

Macro Focus: Generative AI has entered the chat

How AI could rearrange the labour market and global economy

- AI could help ease labour market inequalities and spur productivity
- AI could mean higher real interest rates and lower inflation
- Short term disruption is probably inevitable

The genie is out of the bottle. In November 2022, OpenAI released ChatGPT, a conversational chatbot based on a generative pre-trained transformer model, marking a significant leap in the field of generative AI. The platform reached one million users within five days, and 100 million in the first two months. Within a few months after the launch Google, Baidu, and Meta (among others) accelerated the development of their own competing products. Unlike traditional AI, which consists of rules programmed to perform specific tasks (like search engine optimisation), generative AI involves training a machine learning model to generate new content that is similar to a set of training data.

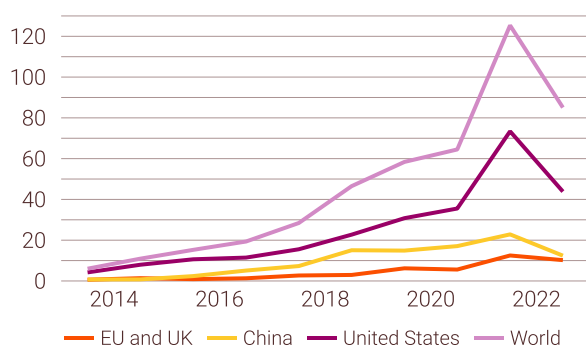
So far, introducing generative AI into the workforce has boosted productivity and efficiency, and creative tasks that were previously time-consuming and resource-intensive can now be accomplished rapidly with the assistance of various forms of AI. Going forward the effects of AI could be much more disruptive. Summarising this analysis using ChatGPT gives the following overview:

“The fear of AI centres on its impact on jobs, as evolving generative AI threatens to make certain tasks and jobs obsolete. AI already excels in tasks like coding and text generation. Historical evidence shows that technological shifts have complex effects on employment, with new jobs often emerging. AI adoption risks job changes and wage pressures. AI could reduce labour market inequalities, benefiting low-ability workers. MIT research suggests AI, like ChatGPT, raises productivity and narrows output gaps. AI’s impact on the economy includes potential productivity gains and GDP growth, affecting interest rates and inflation dynamics. The AI’s future impact remains debated.”

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Private investment in AI, 2013-2022

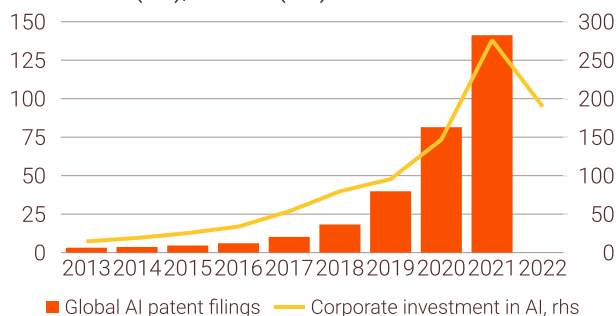
USD bn, constant 2021 prices



Sources: 2022 AI Index Report, Swedbank Research & Macrobond

Global investment in AI and number of AI patent filings, 2013-2022

Thousands (lhs); USD bn (rhs)



Sources: CSET, Swedbank Research & Macrobond

Investments in AI are trending

Between 2013 and 2021, global AI-related corporate investment increased almost nineteen-fold, up to almost \$280 bn. However, for the first time in a decade investment in AI experienced a slump, as investment in 2022 reached just short of \$190bn¹. Despite the stumble, investments are still on an upwards trend. In the first six months of 2023, venture capitalists (VC) have invested \$15.2 bn into generative AI companies globally, the bulk of the sum coming from Microsoft's \$10 bn investment in OpenAI. Even excluding this substantial sum, the value of VC investments in generative AI was up by almost 58% compared to the same period in 2022. Nvidia, the maker of the microchips required to power generative AI, became the sixth company in the world to reach a market capitalisation of \$1 trillion in May, its stock rising by 207% since the start of the year. All in all, over the past decade investments as well as the number of patent filings have grown substantially.

