Global Economic Viewpoint

AI Matters #3: A large productivity take-off is ahead - just not immediately

Where are we now? Macro gains are lagging micro so far

AI is already boosting productivity gains in very specific well-defined tasks (i.e., +55% in software development, +40% in writing). But these increases have yet to scale sharply across the whole economy. In practice, slow adoption, skills gaps, and organizational constraints have limited AI's impact on output. Thus, for now, economy-wide productivity (TFP) is only rising about 0.1% per year. This is a small aggregate effect relative to all the excitement around AI.

Productivity upside could be 10x the current estimates

AI differs from earlier technologies in that it can take on a broader range of tasks and continuously expand what it can do. As AI models improve and the technology spreads to more tasks and becomes cheaper, macro gains could be much larger. We think AI could have a much bigger impact on aggregate productivity—up to 10x larger than what we're seeing today. Global growth is at 3.5% and AI-driven productivity gains are currently adding 10 basis points per year to it. But in the best case, AI-driven productivity could lift growth by about 1% a year over the next decade, increasing global growth to 4.5%.

Innovation productivity is the real multiplier

AI can also lift the productivity of innovation itself, speeding up idea generation and improving the growth rate, not just the level, of long-run output. This means that even modest improvements will compound over time into substantially strong er economic outcomes. In our view, there will be significant increases in productivity in the long run, but not just immediately.

Diffusion will create winners and losers

Countries with stronger capacity to adopt AI, especially the US and China, will capture productivity increases earlier and more fully than potential laggards, such as Europe and EM economies. Even small differences in variables today, like diffusion, could not only drive bigger one-time productivity boosts but also leave some permanently ahead while others fall behind never managing to close an ever-expanding gap.

AI will widen the r* divide across global economies

Fast adopters (US/China) are likely to see higher neutral interest rates (r*) as stronger productivity boosts the return on investment and drives more demand for capital. Slower adopters (Europe/EM), by contrast, will see smaller increases in neutral rates as their output lags. Although, for now, the overall global path for r* remains uncertain: higher inequality, a falling labor share of income, and aging populations may make households inclined to build up savings as security, offsetting, or even reversing, part of the upward push from investment.

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Economics
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Previous reports in the series

AI Matters #1: The tip of the AI-ceberg?

AI Matters #2: Adaptability is the new job security

Did you know?

- **Adoption is increasing:** AI adoption hit 64% globally across industries in 2025, according to Nvidia's "State of AI" surveys.[1]
- **Junior workers benefit from AI-productivity:** GenAI boosts consumer-support productivity by c 15%, with the biggest gains among less-experienced workers.[2]
- **Software is greatly benefited:** Software developers using AI code assistance complete 26% more tasks overall during the workday. [3]
- At the same time, **software job postings on Indeed are at their highest since 2023** and have risen consistently over the last two months. [9]
- According to the OECD, **firms more exposed to generative AI tend to make better-informed, strategic investments** and achieve higher returns, though causal links are uncertain.[5]
- **Despite productivity gains, diffusion is uneven:** AI adoption in the Global North grew almost twice as fast as in the Global South.[7]
- **It's not just North America:** South Korea jumped from 25th to 18th in global AI-usage rankings in 2025 with stronger policy support, better Korean-language frontier models, and fast consumer uptake. This is one of ChatGPT's fastest-growing markets and prompted OpenAI to open a Seoul office.[7]
- **Web usage:** Chatgpt.com became the 5th most searched website in 2025 (up from 19th in 2024) in the US.[6]
- **North America leads AI usage** with 70% of companies actively deploying it, with larger companies (> 1,000 employees) having broader adoption. 65% in EMEA and 63% in APAC.[1]
- **Gains in small tasks:** in short-term work activities (20-60 mins.), each new year of LLM advancement cuts task time by c 8% on average in the US.[4]
- **Europe AI use:** in Europe, most firms deploy AI to improve processes, not to reduce personnel costs or accelerate R&D and innovation.[8]
- **AI-related patent filings lift US stock prices far more than EA stocks**, revealing a much stronger market reaction to expected AI-driven productivity gains in the United States.[8]

