Artificial Intelligence and the economy

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* The views expressed here are those of the presenter and not necessarily the Bank for International Settlements

Overview

- Impact of gen AI on productivity
- Effects of gen AI on output and inflation
- Heterogeneity in gen AI effects across countries
- Conclusions

Impact of AI on productivity

Impact of AI on productivity

- Impact of AI on the real economy
- Evaluation of Gen AI on labour productivity
  - General consensus: Gen AI will increase productivity
    - US macro-level estimates:
      - Acemoglu (2024): less than 0.1% annual increase in labour productivity growth
      - Baily et al (2023): ~2.5% annual increase
      - OECD (2024): between 0.4% to 0.9% annual increase
- Different estimates: Especially in tasks requiring cognitive skills
- BIS and Ant Group collaboration (micro-level study)
  - Quasi-experiment in coding industry
  - Investigate impact of Gen AI on labour productivity for software programmers

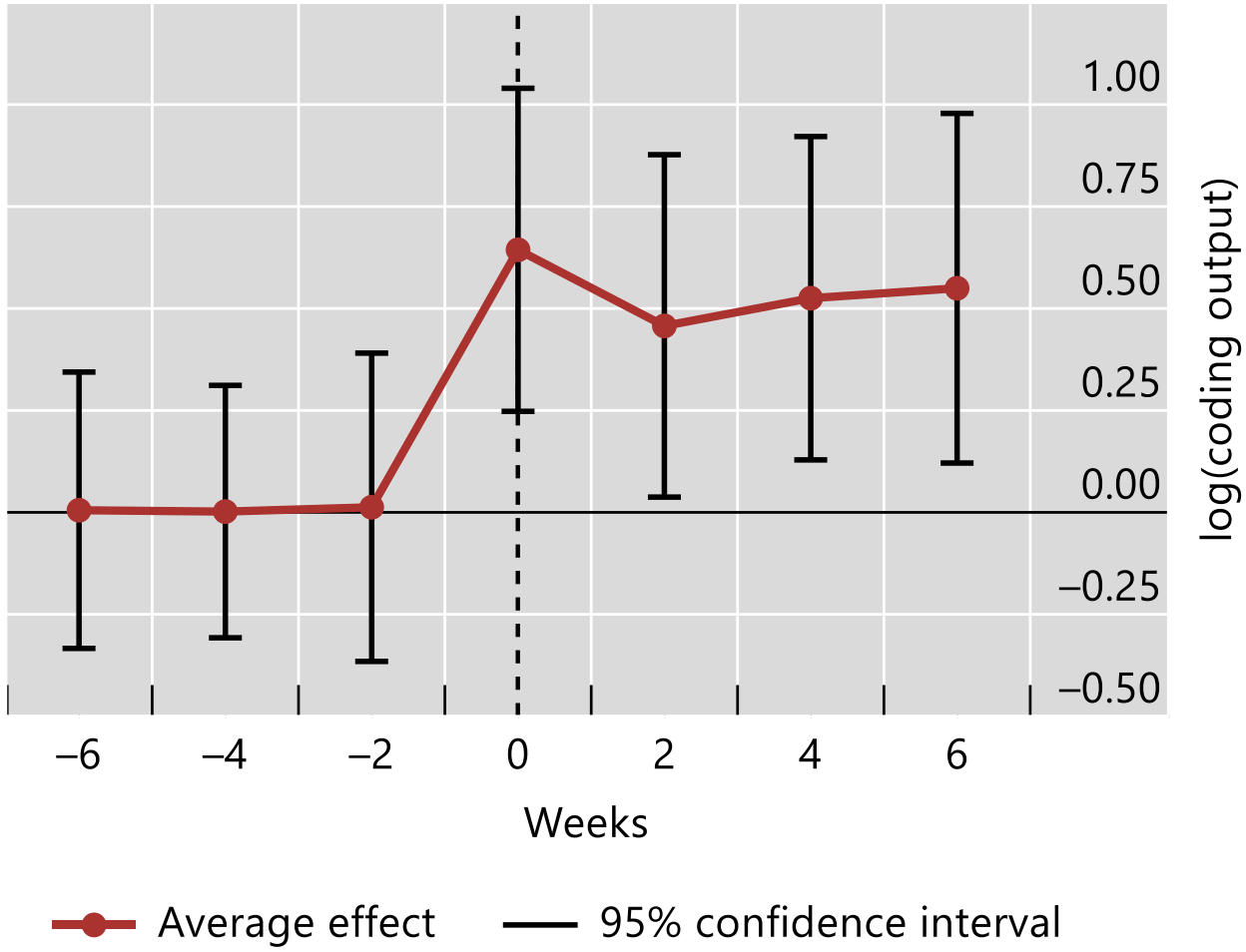
Structure of the quasi-experiment

- CodeFuse, a Large Language Model (LLM) for coding assistance, was launched by Ant Group in September 2023
- Programmers were divided into control and treatment groups (884 vs 335)
- Use propensity score matching combined with a difference-in-differences analysis to evaluate effects on labour productivity
- Output measure is volumes of lines of code produced. Also access to task data, acceptance and rejection rates.
- The analysis was conducted in three steps: :

1. Evaluating the impact on productivity
2. Analysing productivity differences based on workers' experience level
3. Explaining the causes of the observed differences

