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AI at 70: 14 lessons from a lifetime of boom and bust

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With deep dedication.

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IMPORTANT RESEARCH DISCLOSURES LOCATED IN APPENDIX 1.

Artificial intelligence marks 70 years since Dartmouth Summer Research Project

“Context is all you need”: clues from the past for what comes next



Seventy years ago today, the curtain came down on the summer workshop that gave birth to artificial intelligence. Dwight Eisenhower was in the White House, the Suez Crisis was gripping Britain and Elvis Presley topped the US charts with “Don’t Be Cruel” and “Hound Dog”.

The Dartmouth Summer Research project brought together a dozen or so academics convinced that every aspect of intelligence could in principle be described precisely enough for a machine to simulate it. Emboldened by the techno-optimism of the age, John McCarthy, who coined the name AI, wrote that “we think that a significant advance can be made... if a carefully selected group of scientists work on it together for a summer.”

Since then, AI has lived a lifetime of summers and winters, punctuated by stunning breakthroughs and false dawns. As it is now the cornerstone of a new investment and valuation boom, the past 70 years are a treasure trove of clues for what to expect in the future.

To paraphrase the research paper that sparked the current boom in generative AI in 2017, “Attention is all you need”, you could say “context is all you need” to understand what is to come. The signals are there, from non-linear growth to infrastructure constraints and valuation booms and busts.

Some will say “this time is different”. Maybe. But the following charts give a flavour of what could happen if it isn’t. To quote the UK No. 1 single from 70 years ago, sung by Doris Day: “Whatever Will Be, Will Be (Que Sera, Sera)”.

14 lessons from a lifetime of boom and bust

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|---|--|
| 1. AI progress is non-linear | cheaper, and more at risk |
| 2. Progress exceeds Moore's law | 9. Tech revolutions take time to pay |
| 3. Today's leading tech may not be tomorrow's | 10. Consumers have adopted AI faster than businesses |
| 4. The pipeline matters | 11. The biggest valuation booms are often tech booms |
| 5. Cheaper AI will likely boost spending | 12. This time is different – and will need to be |
| 6. Software revolutions need hardware | 13. Early leads do not guarantee long-term winners |
| 7. Hardware is often a bottleneck | 14. Long-term trends tend to persist |
| 8. Globalisation has made tech | |

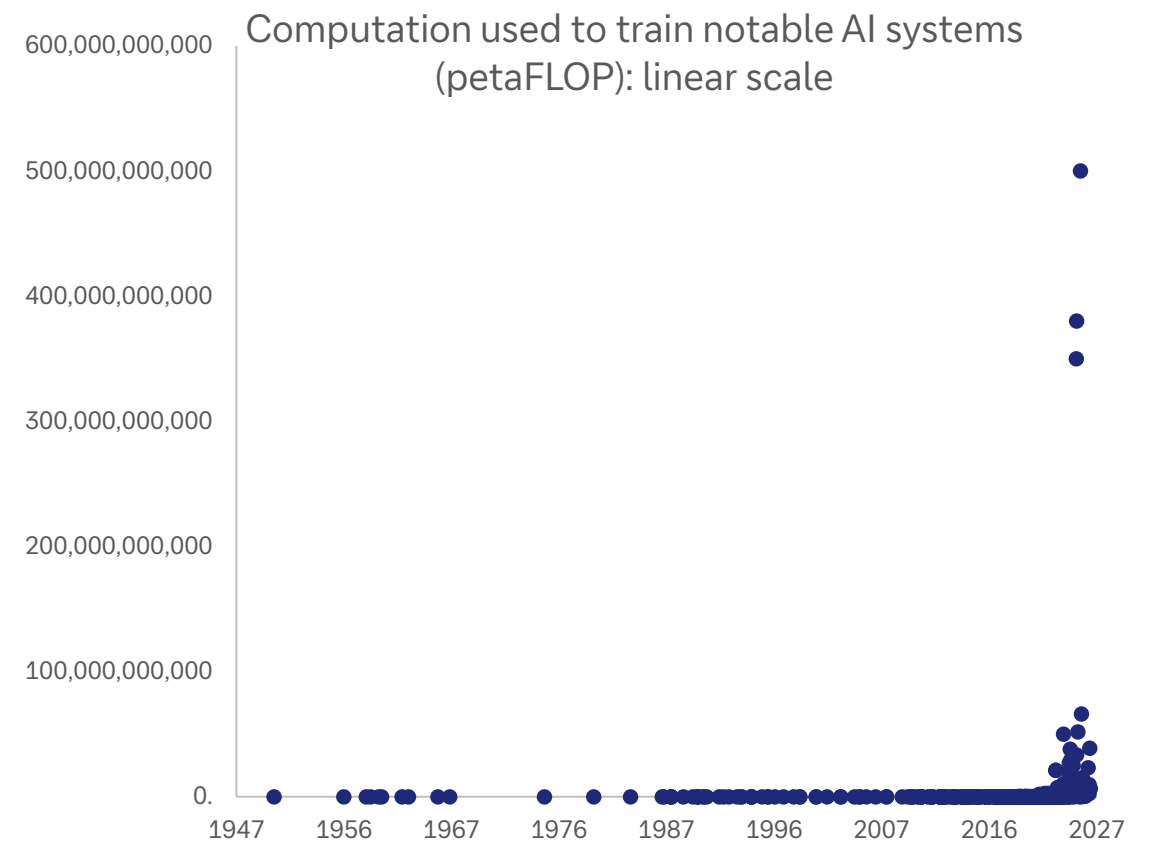
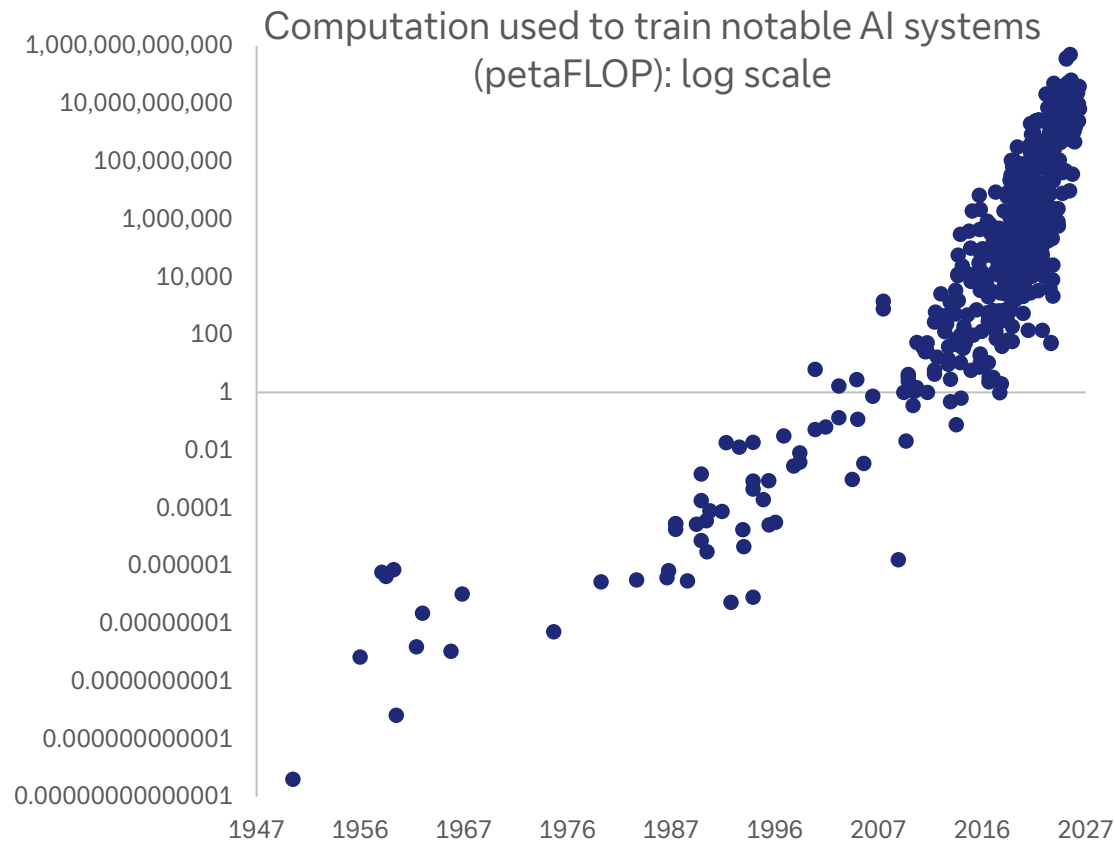
A Proposal for the

