US Rates Strategy

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Where is AI productivity?

Task studies involving AI use at work point to significant time savings. Yet, measured non-farm productivity is growing close to its long-term average and only modestly faster than its pre-COVID pace.

- **AI significantly shortens the time needed to complete many work tasks**. Hartley reports average time savings of 71% across 34 common work jobs.[1] This is close to estimates based on Claude conversations.[2] Peng notes programmers using AI for coding were 56% faster than non-users.[3]

- **Although non-farm productivity is growing faster than its pre-COVID pace it hardly matches these task savings results**. Estimated productivity gains over the next decade range from 0.7% to 1.8%. The latter would be a near doubling of its current pace.

- But these estimates are subject to some interpretation. **Most of the current corporate work is experimental or only at the pilot stage. Adoption is highest for relatively easy tasks that have readily defined, measurable outcomes**. These tasks are likely to be the first to be automated and replaced by AI once the technology is rolled out firmwide.

- **Behavioral biases may influence the time savings results**. Worker surveys may overstate AI use reflecting social desirability effects. **"Work leisure", or the propensity to use the time saved from AI-use for non-work-related activities may also lead to some overstatement**.

- **By contrast, short-term productivity gains may be understated because adoption requires investment in complementary intangibles like training and new business processes.** Over time, these effects are captured in the output data as increased productivity creating a "j-shaped" effect.

[1] See, "The Labor Market Effects of Generative Artificial Intelligence", J. Hartley, F. Jolevski, V. Melo, and B. Moore, Stanford University, World Bank, Clemson, and Stanford, October 2025.
[2] See, "Estimating AI productivity Gains from Claude Conversations", A. Tamkin, and P. McCrory, Claude.ai, November 5, 2025
[3] See, "The Impact of AI on Developer Productivity: Evidence from GitHub Copilot", S. Peng, E. Kalliamvakou, P. Cihon, and M. Demirer, Microsoft Research, GitHub, and MIT, arXiv:2302.06590v1, February 13, 2023.

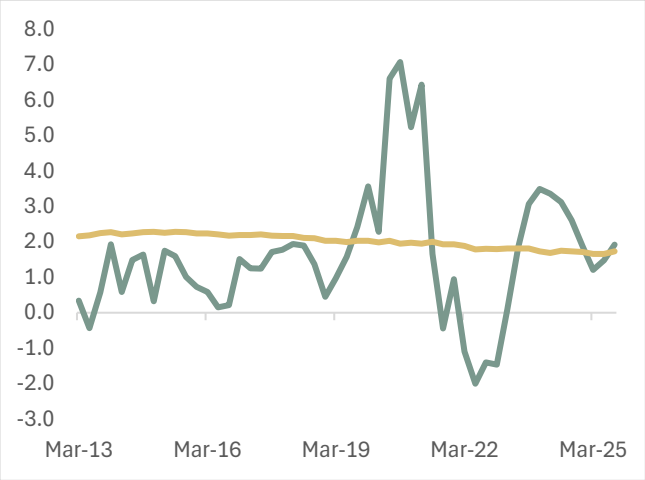
Task studies

Non-farm productivity is growing at its long-run historical pace of just below 2% (Figure 1). Average annual growth in output per hour since the introduction of ChatGPT has averaged 2.2% compared to 1.6% between 2015-19 despite reports of an impending revolutionary shift in how people work.[4] To paraphrase Robert Solow, it seems that AI "is everywhere but the productivity statistics".

Some of this may reflect the nature of the studies done so far on AI productivity gains. **Most of these studies are surveys of workers who are essentially asked how much time they save using AI to perform some of their common work chores**. Peng et al (2023) is interesting because it looks at a specific – albeit very narrow – task and compares the result of AI-trained and untrained workers. Using an online freelancing website (Upwork), contractors were asked to create a http server in JavaScript. One set received training in GitHub Copilot, an AI coding program. **The "trained" contractors completed the task about 56% faster**. On average they finished the job in 72m compared to the control group than needed an *additional* 89m to complete the same task. There was no difference between the two groups' success rate – each completed the task.

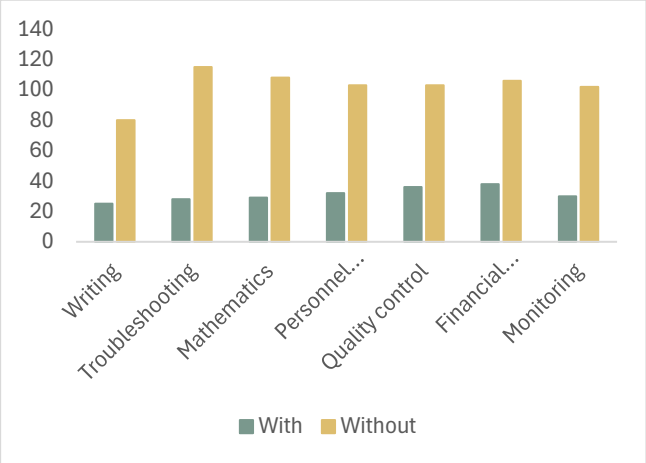
More commonly, workers are surveyed directly about how much time AI saves them while performing certain tasks. Hartley et al, for example, find that, on average, across 34 different work tasks, AI time savings is significant – even larger than the Peng study. **Time savings averages 71%; a task that would take 112m instead takes 31m**. We plot the time saved for some common work tasks like writing, financial and personnel management (Figure 2).