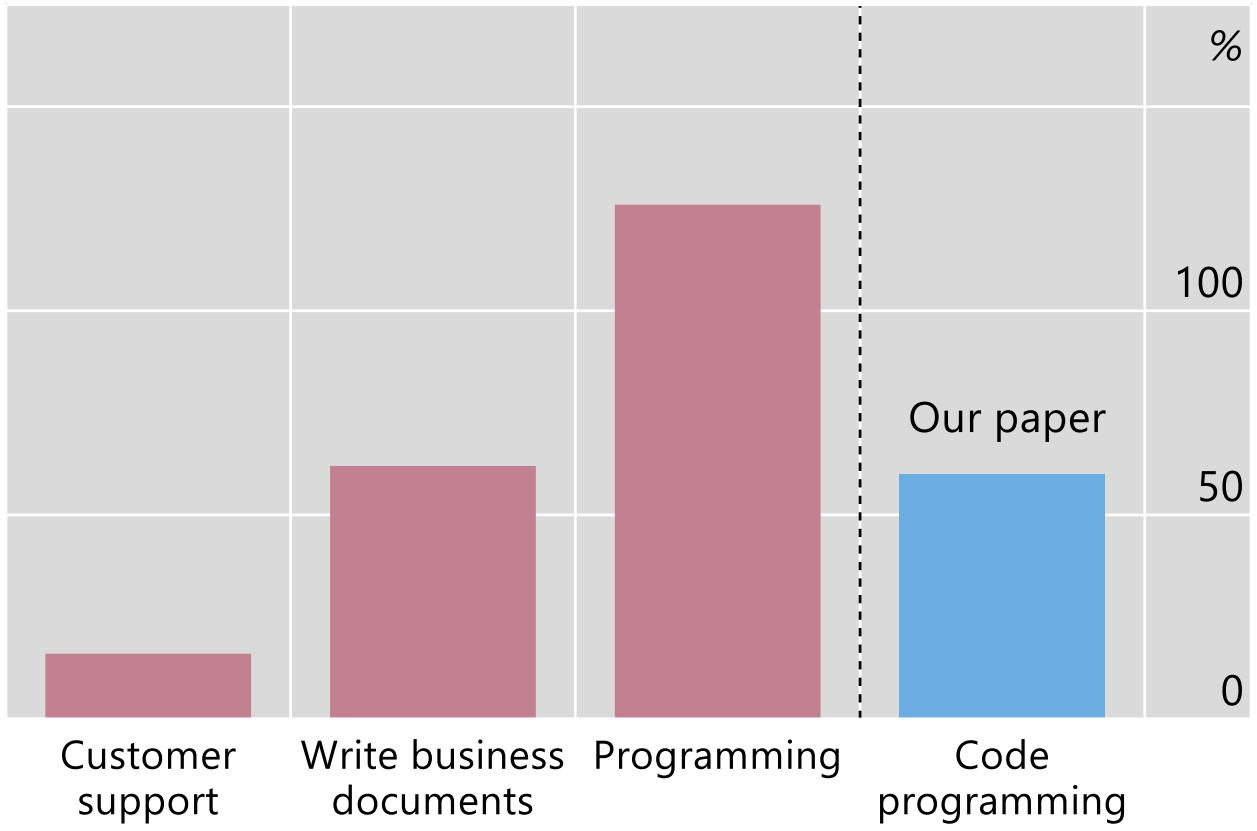
Impact of gen AI on labour productivity: treated vs control groups

- Variables in logs, changes represent growth rates
- Assessment period: 6 weeks before, 6 weeks after the launch
- Positive effects for up to 6 weeks after the distribution of LLM
- Average short-term effect is a more than 50% increase in productivity



A comparison with other studies

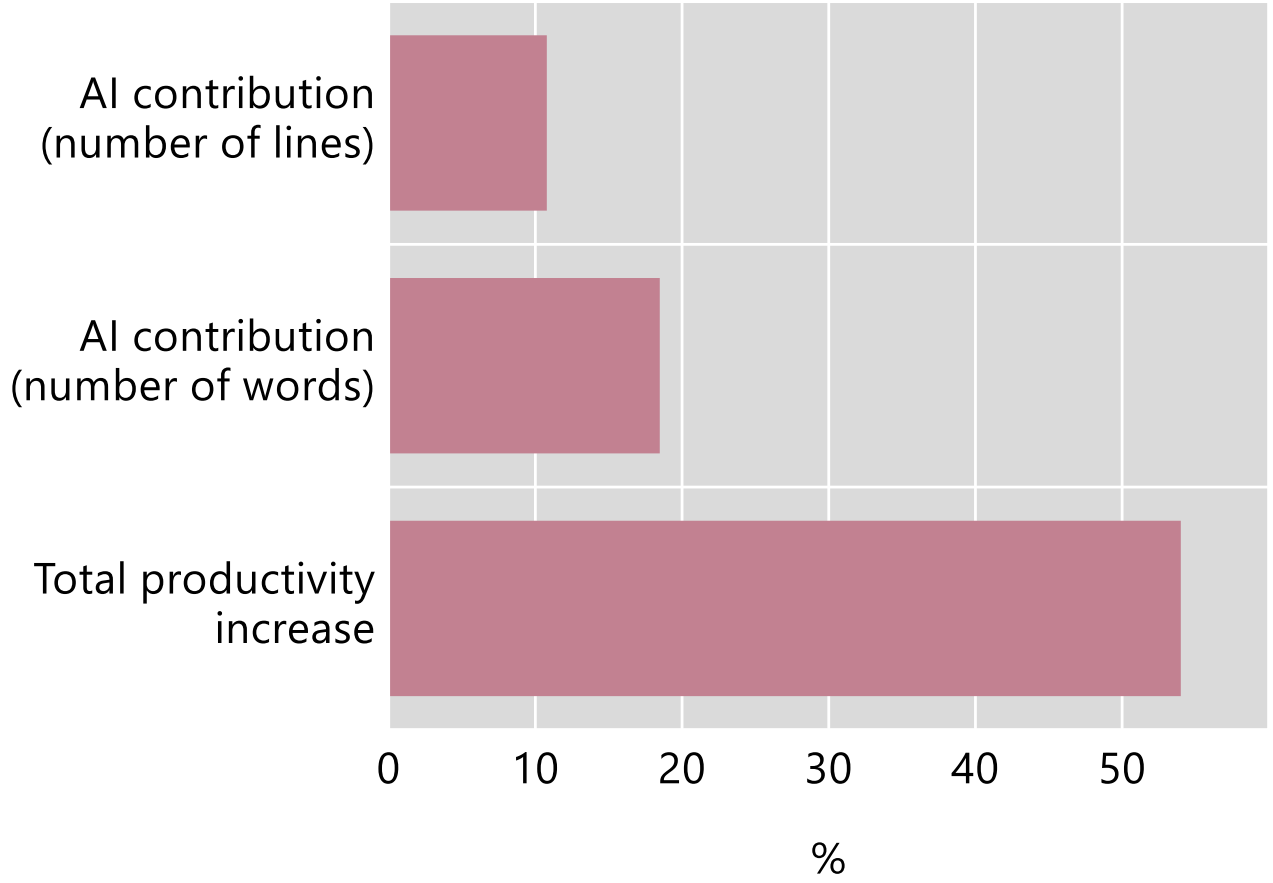
- AI enhances productivity in tasks that require cognitive skills, such as customer support, writing, data analysis, and programming
- There is a 40% reduction in time required and an 18% improvement in output quality
- Findings from our study on code programming align broadly with the literature



