government restrictions on commercial and social activities. After the fears and restrictions subsided, WFH stabilized at about 28 percent of paid workdays.¹ Evidence from online job vacancy postings also suggests that WFH rates have stabilized since 2022.²

Why has the economy not reverted to pre-pandemic WFH rates? Most Americans were favorably surprised by their ability to be productive in WFH mode during the pandemic.³ Their experiences gave them a reason to reconsider their working arrangements and lifestyles. Many employers also adapted to some level of remote work. And the stigma once associated with WFH has all but vanished. The result is a newfound variety in working arrangements. Many Americans now work full days at home (or other remote location) one or more days a week. Some work from home most or all of the time.

Chart 1: Percentage of Paid Full Days Worked from Home in the United States, 2019 and May 2020 to March 2024



Notes: Reproduced from Barrero et al. (2024b). Monthly updates available at www.WFHresearch.com. We estimate the “Pre-Covid” percentage using data from the 2019 American Time Use Survey. We calculate SWAA statistics based on responses to the following questions: “Currently (this week) what is your work status? And “For each day last week, did you **work a full day (6 or more hours)**, and if so **where?**” We calculate HPS statistics based on responses to: “In the last 7 days, have you...teleworked or worked from home?” We limit our samples to persons 20-64 years of age. We drop persons with annualized earnings of less than \$10,000 in the ATUS and SWAA and with annual household income of less than \$25,000 in the HPS. The break in the SWAA time series in November 2020 reflects a change in the survey question.

Chart 1 actually understates how much we now rely on audio and video conferencing to engage coworkers, customers, and suppliers. To see this point, consider a five-person work team, where each person works Monday to Friday. If all team members commute to a common worksite every workday, all team-wide meetings can be fully in-person. But if only one person works entirely in a remote capacity, no team-wide meetings can be fully in-person. The same conclusion follows if each person works from home on a different weekday. As these examples illustrate, even a 20 percent WFH rate can spell the end of fully in-person team meetings. Of course, these are just examples. We need systematic evidence to assess how we actually engage one another in our work-related activities.

The March 2024 [Survey of Working Arrangements and Attitudes](#) (SWAA) elicited information about one randomly selected meeting per worker. Among other things, we asked how the meeting participants engaged one another: fully in-person, fully remote, or a mix of in-person and remote participation. According to these data, 40 percent of work meetings now involve at least one remote participant.⁴ The corresponding figure is 58 percent for people who split the workweek between home and employer premises. In some industries, meetings with remote participants are now the norm.

There is little prospect of a widespread return to fully in-person meetings. For one thing, many employers have embraced remote work as a means to improve recruitment and retention, moderate pay, reduce space needs, and cut overhead costs. They have learned that a (partial) shift to remote work often involves no loss in productivity, or even a gain.⁵ The pandemic also triggered an innovation speed-up in technologies that support video conferencing and remote collaboration.⁶ Thus, we can expect video-conferencing technologies and remote-collaboration tools to continue improving at a rapid clip, reinforcing the shift to remote work and remote meetings over the next few years.