Figure 1: Non-farm productivity (%y/y)



Note: The gold line is a rolling 20y average. Average annualized growth since 1970 is 2%. Source: BEA, SMBC Nikko

Figure 2: Task completion times (m)



Source: Hartley et al, SMBC Nikko

Bick et al take a somewhat broader approach.[5] Rather than looking at specific tasks, they ask workers in various occupations how many additional hours they would need to complete their work in the absence of AI. They also compare these results against a survey taken a year-earlier (2024) (Figure 3). First, across

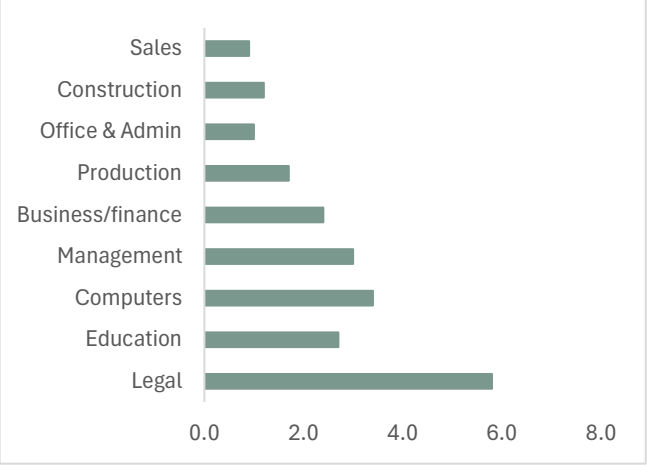
[4] We exclude the distortions to productivity caused by COVID.
[5] See, "The State of Generative AI Adoption in 2025", A. Bick, A. Blandin, and D. Deming, Federal Reserve Bank of St. Louis, November 13, 2025.

all occupations, workers estimated they saved 2.5% of the prior week's hours worked. Assuming a 40h work week, this translates into about an hour. **It is possible that this *understates* the true amount of time saved**. Peng, for example, found that when programmers were asked to estimate the amount of time they saved using GitHub, they significantly underestimated the actual savings.[6] This might reflect a tendency of workers to overstate their current productivity (see below). A recent study takes out the human element from the time survey and instead, asks the Claude software to estimate the time savings based on 100,000 conversations.[7] Bick et al, note that the amount of estimated time savings has *doubled* from their 2024 results. This makes sense given the reported increase in the frequency and duration of AI use at work (Figure 4).

Productivity gains

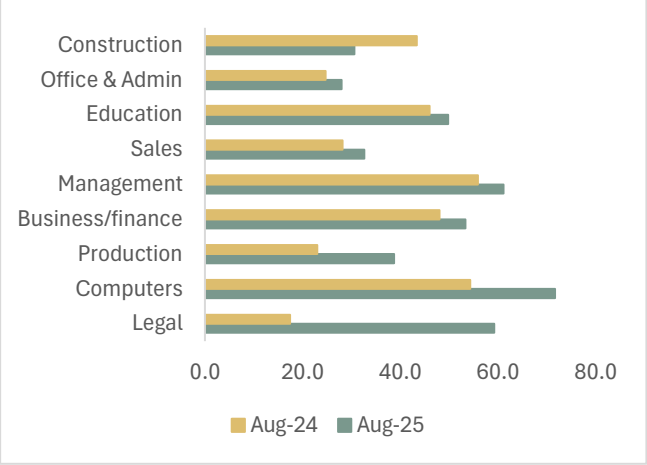
Bick applies the time savings results to a standard output model and notes that labor productivity might have increased 1.3% since the introduction of ChatGPT in late 2022. Pre-COVID average productivity growth (2015-19) was 1.4%/y so, their estimate would account for all the reported acceleration in productivity since COVID – and suggests that non-AI related productivity has declined. Acemoglu arrives at a smaller potential productivity gain – potentially around 0.7% over a 10y horizon.[8] He applies an estimate of AI-exposed tasks to an estimate of average time savings of 27%. **If we instead use the time savings results from Peng et al or Hartley et al, the potential productivity gain increases to between 1% and 1.4% over the period**. Estimates from the Claude conversations suggest that productivity might increase 1.8% (effectively doubling the current pace) in the next decade.[9]

Figure 3: Hours saved using AI (% prior week)



Source: Bick et al, SMBC Nikko

Figure 4: AI adoption (% reporting use)



Source: Bick et al, SMBC Nikko

The productivity gains seem small compared to the task survey data. After all, if a task that used to take 90m now only takes a worker 30m to complete, her productivity has increased 3-fold; she can

[6] Programmers estimated that they were 35% faster when they were actually 56% more productive.
[7] See, "Estimating AI productivity Gains from Claude Conversations", A. Tamkin, and P. McCrory, Claude.ai, November 5, 2025.
[8] See, "The Simple Macroeconomics of AI", D. Acemoglu, MIT, April 5, 2024.
[9] See Tamkin and McCrory.

accomplish 3-times as many tasks in the same 90m of work. However, there are several measurement and behavioral issues that the task survey data may not fully address.