The bars correspond to estimates of the increase in productivity of users that leverage generative AI tools relative to control groups that did not. Sources: Brynjolfsson et al (2023); Nielsen J (2023): *AI Improves Employee Productivity by 66%*; Noy and Zhang (2023); Peng et al (2023); Federal reserve bank of New York: *Survey of Consumer Expectations*.

Disentangling the increase in productivity due to Gen AI

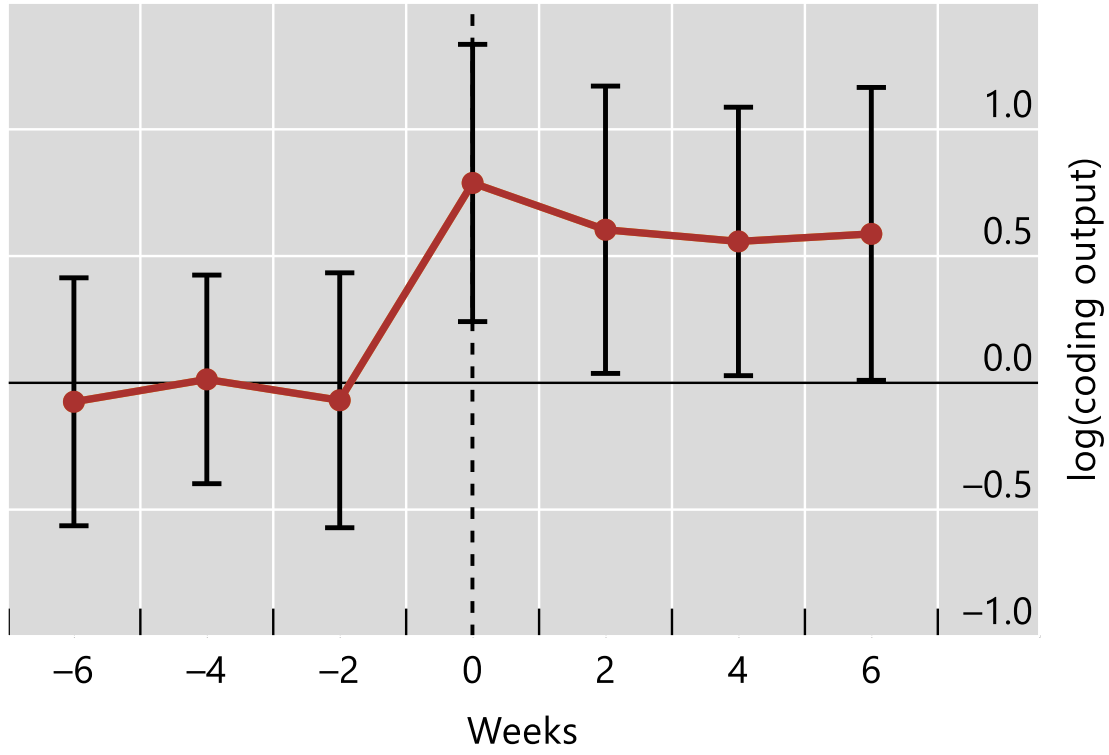
- The direct impact of Gen AI on productivity is around 11%-18%.
- Another 30-40% increase in productivity is generated by more time for programmers, which means AI could also increase productivity indirectly.



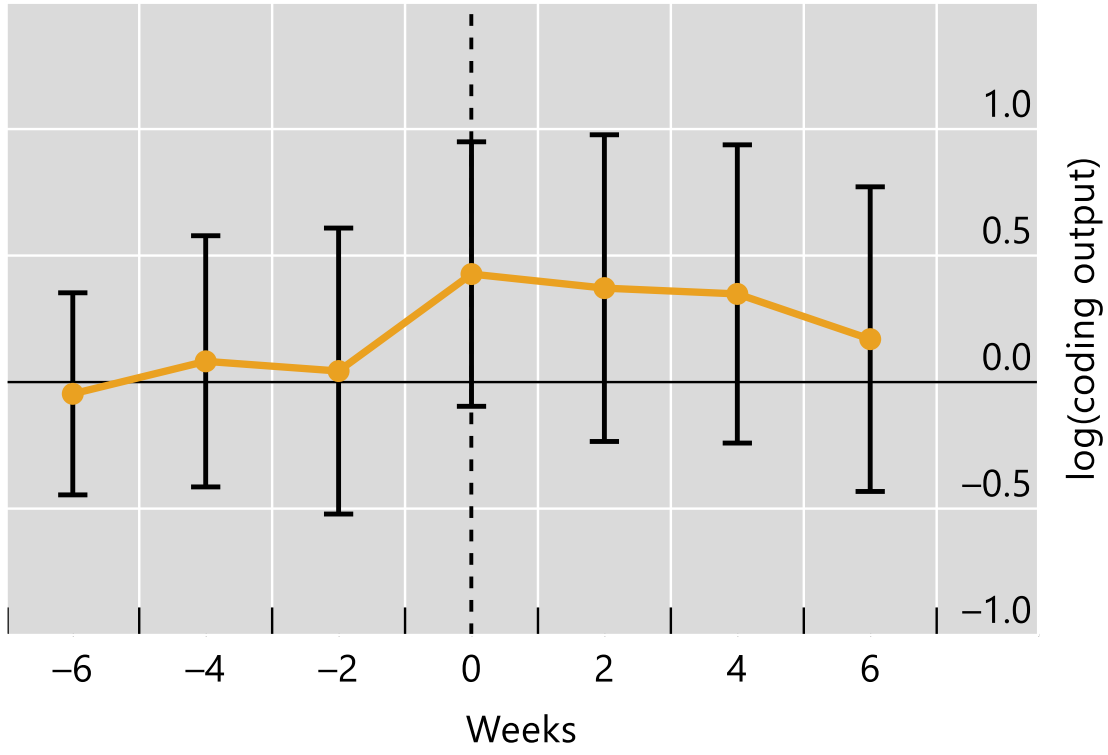
Simple tasks refer to tasks that can be instructed with a one line command. Complex tasks need several lines of prompt command and require more creativity.