Sources: [1]Nvidia, [2]Brynjolfsson et al. (2025), [3]MIT, [4]Merali (2025), [5]OECD, [6]ActivTrak, [7]Microsoft Research, [8]Lane (2026). [9]The RIC Report

AI is about to lift macro productivity

So far, AI's macro-level productivity impact remains limited. While evidence shows large task-level (micro) productivity gains, AI has barely moved aggregate productivity, echoing the early phases of past breakthroughs such as electricity and ICT. But AI is different: its scale, general-purpose nature, and boost to innovation mean long-run gains could far exceed what we are currently seeing. Indeed, we expect fast adopters like the US and China to be the first to show a clear rise in macro productivity —specifically higher total factor productivity. That would raise the marginal product of capital, lift investment, and push up r*. But the overall global path for r* remains uncertain: higher inequality, a falling labor share of income, and aging populations may increase desired household savings, offsetting, or even reversing, part of the upward push from investment. Meanwhile, we think that slower adopters (Europe/EM) risk persistent productivity (and r*) divergence.

AI and productivity: Big micro, small macro—for now

There is clear evidence that AI is sizably increasing productivity at the micro level. But the more we move away from the micro to the aggregate (macro), the smaller the impact becomes. These findings suggest that short-term aggregate effects are dampened by heterogeneity across firms and sectors (Exhibit 1).

Exhibit 1: The literature is inconclusive so far on the impact of AI on productivity
Empirical evidence on AI and productivity

Study	Level	Productivity measure	Results
Acemoglu & Restrepo (2020) – AI and Jobs	Industry & occupation panels (US)	Labor productivity (industry)	Small positive average effects; strong heterogeneity across sectors
Rammer et al. (2022)	Firm-level panel (Germany)	Labor productivity, innovation output	Positive but modest productivity effects, stronger innovation impacts
Aghion et al. (2023) – AI and Firm Dynamics	Firm-level (multi-country)	TFP, markups	TFP ↑ ~3–5% for adopters; gains concentrated in frontier firms
BIS (2024) – AI Adoption and Productivity	European firm panel	Labor productivity	Adopting firms ↑ ~4% relative to non-adopters
OECD (2024) – AI, Productivity and Growth	Cross-country & firm surveys	Labor productivity, TFP	Positive firm-level effects; aggregate effects delayed (J-curve)
Babina et al. (2024) – AI and Capital Deepening	Firm-level financials (US)	Output per worker, capital intensity	Productivity gains mediated by capital deepening
Filippucci et al. (2025) – Measuring AI's Contribution	Macro & sectoral data	Aggregate TFP	Measured effects small; true effects likely understated

Source: BofA Global Research

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Short-term productivity gains are constrained by several frictions. First, workers and managers require time to adapt to AI systems. Second, existing workflows may not align with AI-enabled processes, so organizational innovation is required. Third, there could be a mismatch between AI-driven skill demand and the current skills of the workforce, which needs time to retrain. As a result, the short-term impact of AI on aggregate productivity is frequently modest, and in some cases statistically indistinguishable from zero at the macro level.

With what we know today, the academic literature is inconclusive on how big the boost to aggregate productivity will be. But AI is different, if we are to compare it to previous

innovations such as electricity or Information and Communication Technology (ICT). What makes AI different is that it can have an impact across a broader part (sectors) of the economy. Small improvements on this front can easily magnify the impact on aggregate productivity 10 times over the next decade (see below for some examples). But crucially, AI can also increase the productivity of innovation, i.e. it has the potential to affect cognitive work and the generation of ideas. In other words, it can make innovation more productive.

This is what, in the long term, can make AI go beyond a one-off level effect on productivity to impacting productivity growth. It can potentially lead to an increase in the growth rate of productivity, taking the economy to a faster (permanent) trajectory, in an optimistic scenario. It takes time though, as we saw with IT, for the new ideas that are possible to new technologies to arrive. In the meantime, c ountries that are better positioned to convert AI into durable productivity gains such as the US and China are more likely to have larger one-off effects in productivity and be closer to the more optimistic scenario. The average country in Europe, instead, is unlikely to benefit as much absent substantial reforms. The impact would likely be even smaller in countries in EEMEA and in LatAm.