Measurement and behavioral issues

First, Acemoglu's estimate of future productivity gains rests on an additional assumption beyond the average time saved; **that is, what portion of jobs are exposed to AI?** His estimate (from other research) is around 20% which is much lower than what the AI adoption figures suggest. But the 60% adoption by legal workers says nothing about how much of their work could be replaced or improved by AI. AI might be used to draft new legal contracts just as easily as it can be used as an enhanced search engine or proofreader.

Indeed, this highlights a related point made by Acemoglu regarding the nature of the tasks that AI is likely to replace and how quickly this might occur. **Low value or easy-to-automate tasks are most sensitive to replacement by AI**. These tasks have clear objectives so measuring successful completion makes it easier for AI to learn by comparing "right" and "wrong" answers. Not surprisingly, AI quickly becomes faster and better at completing these tasks than humans. **By contrast, harder tasks or ones without a clearly defined outcome or for which there is no database of results, are harder to replace with AI**. Acemoglu gives the example of diagnosing the causes of a dry cough. AI results are likely to mimic an "average" diagnosis across many doctors. This is quite a bit different from the programming example cited in Peng et al.[10] And it may explain the lack of hiring of recent college graduates; AI replaces "book learning" but not experience.[11]

There may also be a related issue with respect the AI job exposure estimate. Survey work from McKinsey suggests that most firms are only experimenting with AI currently and have only launched pilot projects.[12] So, while other survey data point to heavy adoption, it looks like most of this has yet to be rolled out beyond the early adopters at the firm.

Separately, we suspect that the reported use statistics may be overstated. **The data may be sensitive to a social desirability bias**. That is, workers may report using the technology more than they really use it because AI-use is viewed favorably by management. Indeed, employers have been encouraging workers to use the technology with bonuses because employees are fearful the technology will replace them or what to keep how they use the technology a secret to safeguard their jobs.[13] This contrasts with work measuring AI use among college students who significantly under-report. About 60% of college students report using AI but note that 90% of their fellow students use the technology. The underreporting reflects negative perceptions about how the technology might be used to cheat or otherwise enhance their work.[14]

Finally, we suspect that there may be some potential "work leisure" bias in the data. Workers who complete a writing task in 30m with AI that might normally take 90m have an additional 60m of "released" time. Output per hour would increase, if, for example, the worker used the extra 60m to, say, write more

[10] The nature of the test also makes it hard to judge the quality of the results; where some programs shorter/simpler?
[11] See, "Canaries in the Coal Mine? Six Facts about the Recent Employment Effects of Artificial Intelligence", E. Brynjolfsson, B. Chandar, and R. Chen, Stanford University, November 13, 2025.
[12] See, "The State of AI in 2025: Agents, Innovation, and Transformation", McKinsey, November 5, 2025.
[13] See, "Bosses Try Bonus Pools, Spot Cash Awards to Get Workers Using AI", J. Constantz, Bloomberg News, December 2, 2025.
[14] See, "Underreporting of AI Use: The Role of Social Desirability Bias", A. Imas and Y. Ling, University of Chicago, May 2025.

research. However, if the worker instead uses the time to research vacation prices, read the newspaper, or search ESPN, the amount of output and time spent on the task may show little change. Together with the social desirability bias described above this could account for a difference in reported time savings and measured productivity. Of course, in the long-run, employers will recognize the enhanced productivity of their workers and either assign three writing tasks over the 90m period or replace the worker. AI will either complement labor or be a substitute.

Longer-term productivity j-curve

Beyond any potential reporting and worker biases, the productivity gains from a new technology like AI may be misrepresented in output per hour data. Adapting the workplace to AI requires significant investment in new business processes, worker training and management. These, often intangible, investments are necessary to fully adopt the new technology. But any spending associated with intangible investment may initially bias the productivity statistics lower because labor and capital inputs applied to the output have increased.[15] That is, the same output using the new technology may be produced with more capital and labor than what was required using the old technology. However, once these investments have been fully incorporated and optimized into the new technology output will increase and measured productivity will rise. The effect results in a "j-shaped" productivity curve; output per hour is low initially as the technology is adopted and then accelerates once the intangible investments start bearing returns.

While we believe AI will boost non-farm productivity it is unclear when this will start showing up in the data. And while the task level data suggest a very sharp acceleration once fully rolled out, it is not clear yet how sustainable the initial, heightened productivity gains will be once AI is applied to harder to automate tasks.

[15] See, "The Productivity J-Curve: How Intangibles Complement General Purpose Technologies", E. Brynjolffson, D. Rock, and C. Syverson, NBER, January 2020.

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