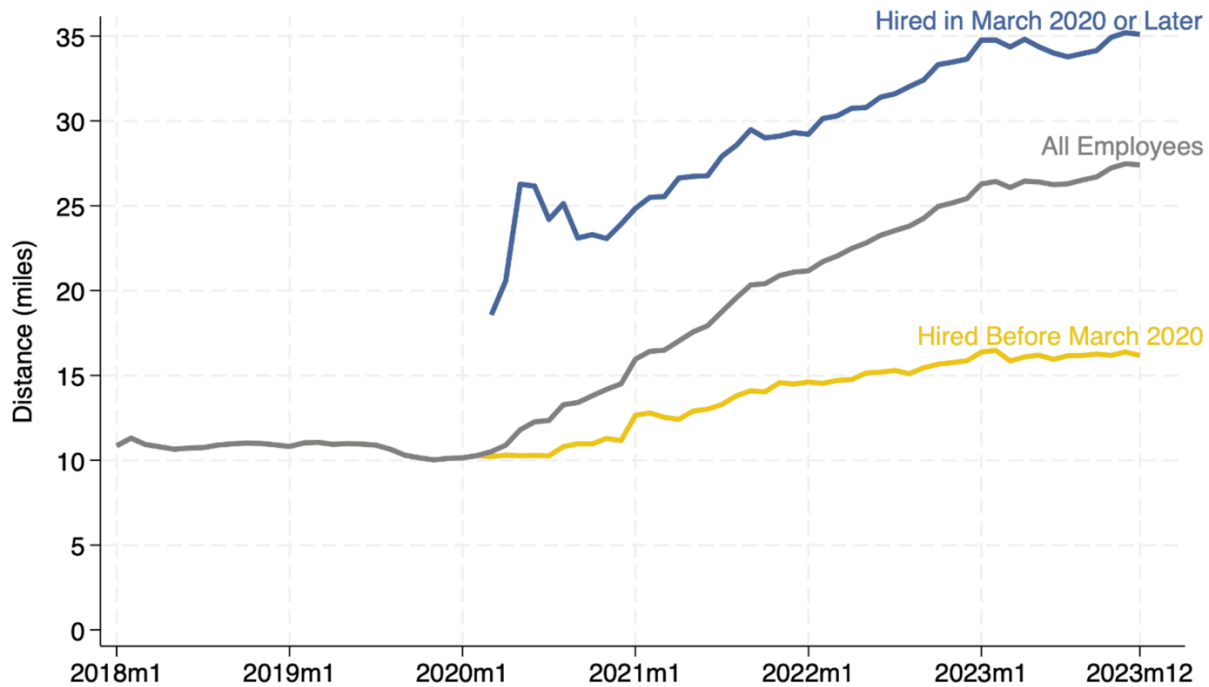
Return-to-office mandates feature prominently in the media, sometimes giving the impression that WFH is on a downhill slide. Systematic evidence says otherwise. As part of the July 2023 [Survey of Business Uncertainty](#), my colleagues and I asked U.S. business executives about the WFH outlook at their own firms. The survey responses cover about 500 firms distributed widely across industries, states, and firm size categories. We asked: “Looking forward to five years from now, what share of your firm's full-time employees do you expect to be in each category [fully in-person, hybrid, fully remote] in 2028?” We asked a parallel question about the firm’s current working arrangements. Compiling the results, executives anticipate modest increases over the next five years in both the fully remote share and the hybrid share of workdays.⁷ This finding holds whether we weight each firm equally or in proportion to its number of employees.

There’s another reason that WFH will stick: Most people like it. When asked directly about their willingness to trade off pay for the option to work from home two or three days a week, nearly a tenth of American workers dislike the idea and require a pay premium to willingly do so. More than a quarter of Americans are equally content to work entirely at their employer’s site or to split the workweek between home and employer premises. The rest, a majority, prefer to work from home part of the week, with wide variation in their willingness to accept lower pay to do so. The average willingness to pay for the WFH option is 8 percent of pay among American workers.⁸ The upshot is that the newfound variety in working arrangements is highly beneficial, because it lets people sort into jobs that suit their desires and lifestyles.

People also value the locational flexibility afforded by WFH. Consider a software designer who wants to live in a small town fifty miles from the nearest suitable job. Fifty-mile commutes twice daily is a heavy price to pay for the joys of small-town life. That price falls steeply when working from home four days a week. Or consider a married couple that manages two careers while raising a family. Suppose their ideal jobs are 100 miles apart. If husband and wife both commute five days a week, it’s hard to manage life with their ideal jobs. The challenges are much less daunting if each one works from home three days a week.

Have people responded to the rise of WFH by living farther from their employers? In a recent analysis, my coauthors and I provide evidence on this score,⁹ reproduced here as Chart 2. We analyze employee-level data at 5,800 firms that operated continuously from 2018 to 2023. As of 2019, just 1 percent of employees at these firms resided more than 50 miles from their employer’s worksite. Among employees at these firms hired since March 2020, more than 7 percent live more than 50 miles away from the employer’s worksite as of 2023. In other words, a partial untethering of worker residential locations from employer worksite locations is underway. This process will continue to unfold for many years, as company workforces gradually turn over.