DARTMOUTH SUMMER RESEARCH PROJECT ON ARTIFICIAL INTELLIGENCE

We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so pre-

1. AI progress is non-linear – and exponential growth is almost invariably underestimated

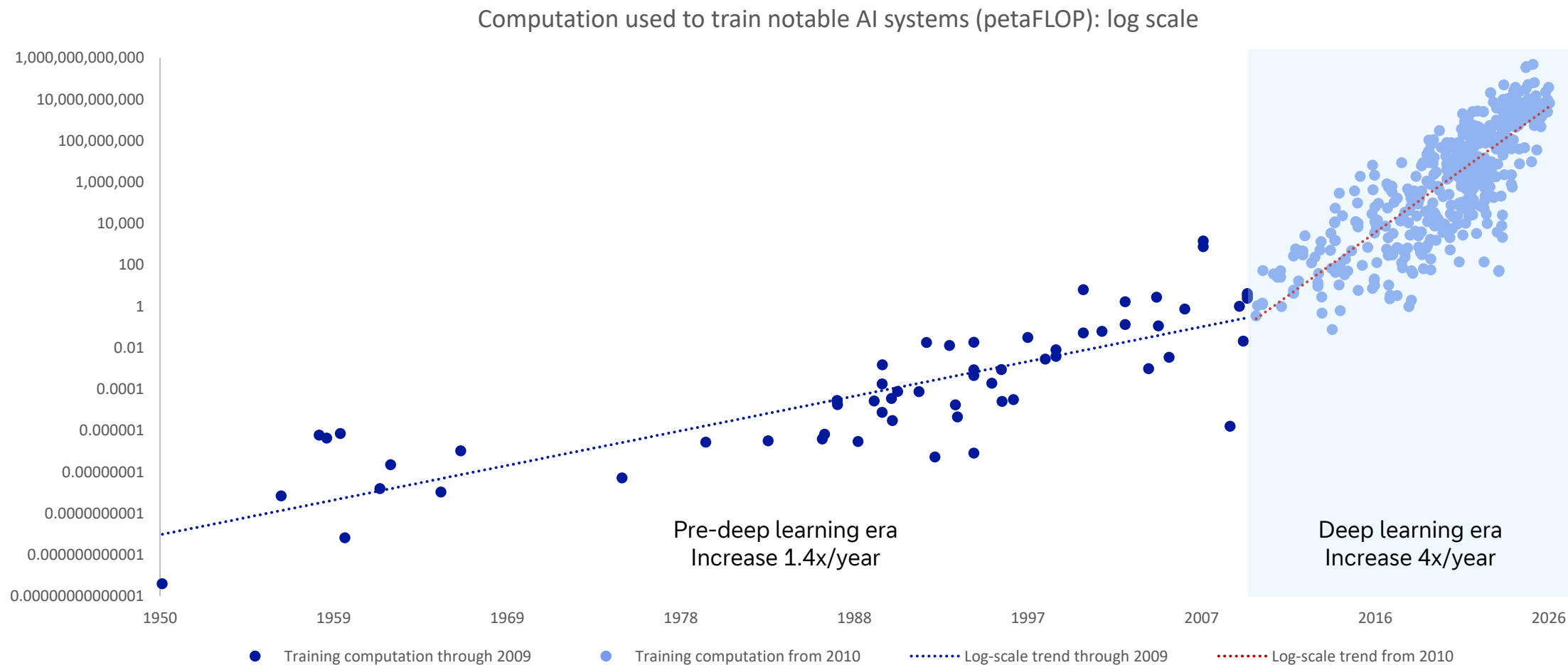
Compare what AI charts usually look like (on the left) vs what they actually represent (on the right)



Source: Epoch AI (citing estimates from AI literature), Our World in Data, Deutsche Bank Research. Note: One FLOP (floating-point operation) represents a single arithmetic operation using floating point numbers; one petaFLOP is one quadrillion FLOPs

2. The pace of progress exceeds Moore's law when many factors are improving at once

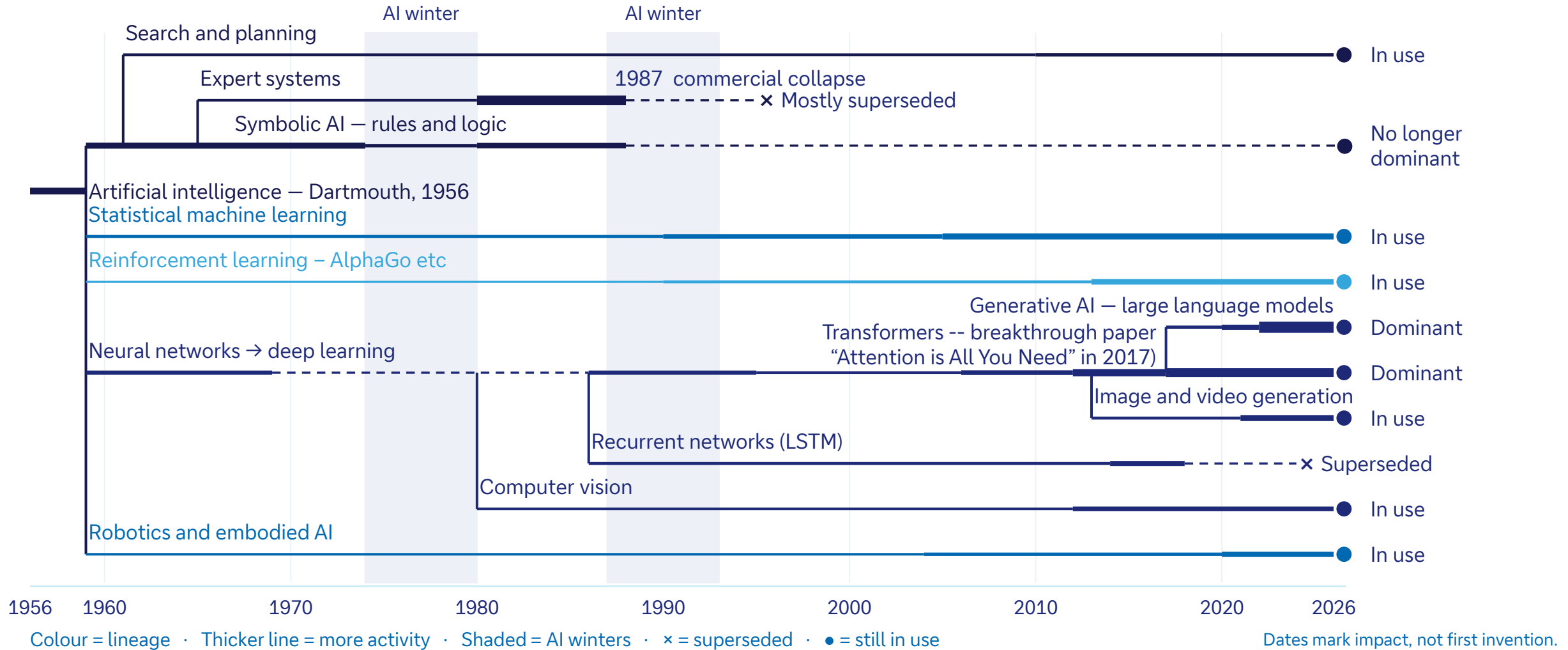
Conventional computing capability has doubled every 18-24 months but bigger and better systems, memory and algorithms have accelerated capabilities far beyond that



Source: Epoch AI (citing estimates from AI literature), Our World in Data, Deutsche Bank Research

3. Today's leading tech may not be tomorrow's

AI has an ever-evolving family tree; large language models may give way to, eg, world models



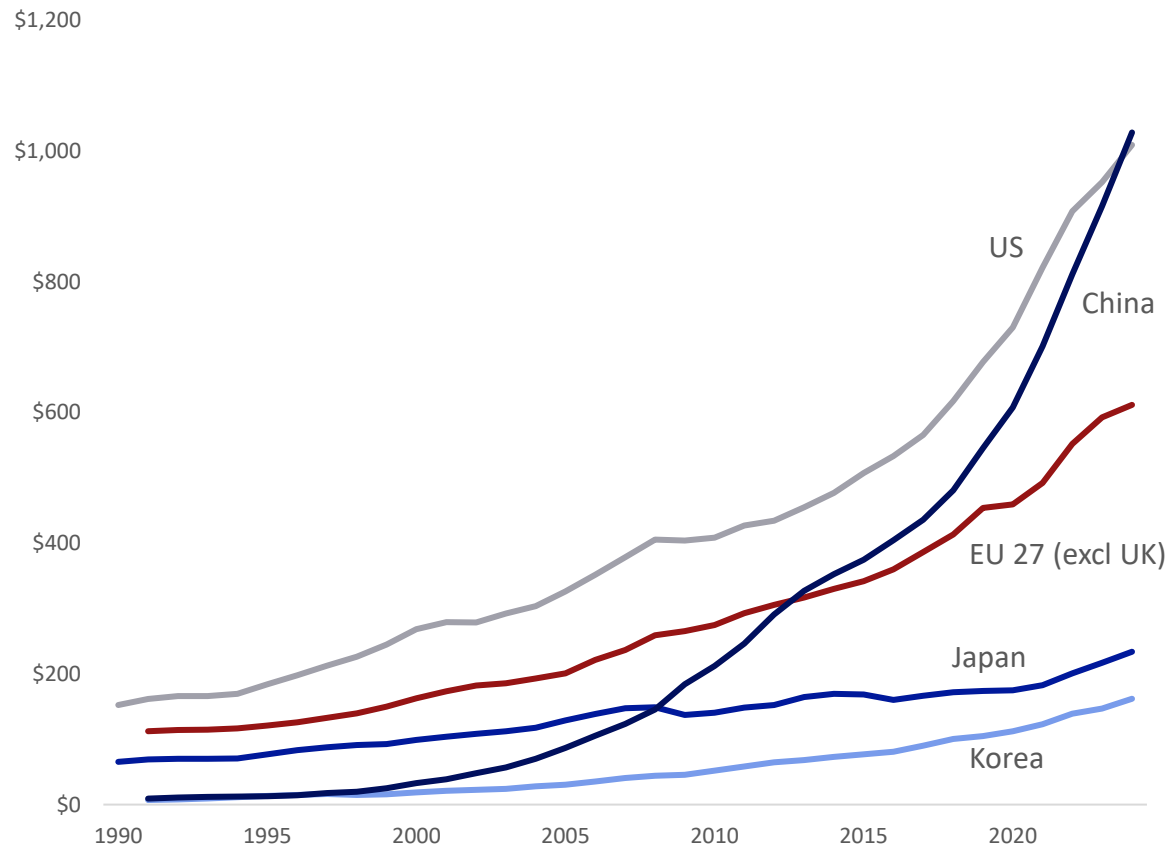
Source: Deutsche Bank Research

4. The pipeline matters: China's overnight success with DeepSeek was years in the making

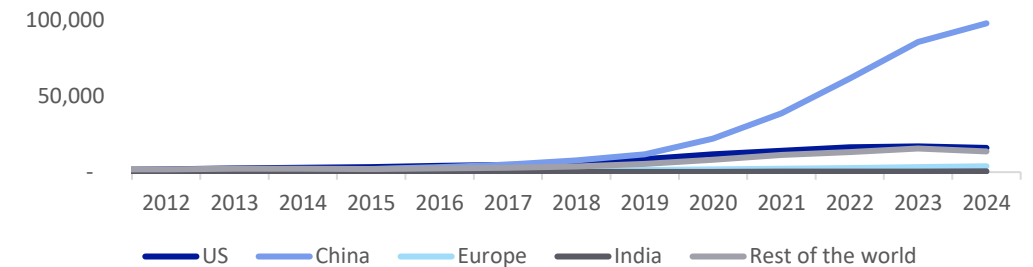
Success of Chinese models reflects a multi-year push in R&D, overtaking the US in 2024