The micro evidence

There is plenty of research on the impact of AI on productivity at the microeconomic level. Empirical firm-level studies often find positive but uneven short-term effects. In general, for well-scoped cognitive tasks, gains can be substantial, in the range of 20-50%. Those gains are somewhat smaller in the context of real operational settings (5-20%). Those numbers are reduced, but still decent, when looking at firm-level averages (often delayed). Exhibit 2 provides a summary of some recent research on AI-productivity.

Exhibit 2: Significant productivity gains in well-scoped tasks, smaller average effects at firm level Review of recent AI–productivity research

Study	Context & Task	Productivity Measure	Estimated Effect Size	Key Heterogeneity Findings
Shakked Noy & Whitney Zhang (2023)	Professional writing tasks using ChatGPT	Time to completion; blinded quality ratings	+37–40% faster completion; +–18% quality improvement	Largest gains for lower-baseline performers; quality gains persistent even when time controlled
Erik Brynjolfsson et al. (2023)	Customer support agents using generative AI assistant	Tickets resolved per hour; retention; quality proxies	+14% productivity on average	Gains concentrated among less-experienced workers (up to +35%); minimal gains for top decile
Peng et al. (2023, GitHub Copilot study)	Software developers completing coding tasks	Task completion time	+55% faster task completion	Larger effects for less familiar problems; lab setting may overstate real-world gains
Brynjolfsson, Rock & Syverson (earlier AI diffusion work)	Broad AI adoption across firms	Revenue per worker; TFP (varies by study)	Positive but modest short-run effects; often statistically fragile	Strong dependence on complementary investments (IT, management practices)
Czarnitzki et al. (2023)	European manufacturing & services firms	Labor productivity: value added per worker	≈3–8% higher productivity for AI-adopting firms	Larger effects in skill-intensive sectors; adoption endogeneity remains concern
OECD synthesis (2024/25)	Cross-country, multi-sector	Various (task-level to TFP)	Consistently positive at micro level; macro effects uncertain	Diffusion speed and organizational change dominate long-run outcomes

Source: BofA Global Research

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Simple arithmetic shows the limit today

The discussion above shows how estimated effects of AI on productivity systematically shrink as we move from micro towards macro. There are several potential reasons for this. At the task level, tasks are well defined. As complexity increases, AI must integrate with the workflow and the organization, workers need to acquire the skills, plus technical, legal, and organizational constraints can slow or reduce the impact (data protection, security concerns, among many others, are also natural sand in the wheel for adoption rates). This is even more the case at the macro level, where diffusion can be even slower given all the constraints cited above.

There are also well-established potential measurement issues that could magnify the gap between micro and macro effects. Those include, among others, from poor measurement of improvements in outcomes such as quality, reallocation effects, non - linearities in the impact of AI, or distorted measurement of intangible investments. There are also physical constraints that could slow AI's scaling (energy, infrastructure, which could also be relevant for the long-run impact), as these factors will help determine the transition of micro efficiency gains into macro productivity.

But beyond all these factors, recent work by Wolfers[1] (based on Acemoglu, 2024[2]) shows clearly why it could be hard today to see any significant aggregate macro effect on productivity in the long term, despite sizeable impacts at the task level.

If AI can transform 20% of all tasks today, based on recent estimates, and only 23% of those tasks make economic sense to automate, that means less than 5% of tasks would end up being done by AI. If automated tasks, on average, allow for almost 30% reduction in labour costs, the overall savings in labour costs would stand slightly above 1% (1.2%). Given that labour is roughly half of all costs, the aggregate saving (or the increase in labor productivity) would amount to 0.66%. Exhibit 3 shows these numbers.

Exhibit 3: As of today, the AI impact on aggregate productivity is likely to be small But it could be sizeable in the long run

Task that could be transformed by AI	Task cost-efficient to be automated	Savings from automation	Labor share	Productivity increase
20%	23%	27%	53%	0.66%
40%	23%	27%	53%	1.32%
20%	100%	27%	53%	2.86%
60%	50%	40%	57%	6.84%

With capital deepening

Task that could be transformed by AI	Task cost-efficient to be automated	Savings from automation	Labor-share	Increase in investment	Capital output ratio	Productivity increase
20%	23%	27%	53%	0.66%	0.73	1.14%
40%	23%	27%	53%	1.3%	0.73	2.28%
20%	100%	27%	53%	2.9%	1.73	7.81%

Source: Wolfers (2025).