Heterogeneity in the effects among employees with different experience

Junior programmers: less than 1 year experience



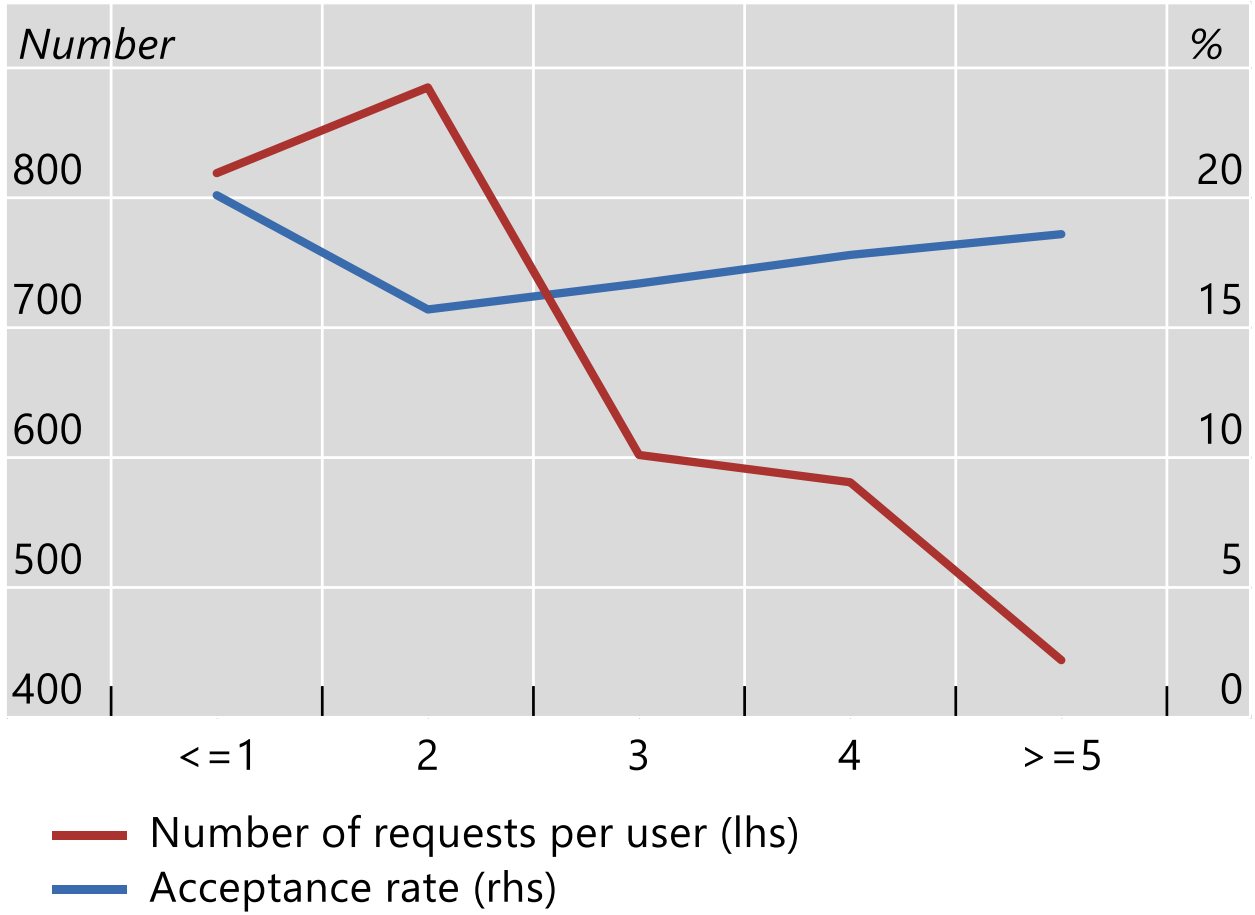
Senior programmers: more than 1 year experience



/ Average effect — 95% confidence interval

Why gen AI is not useful for senior programmers?

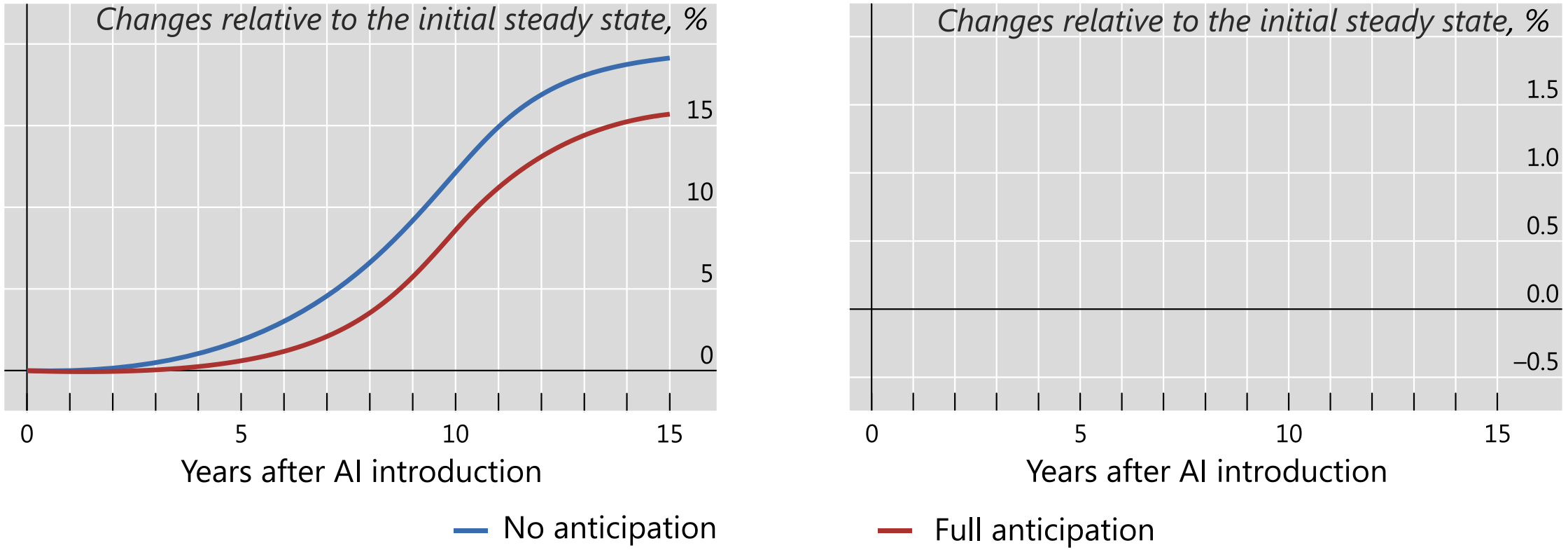
- Different hypotheses are considered: (1) Gen AI is used less by seniors; (2) Gen AI is not helpful for seniors; (3) Gen AI is used somewhat, but it is less helpful.
- Number of requests per user is lower among senior programmers …
- … but acceptance rates for AI suggestions are similar across all level of experience