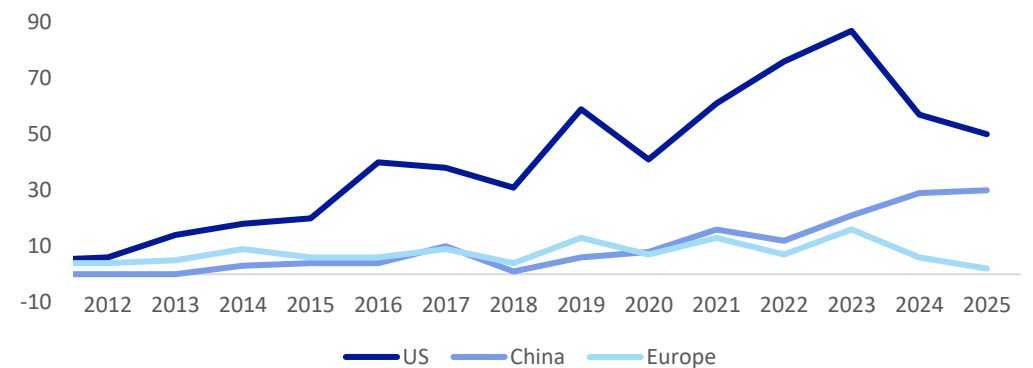
Gross domestic research and development spend by country,
PPP converted, current prices (USDbn)



Number of AI patents granted by select geographic
areas, 2012-2024



Number of notable AI models by geographic area
(2012-2025)



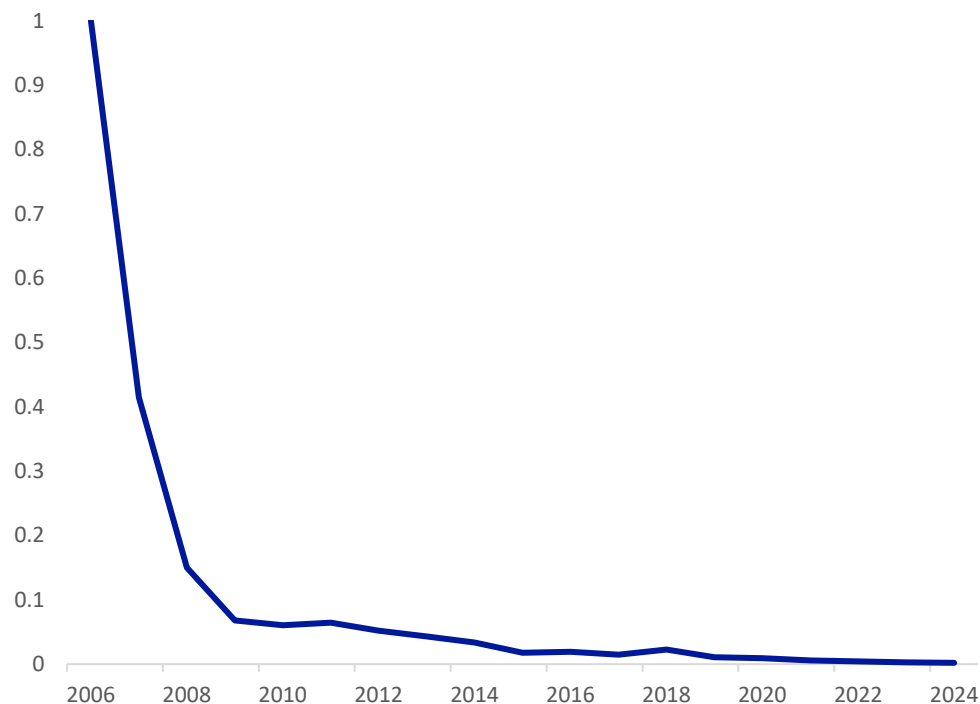
Source: OECD Data Explorer, Deutsche Bank Research

5. Making AI dramatically cheaper will likely increase, not decrease, spending

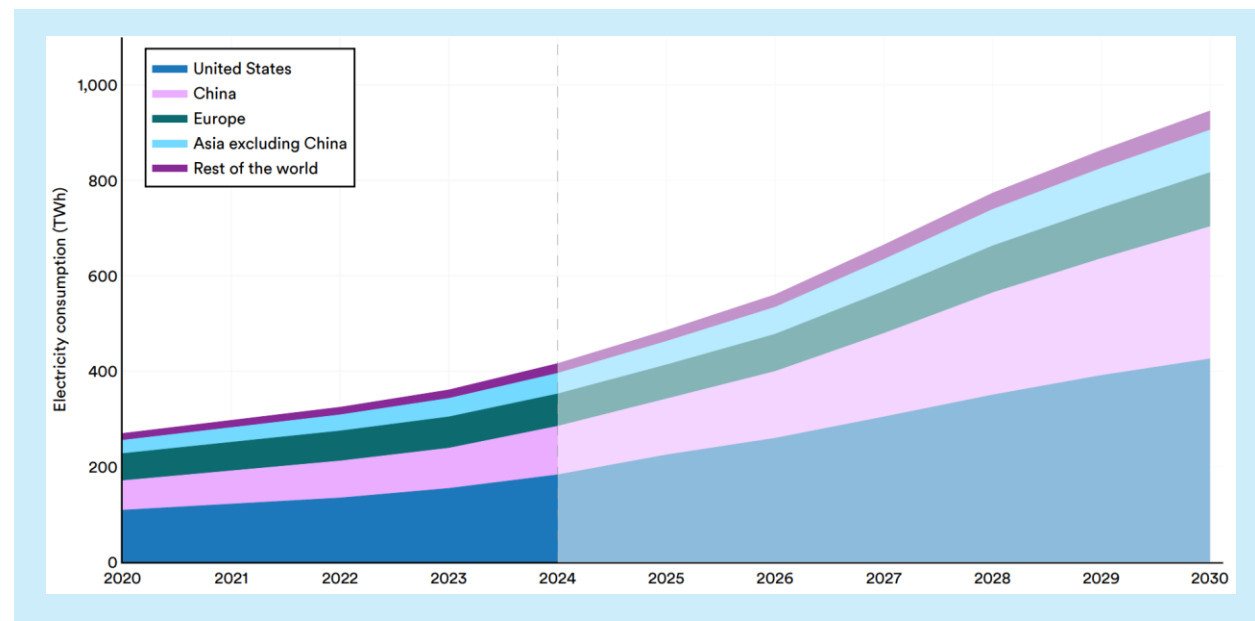
Jevons Paradox is alive: GPU computation cost has fallen by more than 99% since 2006, yet electricity consumption by data centres is set to double from 2024 to 2030 as demand surges



GPU chip computation cost index (2006=1)