Chart 2: Employees Are Becoming Less Tied to the Locations of Their Employers



Notes: Reproduced from Akan et al. (2024) who use proprietary data from Gusto, a payroll processing and HR services firm. The sample covers the employees of 5,793 firms in a balanced panel of mostly smaller and mid-sized firms that operated continuously from January 2018 to December 2023.

Let's take stock. Millions of Americans have learned how to work in a remote capacity. Most of them like it. Many businesses have adapted to remote work. Along the way, they have discovered that WFH offers some advantages. The technologies that support remote work will continue to improve. And a small but growing share of workers now live more than fifty miles from their employer's place of business. Given all this, WFH is destined to last.

AI won't drive large-scale job losses in the next ten years.

Workplace applications of AI are "in the wind"—much hyped and discussed but yet to greatly reshape how we work. That may still be true five years hence. Historically, the applications of a new general-purpose technology in the workplace unfolded much more slowly than advances in the technology itself. That was the pattern for steam power, electricity, and microprocessors. So, even if advances in AI technologies proceed at tremendous speed, it does not mean they will rapidly transform the workplace.

Recent experience with WFH is an exception to the historic pattern whereby new technologies diffuse slowly into the workplace. Before Covid-19 struck, however, the diffusion of remote work followed the traditional pattern. Full days worked from home in the United States rose from 0.6 percent of all paid workdays in 1975 to 2.2 percent in 1995, 3.4 percent in 2005, and 7.2 percent in 2019.¹⁰ The contagion fears and lockdowns prompted by the pandemic drove the abrupt, large-scale adoption of remote work. The adoption stuck in many cases, because WFH worked better than anticipated and because the preconditions for its success were already in place: widespread access to broadband service in American households, video-conferencing technologies of acceptable quality, the "cloud" as a virtual space to

collaborate and share files, and other remote-collaboration tools. In short, an unusual combination of shock and circumstances led to an abrupt shift in working arrangements and lifestyles that, otherwise, would have unfolded over decades.

Much of the excitement surrounding AI pertains to large language models and other generative AI tools that produce text, imagery, and audio content. Rightly so. But the workplace application of these tools is in very early stages. OpenAI released ChatGPT less than 20 months ago. As of 2023, only 1.6 percent of online job postings in the United States referred to “machine learning”, “artificial intelligence”, “natural language processing”, “autonomous driving”, “neural networks”, or other AI technologies.¹¹ While AI could eventually eliminate many jobs, these statistics provide no reason to think that we are on the cusp of a major AI-driven transformation of labor markets.

Setting aside the history of technology adoption and AI’s limited workplace impact thus far, are there specific reasons to think AI’s impact on labor markets will unfold over decades rather than years? Yes.

Training generative AI models and testing their performance require mountains of data. Often, the requisite data must be collected from scratch. That’s expensive, and it takes time. Even with extensive training, the rollout of AI tools often reveals new problems, as illustrated by some [ludicrously ahistorical images](#) returned by Google’s Gemini chatbot.

In practice, AI prediction and decision models lean heavily on “stationarity”. In plain language, the real-world application setting must be the same as, or extremely similar to, the model development setting. If not, even a well-designed AI model can yield bad predictions and poor decisions in real-world applications. The human environment is highly variable, and it involves constraints, opportunities, beliefs, norms and behaviors that change over time, sometimes quite rapidly. Thus, AI models that aim to predict human behaviors or mimic expert human judgments require continuous performance monitoring and frequent recalibration. That’s feasible, but it adds to the cost and raises the risk of major mistakes.

Liability risks encourage firms to take a slow, cautious approach to the implementation of AI technologies. Suppose a bank uses AI to create better models for predicting consumer credit defaults, while also reducing the need for expert human judgment. The commercial appeal of AI prediction models in this context is easy to grasp. But better prediction accuracy is cold comfort for the bank if it also leads to costly litigation around allegations of unlawful discrimination and disparate impact. To take another example, who is liable for patient harm due to a faulty AI diagnosis? The doctor? The developer of the AI tool? The supplier of data to train the AI tool? The insurance company that mandates its use? These and other sources of uncertainty will slow the rollout of commercial AI applications.