Effects of gen AI on output and inflation

AI will expand both aggregate demand and supply – and thereby lead to an increase in output

AI will raise output in the short and long run…



Aldasoro, I, S Doerr, L Gambacorta and D Rees (2024): "The impact of artificial intelligence on output and inflation", *BIS Working Papers*, no 1179, April.

The effects on inflationary pressures in the near term depend on the relative impact on aggregate demand vs supply

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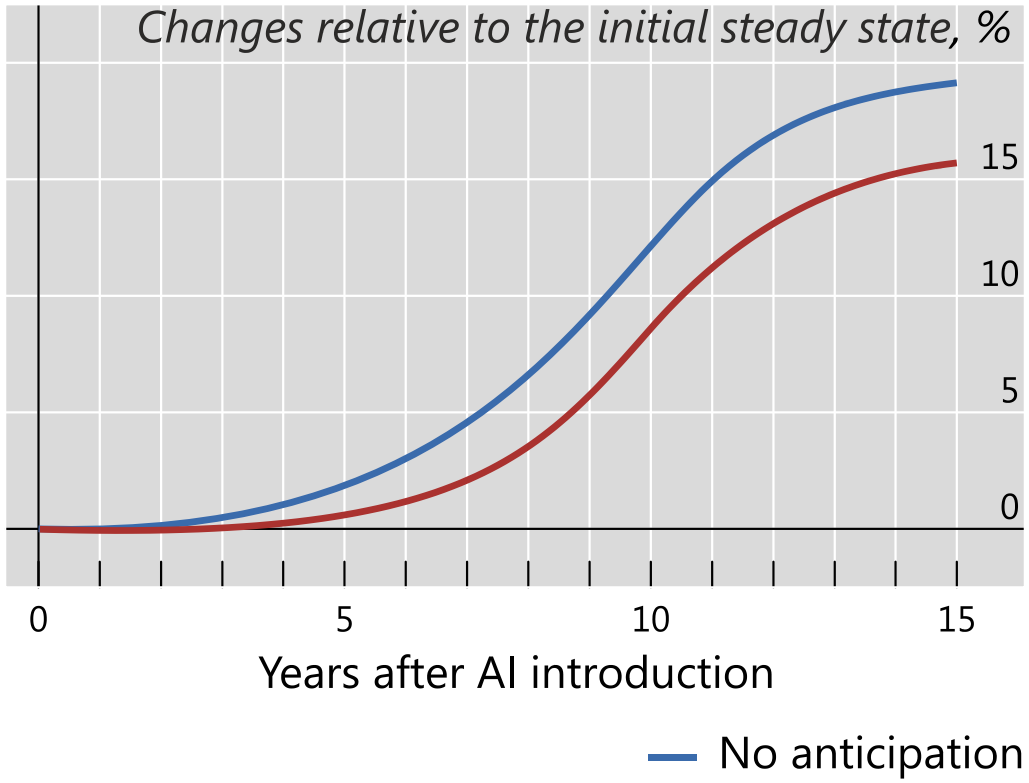
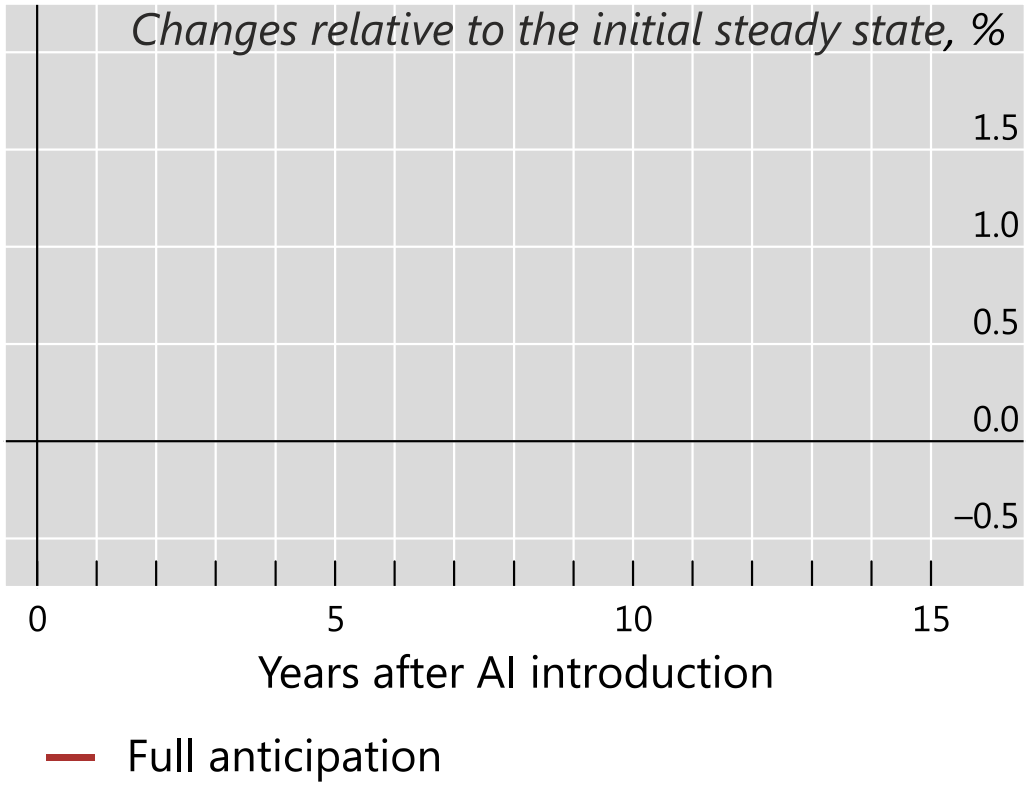