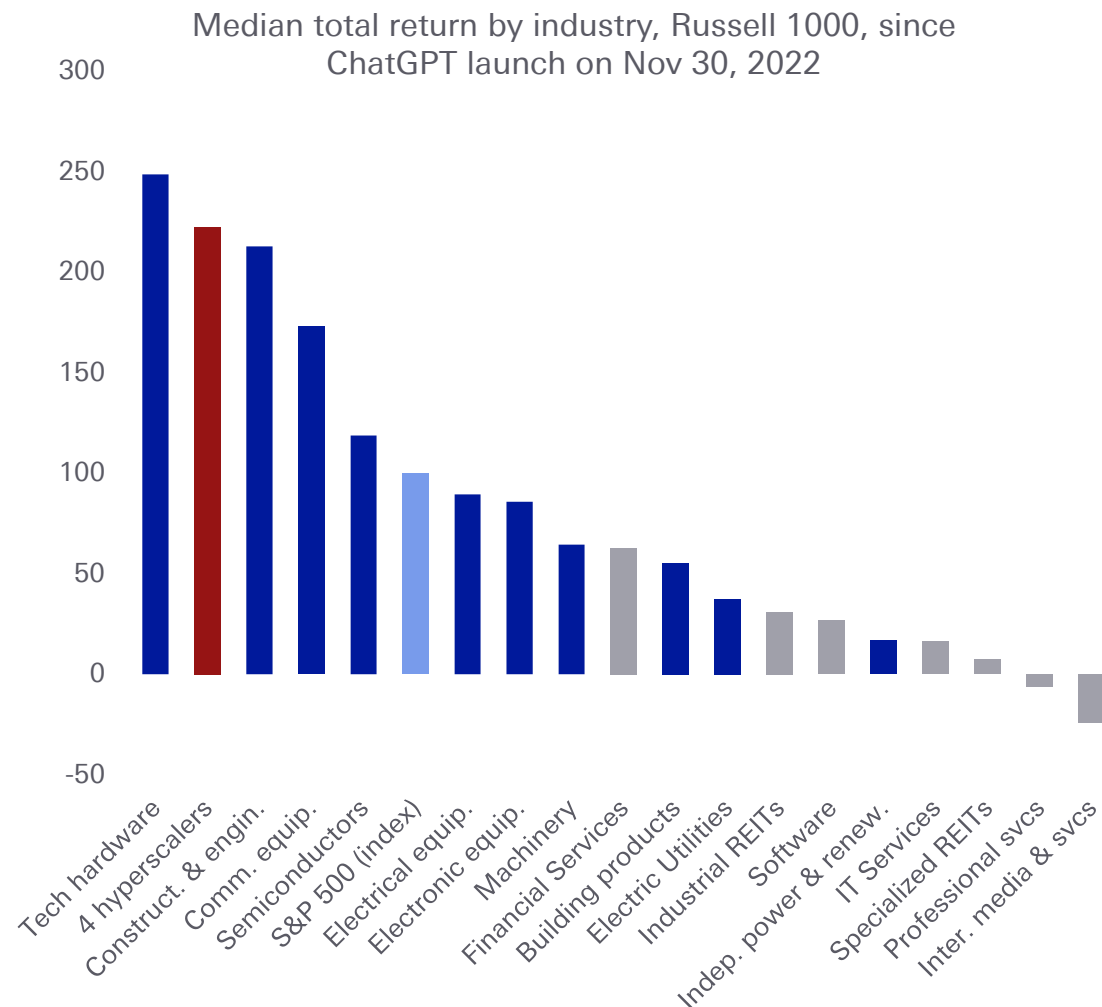
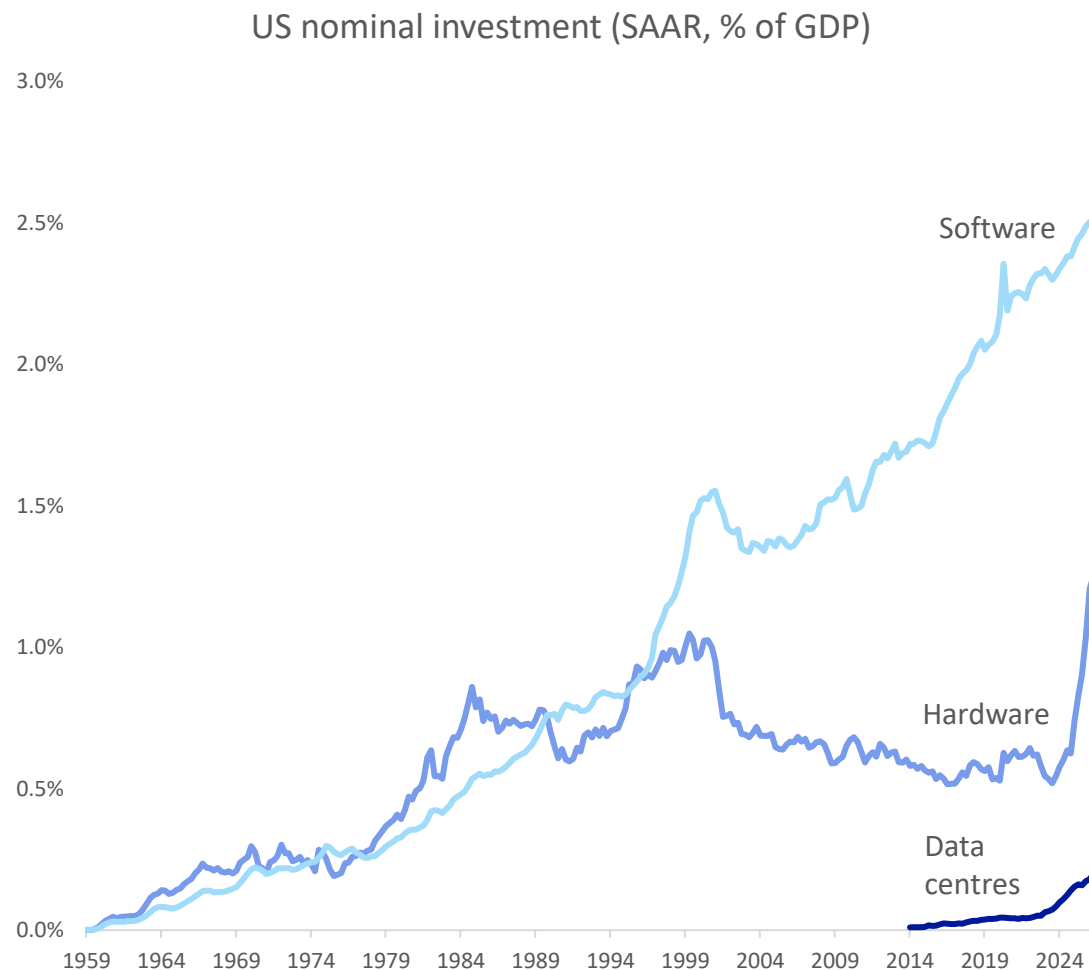
Data centre electricity consumption by region
2020-2030 (IEA projections)



Source: International Energy Agency (2025), Stanford HAI AI Index 2026, Deutsche Bank Research

6. Software revolutions depend on heavy hardware investment

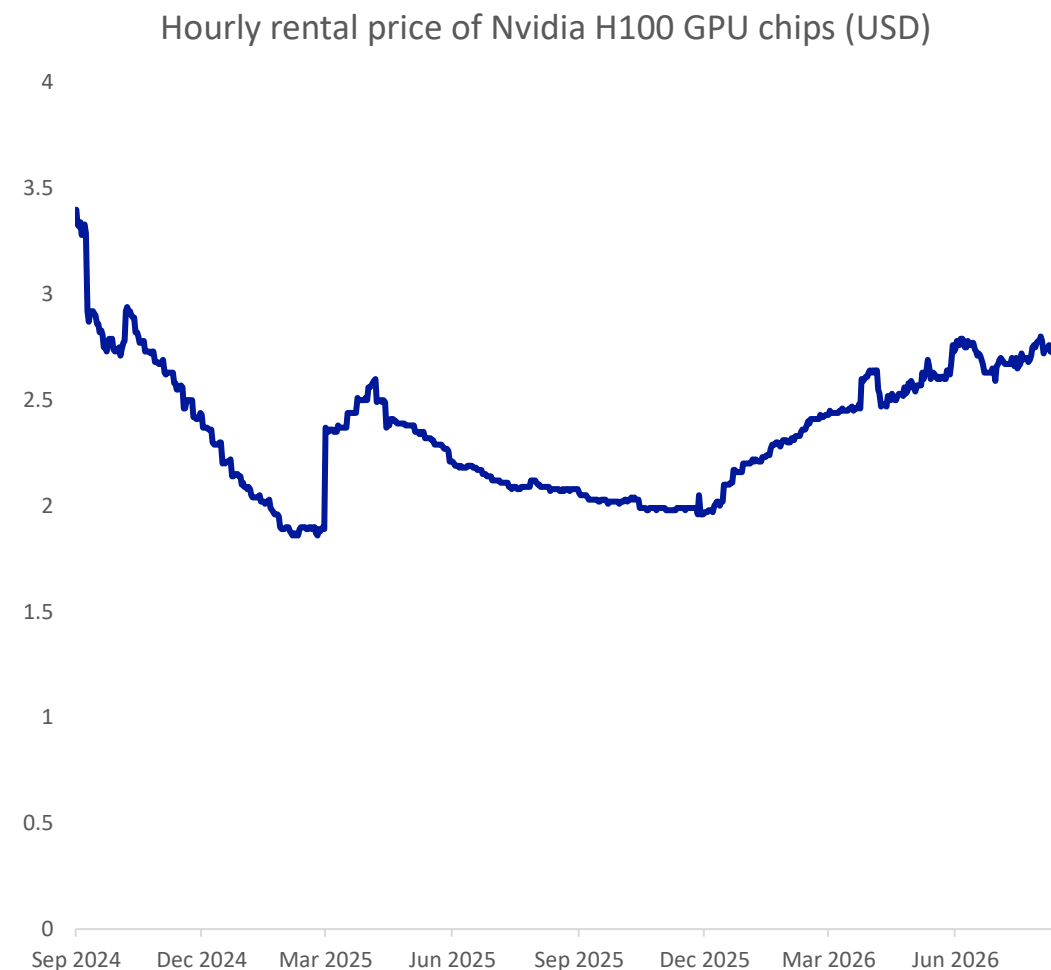
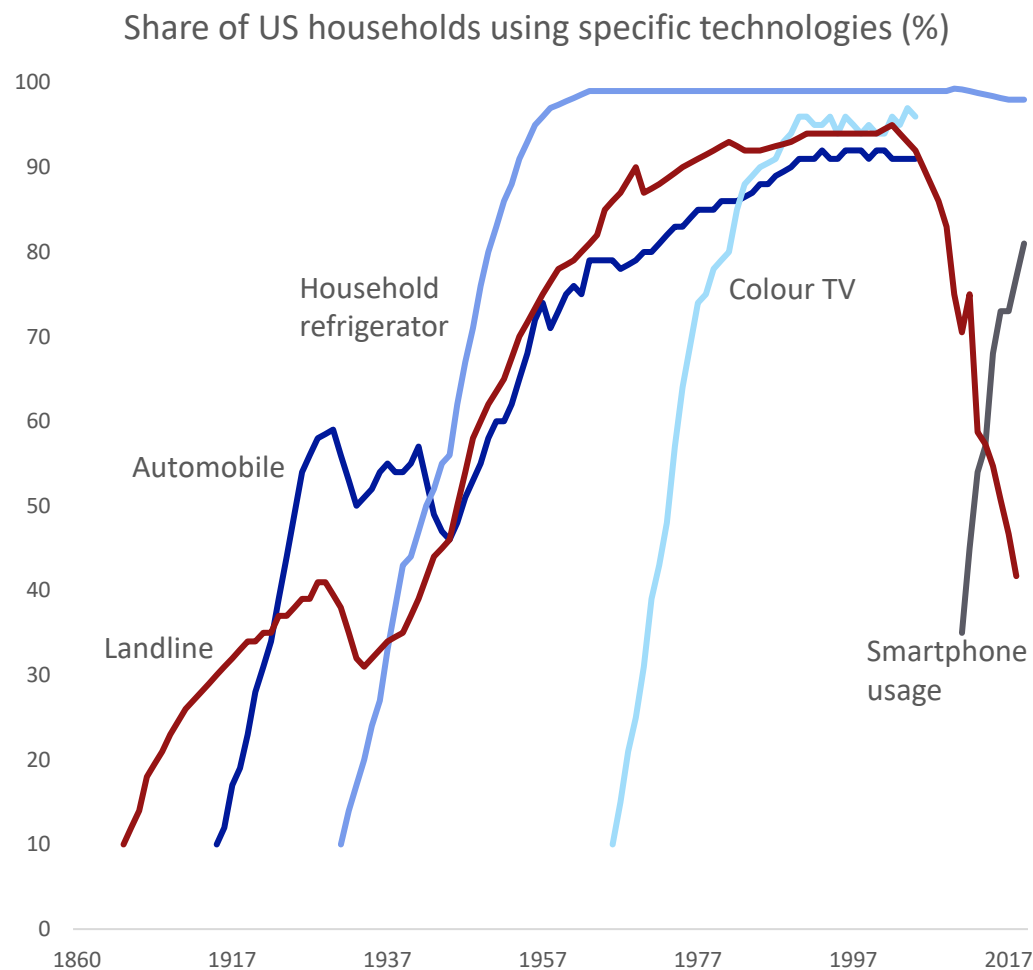
Hardware, construction, chip and equipment makers have led gains in the AI boom so far