While terms like “artificial intelligence” and “machine learning” are brilliant pieces of marketing, they also inspire fear-based impulses to (over) regulate AI. Most of what passes for AI is more aptly described as Applied Statistics with Giant Datasets, Cool Algorithms, and Fast Computers—ASGDCAFC. Now that I’ve coined this elegant acronym, others will surely adopt it in the interest of fostering accurate perceptions and sober assessments. Okay, that won’t happen. Instead, we can anticipate broadly felt anxieties about the potential harms of AI and a political class that caters to those fears—whether well founded or not.

In fact, U.S. and European governments are rapidly advancing new proposals to regulate AI technologies, and there is every indication of more regulation to come. Seventeen U.S. regulatory agencies issued AI

regulations in 2022, and 21 agencies did so in 2023, including the Department of Transportation, the Department of Energy, and the Occupational Safety and Health Administration.¹² Even when new regulations are well designed, they will raise the cost of implementing AI technologies. Uncertainty about current and future regulation discourages innovation and implementation, as I've discussed elsewhere in a broader context.¹³

At least over the next few years, AI-based workplace applications are likely to focus on performance improvements rather than automation. That is, AI will be used in tandem with human judgment and decision making, rather than as a substitute. For example, AI tools could be useful in recognizing potentially harmful drug interactions for a patient and alerting medical staff to the risk. As another example, AI tools can help technical support staff provide better customer service. In other words, even as AI applications penetrate the workplace, they may change the nature of many jobs rather than displacing them.

Systematic evidence also suggests that AI will not bring large job losses in the next several years. The economists Daron Acemoglu, David Autor, Jonathon Hazell, and Pascual Restrepo use online job ads to identify AI-exposed establishments, and to estimate the impact of AI on wages and employment.¹⁴ While they find some effects at the establishment level, they write, “the aggregate impacts of AI-labor substitution on employment and wage growth in more exposed occupations is currently too small to be detectable”.

AI-driven job loss will bring less hardship than industrial job loss.

To the extent that AI displaces some jobs (while creating others), it will bring less economic hardship and dislocation than suggested by U.S. experience with the loss of manufacturing jobs. I reach this view based on several observations.

Let's start by noting some distinctive characteristics of (lost) manufacturing jobs. Most U.S. recessions since 1945 have involved large, spatially concentrated contractions in the manufacturing sector. As a result, many manufacturing workers lost jobs in the same places at the same time. That made it harder for each job loser to find an attractive new job. Other things equal, losing a job in a recession has a much greater negative impact on future earnings than losing a job in an expansion.¹⁵ Because job losses in the manufacturing sector were concentrated, spatially and temporally, they led to worse outcomes for individual job losers.

Job losses in most other sectors of the economy are less concentrated spatially and temporally. That's true of AI-exposed jobs as well, which are distributed across a broad range of industries.¹⁶ Most of these industries are less cyclically sensitive than manufacturing. Hence, future job losses in these industries—whether due to AI or other forces—won't be as concentrated in recessions as manufacturing job losses. And they won't be as spatially concentrated. Their less-concentrated character is the first reason to anticipate that AI-driven job losses will bring less economic hardship than manufacturing job losses.

The second reason: To the extent that AI-exposed workers and jobs are concentrated in particular states and areas, it's in the more densely populated parts of the country.¹⁷ Thus, AI-driven job losses are also likely to be concentrated in densely populated areas. Other things equal, the larger and thicker labor

markets typical of dense urban areas lead to shorter non-employment spells and smaller earnings losses for job losers.¹⁸

The third reason is that the industry mix of employment has become more similar across U.S. states and regions in recent decades. Partly for that reason, the timing and severity of national recessions have become more uniform across states.¹⁹ These developments unfolded over decades, and they will persist for many years to come. Hence, looking forward, future U.S. recessions will be more evenly felt across locations than past recessions, and there will be less spatial concentration of job losses. That's the case whether or not the job losses reflect workplace applications of AI technologies. Conditional on the scale of job loss, that means fewer job losers seeking new jobs in highly depressed local markets.