…but could lead to inflationary or disinflationary pressures in the short run



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If households anticipate the higher income tomorrow, they will spend more today. Inflationary pressures depend on whether spending outstrips supply

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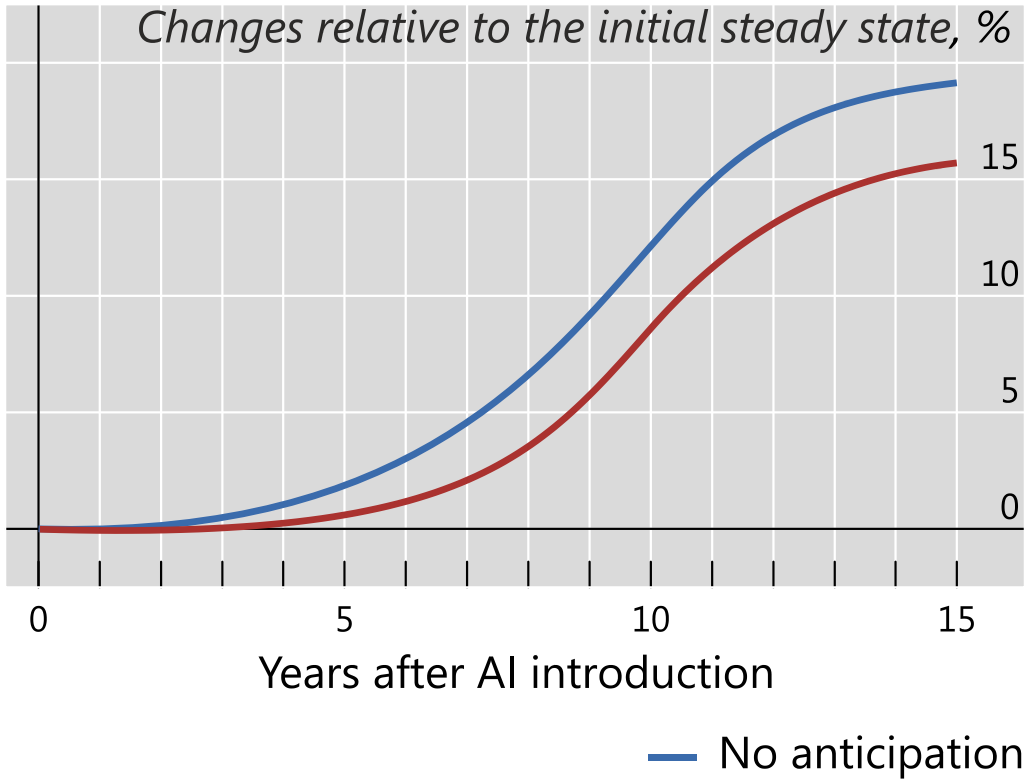

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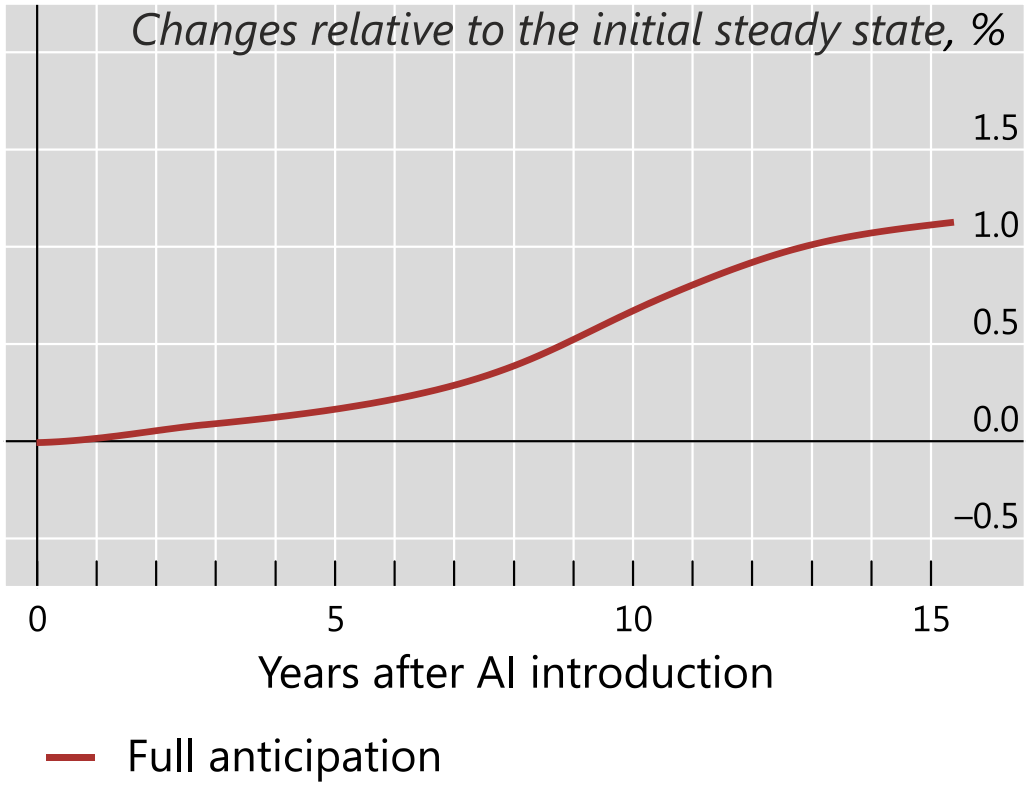