Source: Federal Reserve Bank of St Louis, Haver Analytics, Bloomberg Finance LP, Deutsche Bank Research

7. Hardware is often a bottleneck – but for once the delay is with producers not consumers

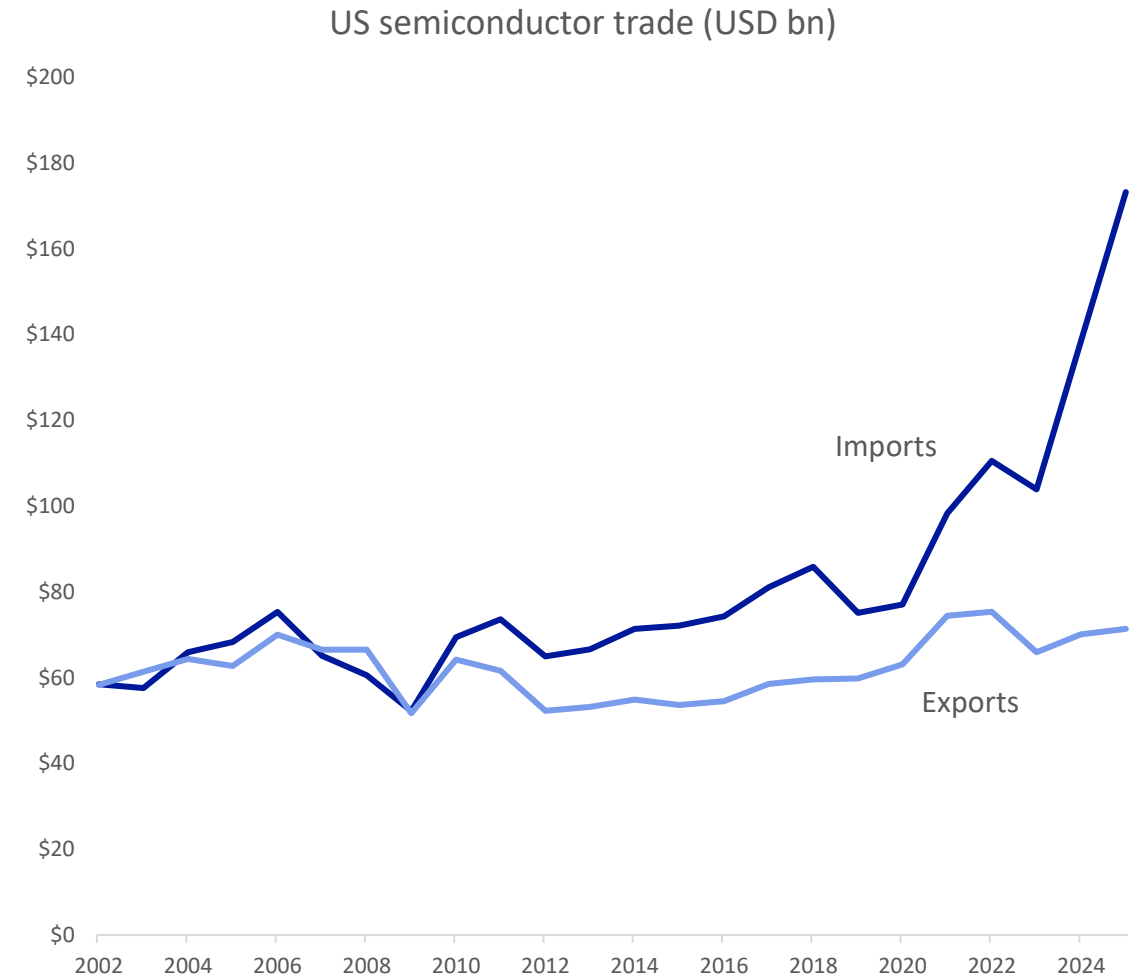
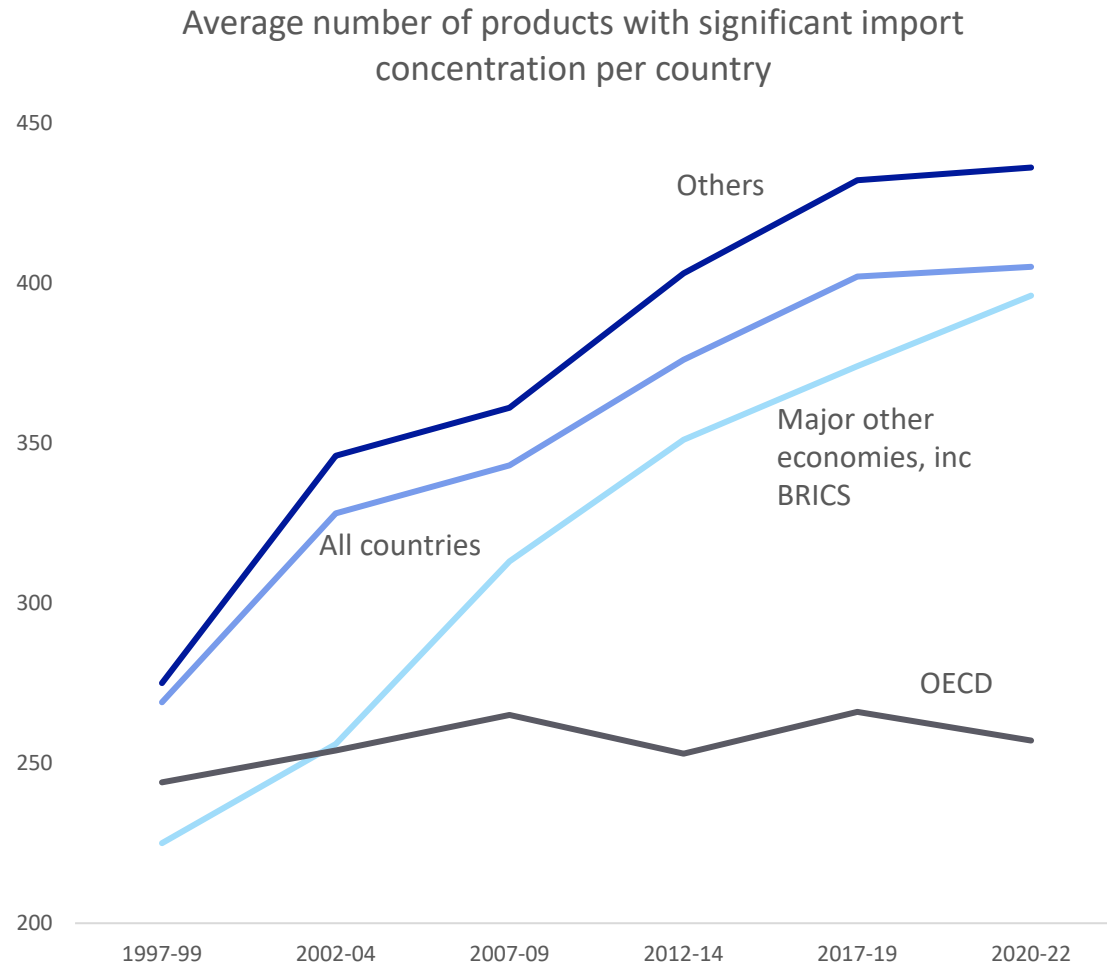
Past booms often relied on getting devices to consumers; now it's about getting scarce hardware online to serve them remotely