The last two reasons go back to remote work. By relaxing locational constraints, WFH enlarges the geographic reach of labor markets for fully remote and hybrid jobs and for the workers who fill them. Effectively, the labor markets for these jobs are now larger and thicker, which is another reason to anticipate shorter non-employment spells and smaller earnings losses for job losers in remote-suitable occupations. That includes many AI-exposed occupations.

Finally, Chart 2 tells us that, on average, each employer's workforce is becoming more geographically dispersed. That's yet another reason to anticipate that firm-wide (and industry-wide) contractions in the future will be less spatially concentrated. Thus, we can see that the resilience of WFH will also help mitigate the economic hardship associated with future AI-driven job losses.

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¹ Chart 1 draws on the U.S. [Survey of Working Arrangements and Attitudes](#) (SWAA)—which I designed with Jose Maria Barrero and Nick Bloom—and the U.S. Census Bureau's [Household Pulse Survey](#) (HPS). See Barrero et al. (2024a) for an analysis of how measured WFH rates differ across major U.S. survey sources.

² See Hansen et al. (2023) and the updates of their statistics at www.WFHmap.com.

³ Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2021. "Why Working from Home Will Stick", National Bureau of Economic Research Working Paper 28731.

⁴ Davis, Steven J. 2024. "The Big Shift in Working Arrangements: Eight Ways Unusual". *Macroeconomic Review*, 23, no. 1 (April).

⁵ Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2023. "The Evolution of Work from Home," *Journal of Economic Perspectives*, Vol. 37 (4), Fall 2023, 23-50. The authors consider evidence on the productivity effects of remote work.

⁶ Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2021. "Why Working from Home Will Stick".

⁷ Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2023. "The Evolution of Work from Home", *Journal of Economic Perspectives*, Vol. 37 (4), Fall 2023, 23-50.

⁸ Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2021. "Why Working from Home Will Stick".

⁹ Akan, Mert, Jose Maria Barrero, Nicholas Bloom, Tom Bowen, Shelby Buckman, Steven J. Davis, Luke Pardue and Liz Wilke, 2024. "[Americans Now Live Farther from Their Employers](#)", February 2024.

¹⁰ Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2023. "The Evolution of Work from Home", Figure 1.

¹¹ Nestor, Maslej, Loredana Fattorini, Raymond Perrault, Vanessa Parli, Anka Reuel, Erik Brynjolfsson, John Etchemendy, Katrina Ligett, Terah Lyons, James Manyika, Juan Carlos Niebles, Yoav Shoham, Russell Wald and Jack Clark, 2024. *The AI Index*. Chapter 4.

¹² Nestor, Maslej, Loredana Fattorini, Raymond Perrault, Vanessa Parli, Anka Reuel, Erik Brynjolfsson, John Etchemendy, Katrina Ligett, Terah Lyons, James Manyika, Juan Carlos Niebles, Yoav Shoham, Russell Wald and Jack Clark, 2024. The AI Index. Chapter 7.

¹³ Davis, Steven J., 2017. "[Regulatory Complexity and Policy Uncertainty: Headwinds of Our Own Making](#)".

¹⁴ Acemoglu, Daron, David Autor, Jonathon Hazell and Pascual Restrepo, 2022. "[Artificial Intelligence and Jobs: Evidence from Online Vacancies](#)", Journal of Labor Economics, 40, S1, S293-S340.

¹⁵ Davis, Steven J. and Till von Wachter, 2012. "Recessions and the Costs of Job Loss", Brookings Papers on Economic Activity.

¹⁶ Acemoglu, Daron, David Autor, Jonathon Hazell and Pascual Restrepo, 2022. "Artificial Intelligence and Jobs: Evidence from Online Vacancies", Journal of Labor Economics, 40, S1, S293-S340.

¹⁷ CEA (Council of Economic Advisers), 2024. Economic Report of the President. U.S. Government Printing Office.

¹⁸ Moretti, Enrico and Moises Yi, 2024. "Size Matters: Matching Externalities and the Advantage of Large Labor Markets", NBER Working Paper 32250.

¹⁹ Fieldhouse, Andrew, Sean Howard and David Munro, 2024. "The Emergence of a Uniform Business Cycle in the United States: Evidence from New Claims-Based Unemployment Data". Forthcoming, Brookings Papers on Economic Activity.