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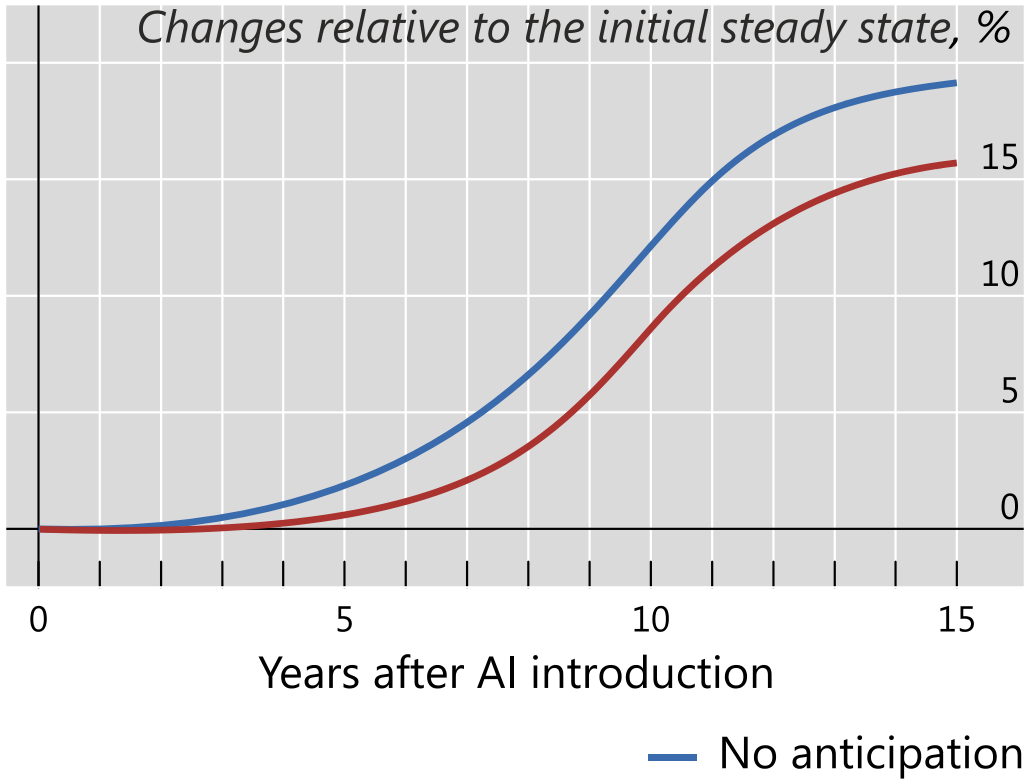
When there is less anticipation, AI will be even disinflationary in the short run

AI will raise output in the short and long run…



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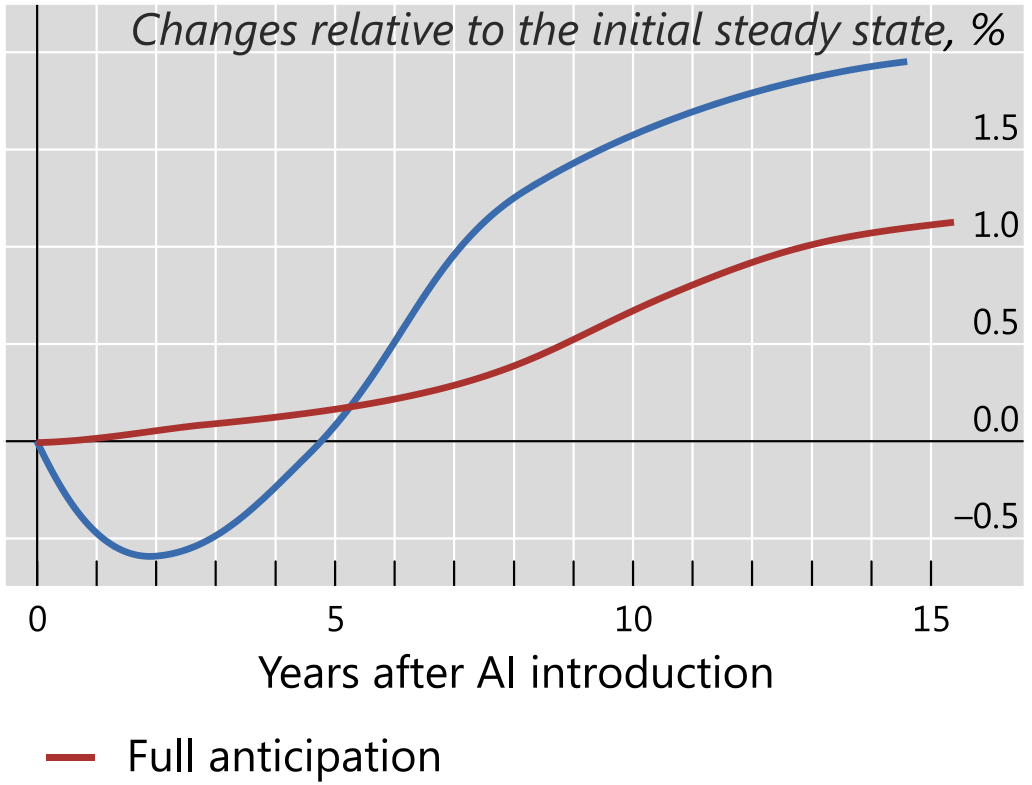