Source: Our World in Data, Federal Reserve Bank of St Louis, Haver Analytics, Bloomberg Finance LP, Deutsche Bank Research

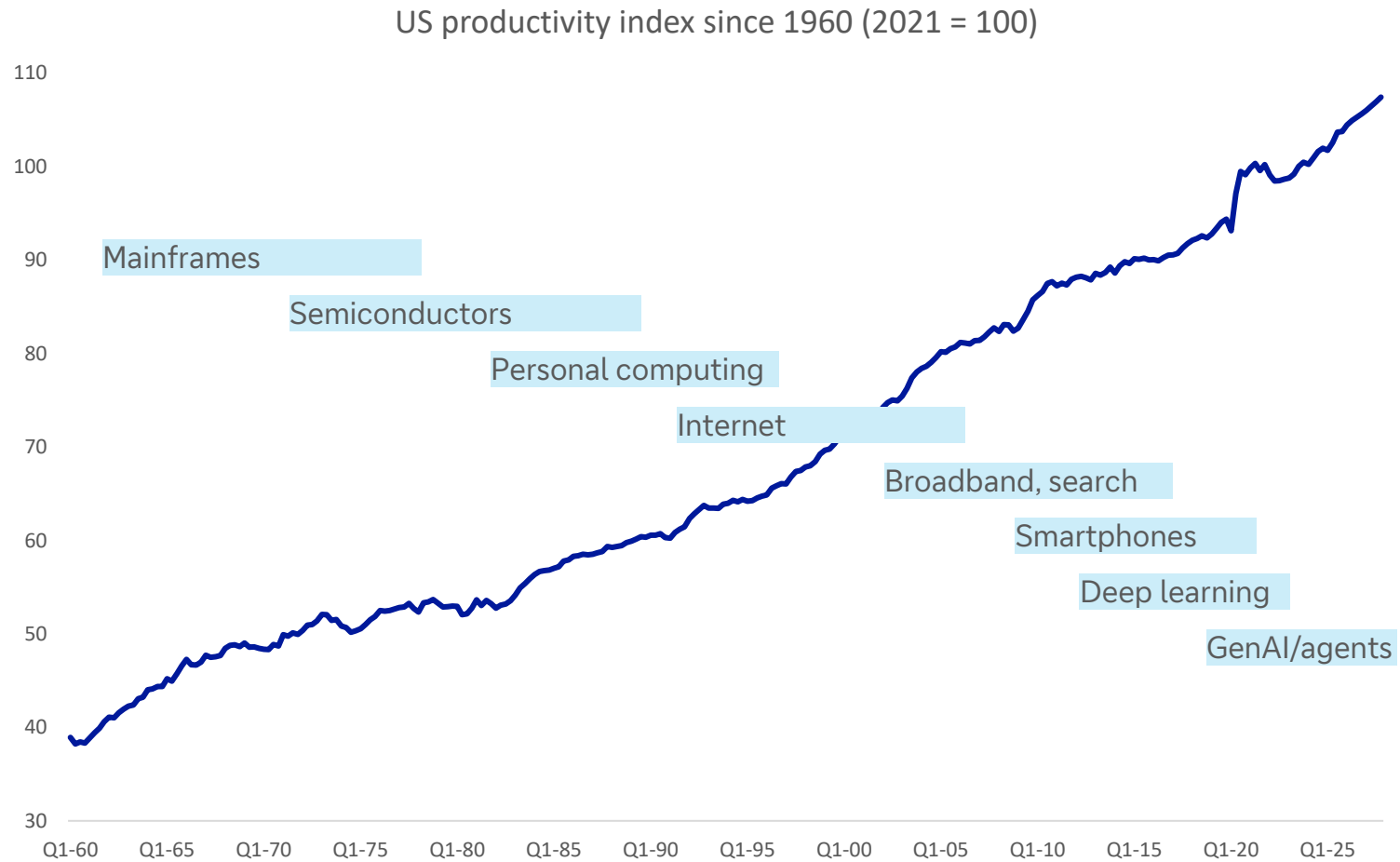
8. Globalisation made tech cheaper – but also increased supply chain risks

There has been a surge in US imports of semiconductors as the AI boom has taken off

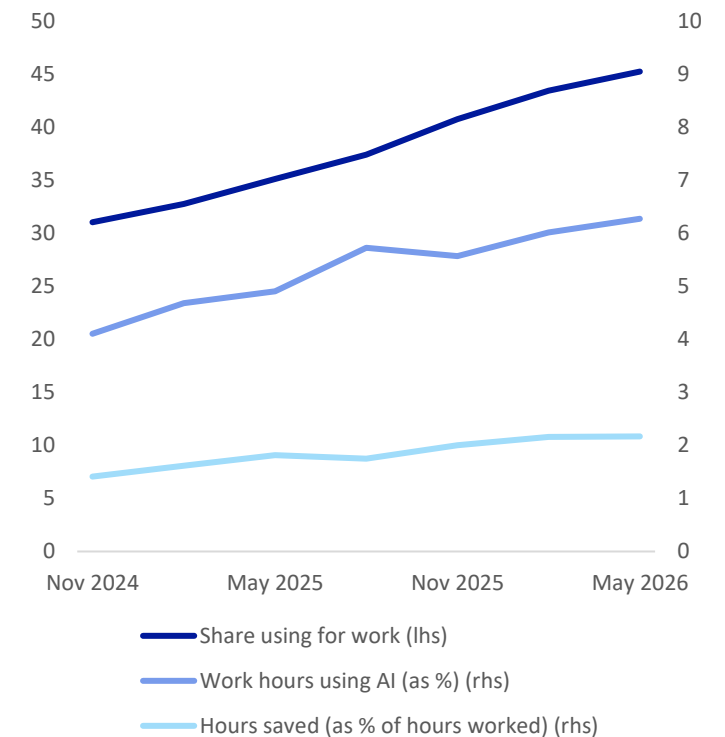


9. Tech revolutions take time to pay off, making them hard to see in long-term data

General purpose technologies have a productivity J-curve, generating costs before results