The fear of AI, and we are not talking about killer-robots...

We are instead talking about the fear of AI as an added component in society, and how this will affect human jobs. The fear of becoming obsolete with the evolution of AI is evident, but is it reasonable?

The simple – and harsh – answer is yes, as generative AI evolves, tasks as well as some jobs will become obsolete. AI can already outperform humans in various tasks, such as computer coding and crunching numbers, and with the recent development in GPT models it is also getting better and faster at producing text. Technology has sharply reduced jobs in manufacturing in the recent decades, but before this, employment grew in line with rapid technological change for over a century. Hence, it is more complicated than the statement of “automation causes job losses”, as the past industrialisation era introduced many new jobs while also experiencing rapid productivity growth in manufacturing.

An OECD survey illustrated the outlook surrounding AI adoption among employers and workers in manufacturing and finance, all of whom consistently signalling that jobs and job stability in finance faced higher risk than in manufacturing. However, less than a fifth of workers in both sectors were very or extremely worried about job loss in the next ten years, although many workers expected downward pressure on wages as a result of AI adoption. On a similar note, the World Economic Forum's latest biannual Future of jobs report predicts that nearly a quarter of all jobs globally will change in the next five years, estimating a net decrease of 2% on current employment. Then again, journalists at The Economist are recalling economists' predictions in early 2010's saying that “robots would kill jobs by the millions”, only to “fall silent when employment rates across the rich world rose to all-time highs”. Predictions ahead of previous technological shifts have often been far more pessimistic than the actual outcome, and despite the complex effects of automation on labour there is ample evidence that, historically, automation does foster productivity growth.

How AI could ease labour market inequalities

A principal difference between previous technological booms and this coming AI-era, some say, is the effect on the labour market. Previous shifts in technological advances have increased income inequalities by primarily benefiting the high-skilled labour force. The introduction of machinery in manufacturing has ultimately reduced demand for unskilled labour, as the most repetitive tasks were easily substituted. Now, with the breakthrough in AI, it could instead be the high-skilled labour force that is threatened, as generative AI has proven its ability to produce largely the same output in numbers and text as humans, while doing it a lot faster.

A study from MIT² published earlier this year evaluated ChatGPT's productivity effects on 450 professionals and found that using the chatbot for work purposes substantially raises average productivity: time taken decreases and output quality rises. Additionally, output inequality between high-

¹ Estimates by Stanford University's [AI Index report 2023](#)

² [Shakked Noy and Whitney Zhang \(2023\)](#)

ability and low-ability workers is cut in half by using the chatbot, revealing that low-ability workers experience a larger boost from using the chatbot than high-ability workers, hence closing the productivity gap between workers at different skill levels. If using generative AI increases overall efficiency, profits could rise, allowing the companies to expand their hiring. A survey by Experis, an IT-recruitment firm, backs up this theory by finding that a majority of British employers expect AI technologies to have a positive effect on their headcount over the next two years.

The MIT study predicts that automation technologies can go one of two ways from here. They can either increase unemployment, replacing human workers while impact on aggregate productivity may be small or non-existent, mainly redistributing income from workers to capital owners. On the other hand, if the automation technology is meant to complement existing workers it can simultaneously benefit workers, capital owners and consumers by raising productivity and wages while at the same time lowering prices. If the technology addresses unmet needs, demand will likely be elastic, and jobs will increase. However, if AI is targeted to already satiated markets, jobs will most likely be lost in the affected industries. If AI does not entirely replace humans, the technological change will create jobs rather than terminate them. It is also difficult to predict what jobs will emerge from the transition, as it is easier to estimate which already existing jobs could be affected. For instance, who could have predicted the growth in data analytics and programming jobs before the computer was invented?