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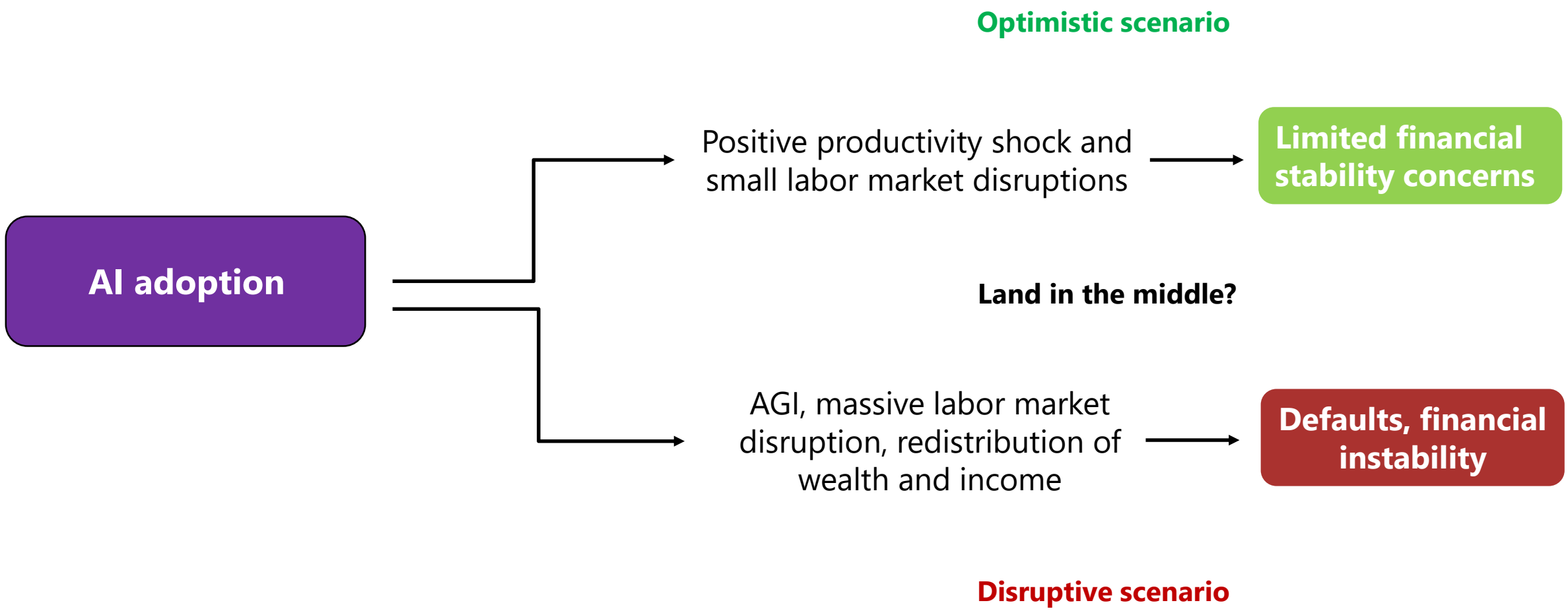
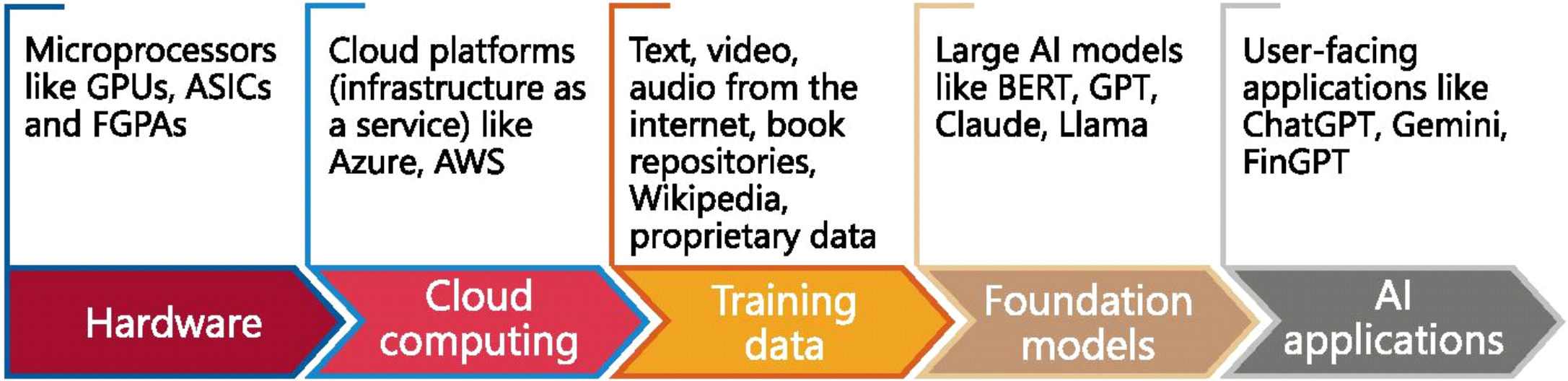
Effects of AI adoption on the labour market



Aldasoro, I, S Doerr, L Gambacorta, G Gelos and D Rees (2024): "Artificial intelligence, labour markets and inflation", SUERF, Policy Brief, no. 923.

Heterogeneity in gen AI effects across countries

The AI supply chain is highly concentrated



Source: Gambacorta L and V Shreeti (2025): "The AI supply chain", BIS no 154, March.

- Market concentration is rife across all layers of the AI supply chain
- Big techs are expanding their footprint over the AI supply chain, integrating their services across different markets to reinforce their dominance
- Impact on competition and contestability is still unclear

Heterogeneity in the effects of AI across countries

- AI supply chain concentration
  - Specific economies gain significant advantages
- Sectoral differences
  - Advanced economies excel in AI-adopting sectors (e.g., finance, healthcare, advanced manufacturing, IT)
- Consumer access and demographic
  - Varying adoption rates due to digital literacy and age demographics
- Outcome could be different
  - The overall productivity pie grows, but slices vary by country

Conclusions

Main takeaways

- Impact of AI on productivity
  - Increase in labor productivity but effects vary across different classes of workers
  - More pronounced impact on tasks requiring cognitive skills
  - Aggregate effects remain uncertain
- Effects of AI on output and inflation
  - A boost in productivity increases both aggregate demand and supply
  - Initial effects on inflation could be disinflationary if the productivity shock is not fully anticipated
- Heterogeneity in AI effects across countries
  - Concentration in AI supply chain
  - Effects vary across different sectors
  - Different consumer access and demographics

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