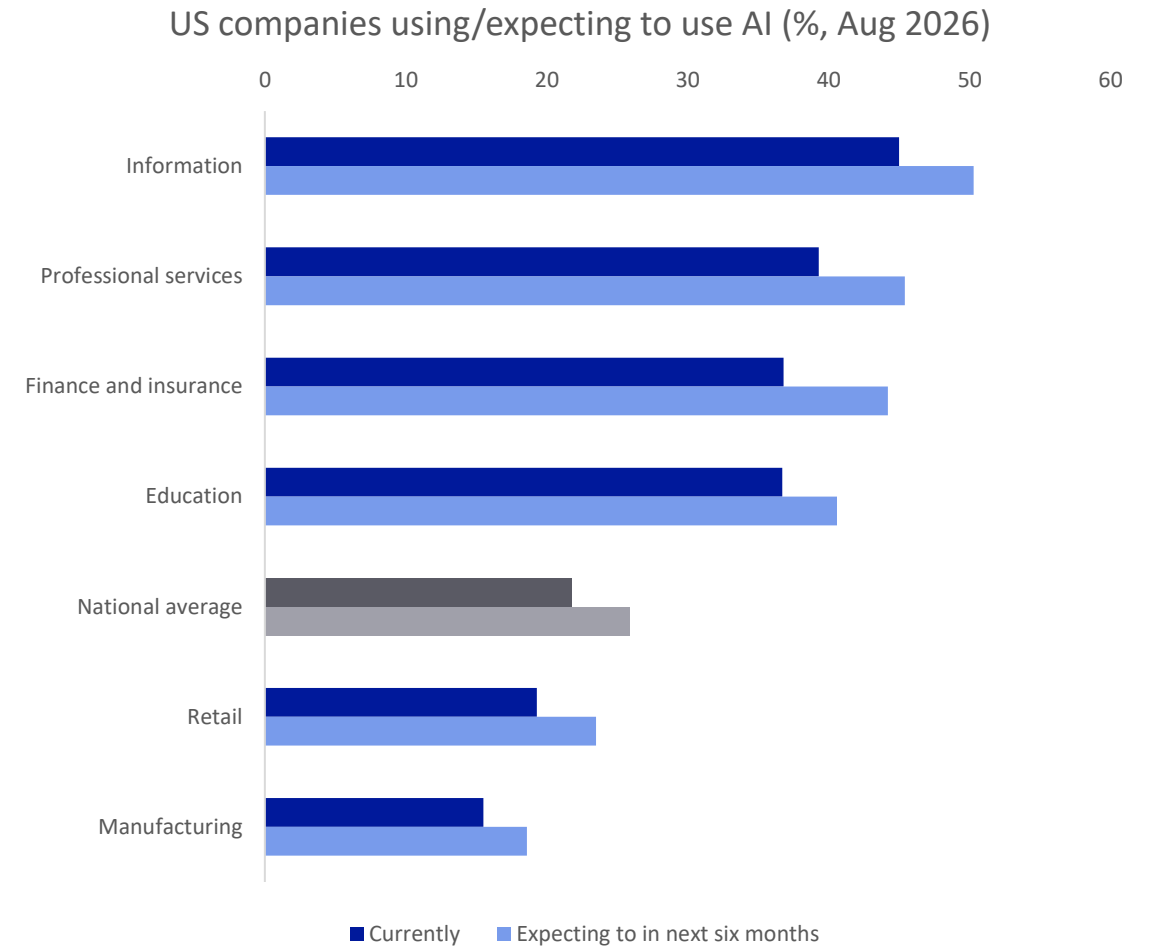
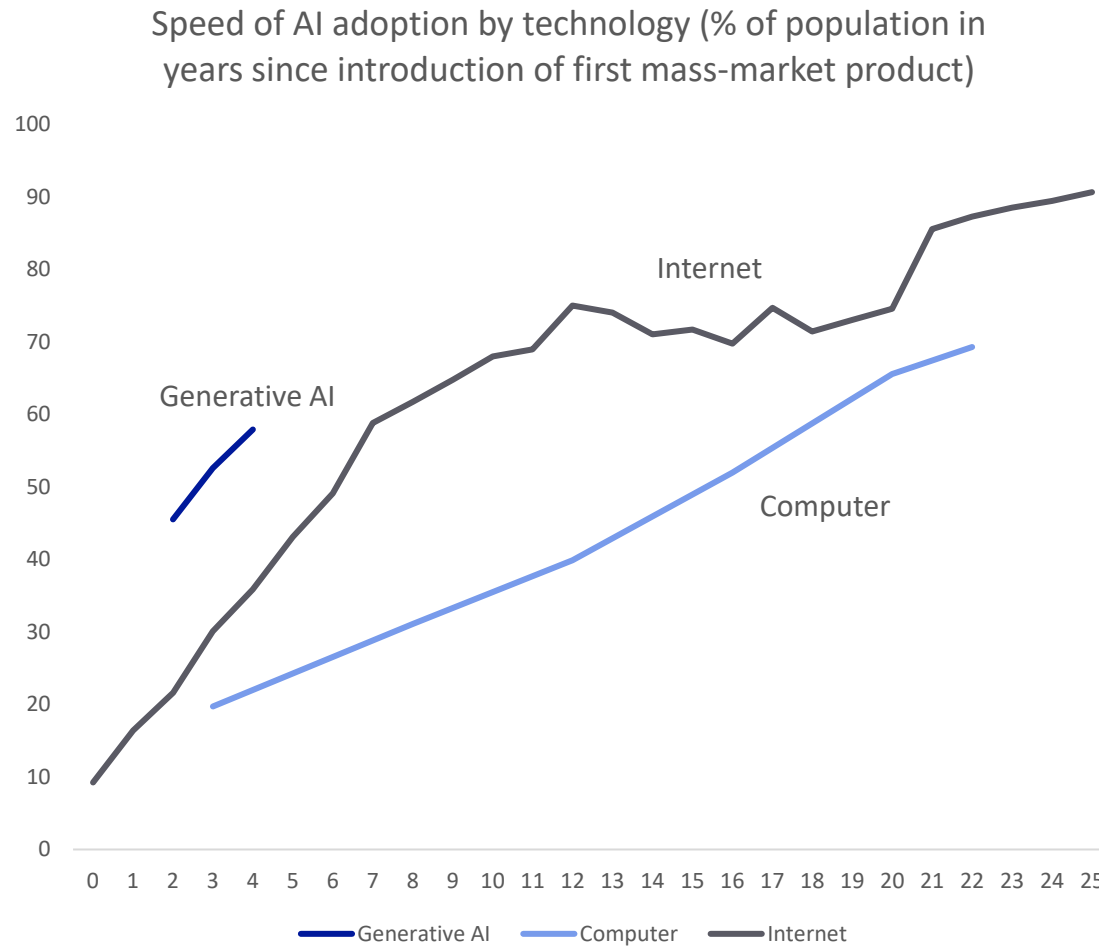
Fewer than half of US workers say they are using AI at work, with a mean of just 6% of time and saving 2% of hours



Source: OECD, GenAI Adoption Tracker, Deutsche Bank Research; blue bars in productivity chart give rough indication of notable tech eras

10. Consumers have adopted AI at a record pace but monetisable business use is slower

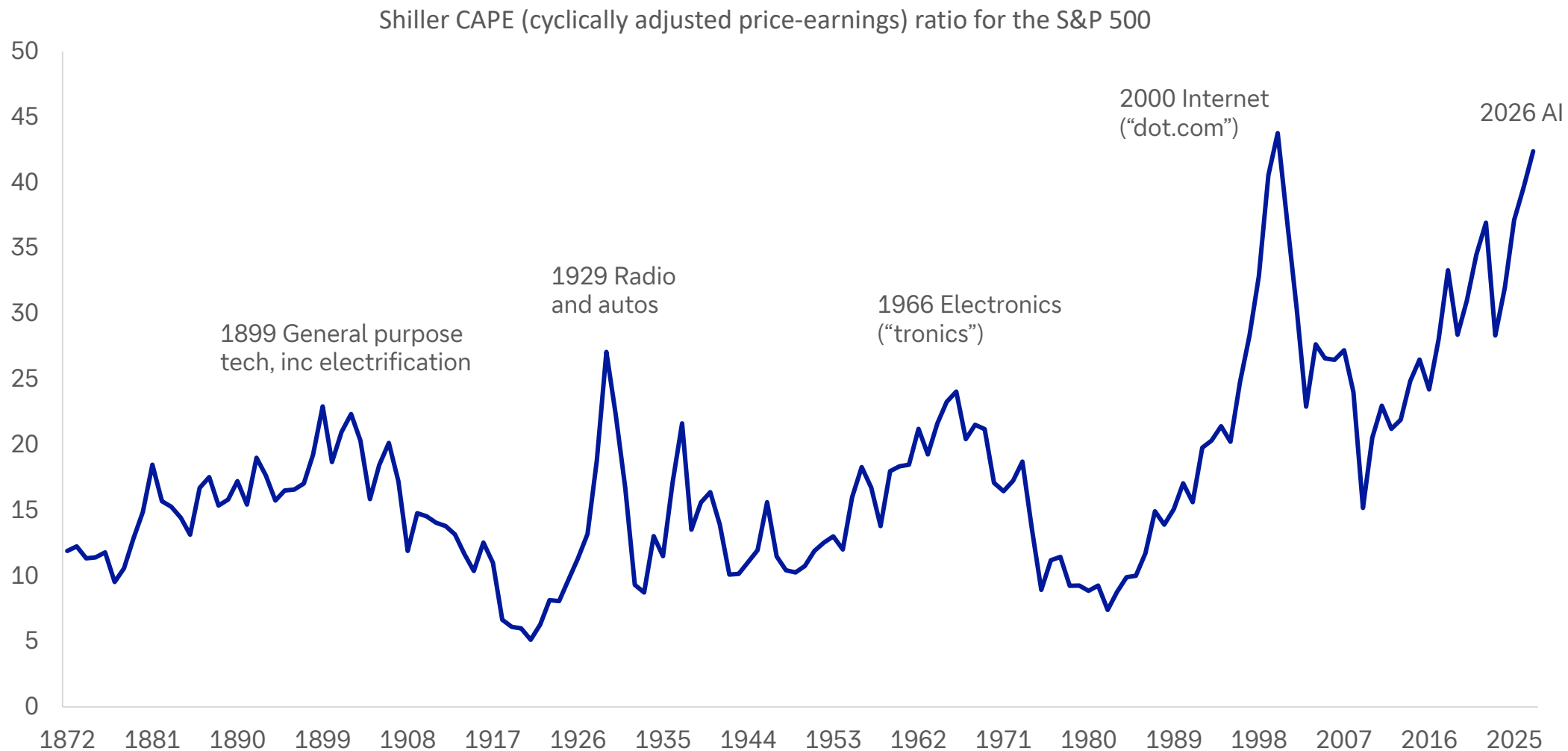
Downloading an app takes minutes; reorganising enterprises round new tech takes years