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That would be the static gain, today, everything else equal, i.e. assuming nothing else changes and that implementation and reallocation of factors is smooth and efficient. Add to that slow relocation, regulatory barriers, and organizational bottlenecks, and near term we would have negligible gains.

Of course, as time passes those constraints lessen. More importantly, companies may invest more in response to an increase in the productivity of capital investments. If we take a similar increase in capital to that of labour, the overall productivity gain (total factor productivity, TFP) would end up being slightly above 1%, cumulative, in the transition to that new "economy" with more productivity and a higher level of capital

[1] Justin Wolfers, 2025, The Economics of AI: A Brief Tour, in Governor's Economic Outlook Briefing, Lansing – November 25.
[2] Daron Acemoglu, 2025, "The simple macroeconomics of AI" Economic Policy, vol 40(121), pages 13-58.

(let's say, in 10 years). So given what we know today, productivity gains at the aggregate level are likely to be very small.

AI is different: breadth and the productivity of innovation

AI differs from past technologies because it can reach a far broader share of tasks, and the portion that is economically automatable is likely to rise quickly as models advance. New estimates already suggest potential productivity effects up to 10x larger than earlier calculations, with even small shifts in task coverage or cost-effectiveness producing disproportionately large TFP gains. More importantly, AI can also raise the productivity of innovation itself, amplifying idea generation and turning a one-off level boost into faster ongoing productivity growth. Even modest improvements in innovation rates can shift economies onto permanently higher trajectories, with large cumulative effects over time.

AI is different (1): broader

AI is different, if we are to compare it to previous innovations such as electricity or ICT. What makes AI different is that it can have an impact across a broader part of the economy. And, while today only 20% of tasks can be transformed by AI and only 23% of those tasks are cost-effective to automate, those numbers could change rapidly given how quickly AI innovation is advancing.

Indeed, recent work by Aghion et al (2024) uses more updated figures for each column (last line of Exhibit 3) and finds aggregate productivity impacts over the next decade that are cumulatively 10x larger.[3]

To illustrate this further, going back to the previous example, if we simply double the percentage of tasks that could be transformed by AI, everything else equal, the aggregate impact on productivity (TFP), including capital deepening, would be north of 2%. If AI ends up affecting all tasks, everything else equal, those productivity gains would multiply by more than 5. Alternatively, even if only 20% of tasks could be transformed by AI, if it becomes cost-effective to use AI with all of them, productivity gains in the next decade would multiply by more than 7.

AI is different (2): the productivity of innovation

More importantly, AI can also increase the productivity of innovation, i.e. it has the potential to affect cognitive work and the generation of ideas. In other words, it can make innovation more productive. This is key: the ability of AI to increase the productivity of innovation is what, in the long term, can make it go beyond a one-off level effect on productivity to impacting productivity growth. It can potentially lead to an increase in the growth rate of productivity.

To illustrate this, we show a simple example from Baily et al. (2023) in Exhibit 4.[4] The starting point is a baseline for cumulative GDP growth since year 0. The "level" scenario corresponds to one in which AI acts as a level effect on productivity like our discussion in the previous sections. After a few years of faster GDP growth, the economy stabilises in a trajectory which is parallel with, but higher than, the baseline. The second scenario is one where AI also increases the productivity of innovation by 20%. In that case, the impact of AI goes well beyond a one-off effect, and the economy finds a faster (permanent) trajectory. In other words, small changes in the rate of innovation can have large cumulative effects over the years.