Expanding the productivity boost to the wider economy

There is plenty of evidence that generative AI can improve worker productivity. The question is to what extent, and how fast, this will scale to an economy-wide boost in the ability to produce more goods and services relative to the input of work. In such a case where employment is not substituted, but rather complemented by AI the economy should see significant gains in aggregate productivity. AI-based tools may not just increase efficiency in already existing work but could also detect strategies to enhance productivity overall.

As predictions on the definite labour productivity boost caused by AI vary substantially, it makes it that much more difficult to estimate the aggregate gains on the wider economy. For instance, some estimates indicate that if AI would increase the productivity of all cognitive work by 30%, and cognitive work accounts for 60% of all labour, this would mean an increase in overall productivity over time by 18%³. Research from Goldman Sachs⁴, in turn, estimate that AI could increase annual global GDP by 7% over a ten-year period as a result of the boost to global labour productivity.

This would also have large effects on interest rates and inflation dynamics. With a supply shock like this one, increasing production capacity in the economy would at least temporarily exert a downward pressure on inflation, as demand would increase at a slower pace, thus somewhat capping price increases. Past examples of this effect are the productivity surge in the late 1990's, China's entry into the WTO and the following trade expansion in the 2000's, as well as the shale gas revolution in the 2010's. However, with expectations on increased real wages with the productivity boost, consumers would likely want to increase their spending today in order to smooth consumption. To keep prices down in the near term, interest rates need to increase to reduce the demand. If AI provides the major impact that people argue it will, we can expect higher growth, higher real interest rates, higher incomes, and subsequently lower inflation.

³ Estimates by Martin Neil Baily, Erik Brynjolfsson, and Anton Korinek in [Baily et al. \(2023\)](#)

⁴ Estimates by Jan Hatzius, Joseph Briggs, Devesh Kodhani, and Giovanni Pierdomenico in [Hatzius et al. \(2023\)](#)

The road ahead is technological, whether that is positive or negative remains to be seen

While frameworks and laws are being drafted across countries innovation is still rapidly advancing. As governments have admitted to dropping the ball on regulating social media, they do not want to make the same mistake with AI. Kent Walker, president of global affairs at Google and Alphabet, warns that obstructing innovation could mean missing out on ground-breaking scientific advances, proclaiming that “social media isn’t going to cure cancer, but AI has the potential to”. The threat of Russia or China coming in first to the finish line with a next-generation advanced AI might discourage even the most tech-conservative legislators in both Washington and Brussels from imposing the strictest regulations on the technology.

That technology growth is a given in the near future seems to be practically undisputed. However, predictions on whether the final effects will be positive or negative differ substantially. While many are hopeful about the technology, Elon Musk and Max Tegmark, both prominent names in the AI debate, are not as optimistic about the impact on society, instead warning that AI could cause civilisation destruction and the downfall of mankind.

Along with increasing use of generative AI, demand for skilled workers capable of operating and optimising these systems will rise. AI trainers, data scientists and AI ethicists are some of the emerging roles in the labour market, emphasising the need to understand AI’s biases, ethical considerations, and potential impact on society to ensure responsible and inclusive AI deployment. As innovation is still rapidly advancing at an extreme pace, the key question is perhaps not anymore whether AI will be introduced in the labour market, but rather to what extent and with what purpose? Some jobs may be completely automated in the near future, but most existing AI applications are targeted toward automating just some subset of tasks performed by specific occupations.

Additionally, the effects of AI will spread throughout the economy, showing signs of a probable growth spurt. From increased labour productivity, the step toward increased production is small. This could result in higher growth and lower inflation, although it is vital to keep consumption from outpacing production in order to keep prices stable.

A critical aspect is the unevenness of AI adoption. While it may not create overall unemployment in the next few years, it will likely eliminate jobs in some occupations while creating jobs in others. Automation of certain jobs may help redistribute manual labour to sectors that are currently experiencing severe labour shortages, while also increasing wages in these industries. The need to retrain and transition workers to new occupations, sometimes in new locations, might be highly disruptive even though the total employment rate remains high.