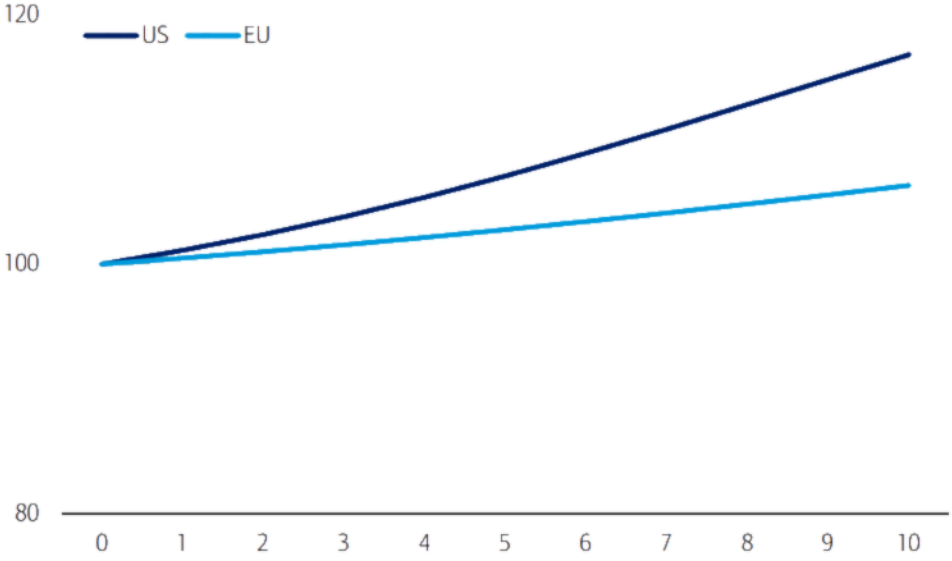
[3] Philippe Aghion and Simon Bunel, 2024, "AI and growth: Where do we stand?", policy note.
[4] Martin Neil Baily, Erik Brynjolfsson, and Anton Korinek, 2023, Machines of mind: The case for an AI-powered productivity boom, Brookings.

in Europe is half that of the US would lead to half the cumulative productivity gains in the long run). Small differences in the variables described above could not only make the one-off productivity boost in China and the US larger, but also eventually make them jump to the orange line. Meanwhile Europe, at best, could get stuck in the light blue line, leading to a permanent divergence between the region and the rest.

A recent survey by Yotzov et al. (2026) finds that firms expect sizable AI-driven productivity gains over the next three years —1.4% on average (about 0.5% per year).[5] But expectations differ sharply across countries: firms in the United States anticipate a 2.3% boost (0.8% per year), compared with just 0.9% in Germany (0.3% per year).

As another example, Exhibit 5 shows a very simple exercise, a calibration of a very simple Solow type model (without capital accumulation, i.e. only with productivity growth) where the main difference between the US and the EU is the speed of diffusion. This is just for illustrative purposes and values should not be taken at face value.

Exhibit 5: Speed of diffusion can lead to large cumulative differences in output per capita over time
Output per worker in a Slow style model with AI. Output per capita., Normalized to 100 from start



Source: BofA Global Research

AI likely pushes r* higher for fast adopters (US/China)

Countries that adopt AI rapidly —most notably the US and China— are likely to experience higher r* as sustained productivity gains lift the marginal product of capital and boost investment demand. Slower adopters —such as Europe and many EMs— are likely to see smaller r* increases, if any, as their productivity lift will be weaker.

AI's effect on r* is inherently mixed. On one side, durable productivity gains from automation, better decision-making, and new business models raise investment demand, mirroring episodes like electrification or the late-1990s tech boom, when firms front-loaded capex and real rates climbed. The impact on r* could be transitory if AI only delivers a level boost to productivity, although we think it will likely be more permanent as we see AI impacting the growth rate of productivity.

But several structural forces push back. If AI raises capital income more than labor income, the resulting increase in inequality may lift desired savings, as high-income households save more, dampening consumption and offsetting investment-driven upward pressure on r*. Demographics add another drag: longer lifespans, including those supported by AI-enabled medical advances, could increase household savings if

[5] Ivan Yotzov, J.M. Barrero, N. Bloom, et al., 2026, Firm Data on AI, NBER Working Paper No. 34836.

retirement ages do not adjust. In countries with weak pension systems, desired savings could rise even further. Conversely, falling public savings would push r* in the opposite direction.

Overall, AI clearly has the potential to raise r*, especially where productivity gains are early and large. That points to upward pressure in r* in the US and China. Slower adopters (Europe/EM) will see weaker investment pressure and therefore smaller moves in r*. But across all economies, the balance is uncertain because rising inequality, shifting labor shares, and aging populations may increase desired household savings, offsetting part of the upward push from investment.

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