Granted, AI can outperform humans in some tasks today, but our current AI fails miserably at other tasks that humans perform. From spitting out incorrect birth dates and referencing articles that have never been written to frightening journalists by trying to break up their marriages or notifying them of their recent death⁵, generative AI without human supervision is not fully reliable yet. However, that step may not be too far off; The distance in capabilities from ChatGPT 3.5 to the newer premium-version 4.0 is astounding. Generative AI is on a learning curve, and it is moving fast.

⁵ For reference, the victims are journalists from NY Times ([here](#)) and The Economist ([here](#))

Sources

- Baily, M., Brynjolfsson, E. and Korinek, A. (2023). Machines of mind: The case for an AI-powered productivity boom. *Brookings Institute*. Available at: <https://www.brookings.edu/articles/machines-of-mind-the-case-for-an-ai-powered-productivity-boom/>
- Bessen, J. (2018). AI and Jobs: The Role of Demand. *NBER Working Paper*, in: [The Economics of Artificial Intelligence: An Agenda](#), Working paper no. 24235. National Bureau of Economic Research, Inc.
- Cooban, A. (2023). AI investment is booming. How much is hype? *CNN*, 23 July. Available at: <https://edition.cnn.com/2023/07/23/business/ai-vc-investment-dot-com-bubble/index.html>
- Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models (Version 4). *OpenAI and Penn University*. Available at: <https://openai.com/research/gpts-are-gpts>
- Experis IT Insights. (2023) AI to boost staff headcount. *Experis UK*. Available at: https://www.experis.co.uk/blog/2023/06/b_ai-to-boost-staff-headcount-according-to-half-of-britains-employers?source=google.com
- Furman, J. and Seamans, R. (2018). AI and the Economy. *NBER Chapters*, in: [Innovation Policy and the Economy](#). (Vol. 19, pp. 161-191). National Bureau of Economic Research, Inc.
- Hatzius, J., Briggs, J., Kodnani, D. and Pierdomenico, G. (2023). The Potentially Large Effects of Artificial Intelligence on Economic Growth. *Goldman Sachs Economics Research*. Available at: <https://www.gspublishing.com/content/research/en/reports/2023/03/27/d64e052b-0f6e-45d7-967b-d7be35fabd16.html>
- Lane, M., Williams, M and Broecke, S. (2023). The impact of AI on the workplace: Main findings from the OECD AI surveys of employers and workers, *OECD Social, Employment and Migration Working Papers*, No. 288, OECD Publishing, Paris, <https://doi.org/10.1787/ea0a0fe1-en>
- Noy, S. & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science* (Vol. 381, Issue 6654, pp. 187–192). American Association for the Advancement of Science (AAAS). <https://doi.org/10.1126/science.adh2586>
- Roose, K. (2023). A conversation with Bing's chatbot left me deeply unsettled. *The New York Times*. Available at: <https://www.nytimes.com/2023/02/16/technology/bing-chatbot-microsoft-chatgpt.html>
- The Economist (2023). AI is making Washington smarter. Available at: <https://www.economist.com/united-states/2023/06/29/ai-is-making-washington-smarter>
- The Economist. (2023) AI is not yet killing jobs. Available at: <https://www.economist.com/finance-and-economics/2023/06/15/ai-is-not-yet-killing-jobs>
- The Economist. (2023). Talking about ai in human terms is natural-but wrong. Available at: <https://www.economist.com/culture/2023/06/22/talking-about-ai-in-human-terms-is-natural-but-wrong>
- World Economic Forum. (2023). Future of jobs report: See how the future of jobs is changing in the age of AI. Available at: <https://www.weforum.org/reports/the-future-of-jobs-report-2023/>
- Zhang, D., Maslej, N., Brynjolfsson, E., Etchemendy, J., Lyons, T., Manyika, J., Ngo, H., Niebles, J.C., Sellito, M., Sakhaee, E., Shoham, Y., Clark, J. and Perrault, R. (2022). The AI Index 2022 Annual Report, AI Index Steering Committee, Stanford Institute for Human-Centered AI, *Stanford University*, March 2022. Available at: <https://aiindex.stanford.edu/ai-index-report-2022/>

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