Source: GenAI Adoption Tracker, US Census Bureau, Deutsche Bank Research

11. The biggest valuation booms are often tech booms – like today

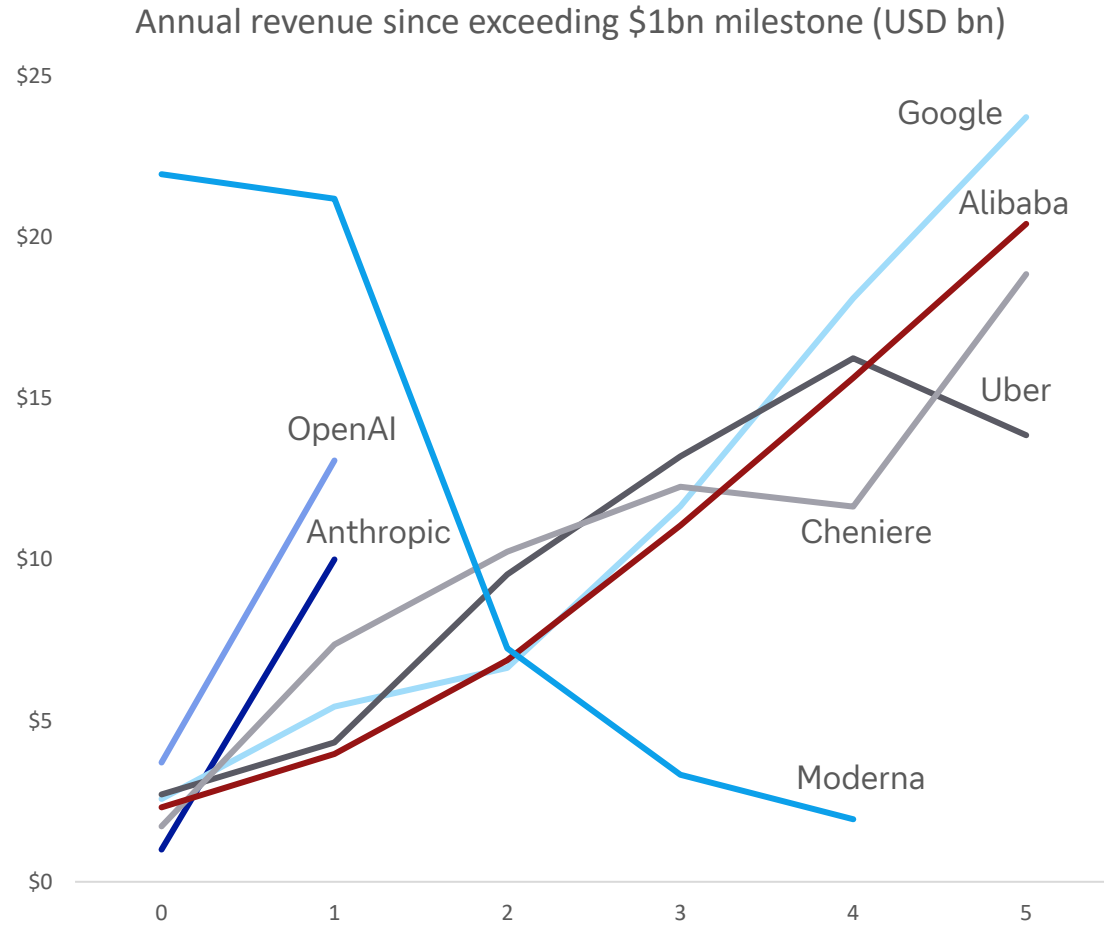
Peaks have mostly coincided with transformative technologies



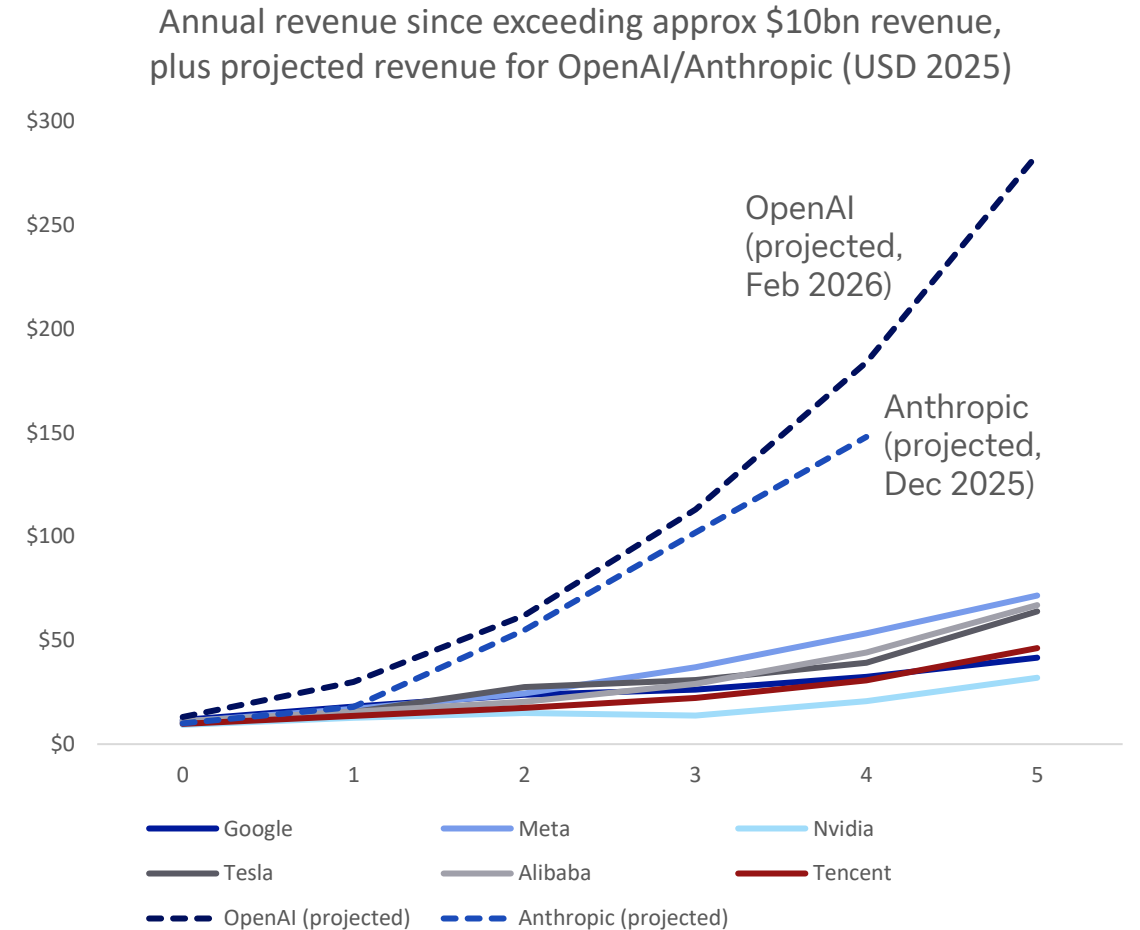
Source: Robert Shiller, Deutsche Bank Research

12. This time is different – but it will need to be even more different to meet projections

OpenAI and Anthropic are exceeding record revenue growth set by peers, at least for now



Source: Bloomberg Finance LP, media reports, Deutsche Bank Research. Note: Year 0 shown as first year revenue exceeded \$1bn (2025 USD). For OpenAI and Anthropic that was reportedly 2025. Moderna nominal revenue spiked from \$800m in 2020 to \$18.5bn in 2021, due to Covid vaccine. Cheniere revenue spiked with 2022 energy crisis.



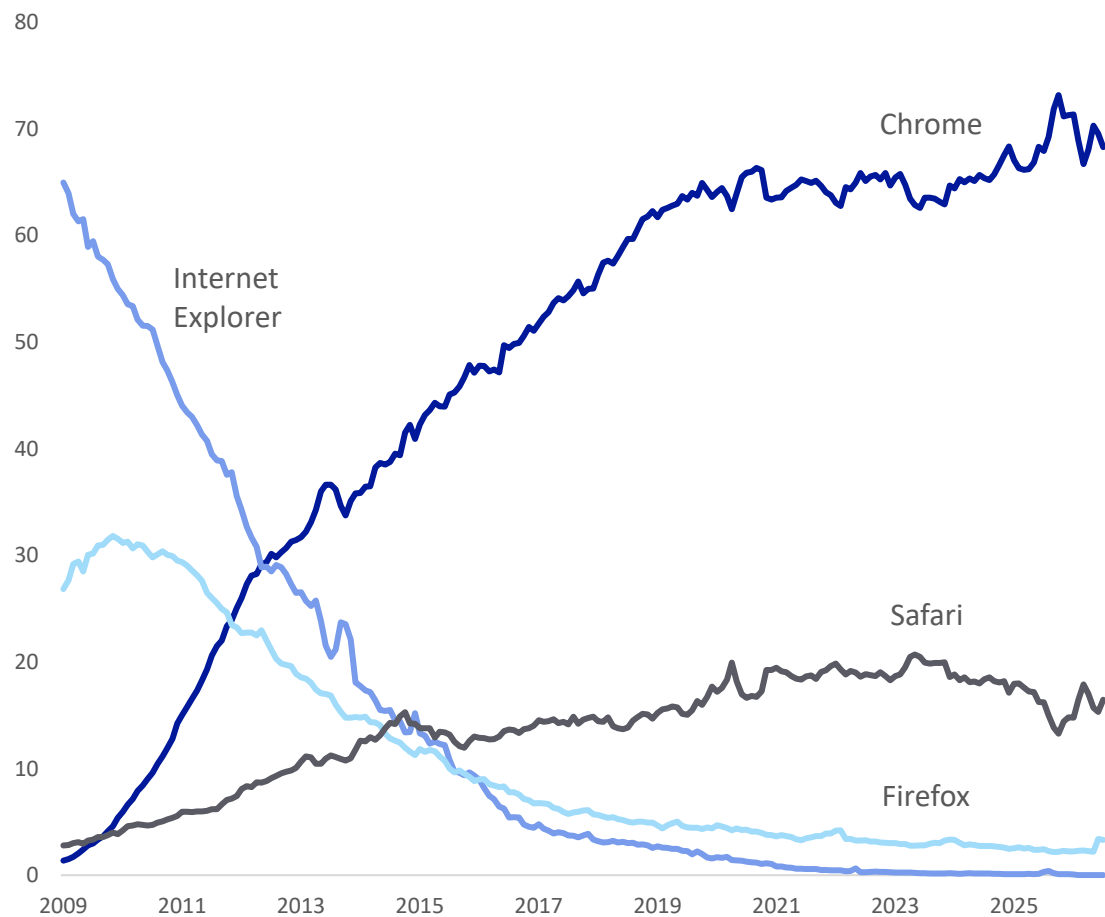
Source: Epoch, Bloomberg Finance LP, The Information (Feb 2026, citing recent updates to investors from OpenAI and Anthropic), Deutsche Bank Research. Note: Year 0 is first year revenue was approx \$10bn (2025 USD)

13. Early leads do not guarantee long-term winners

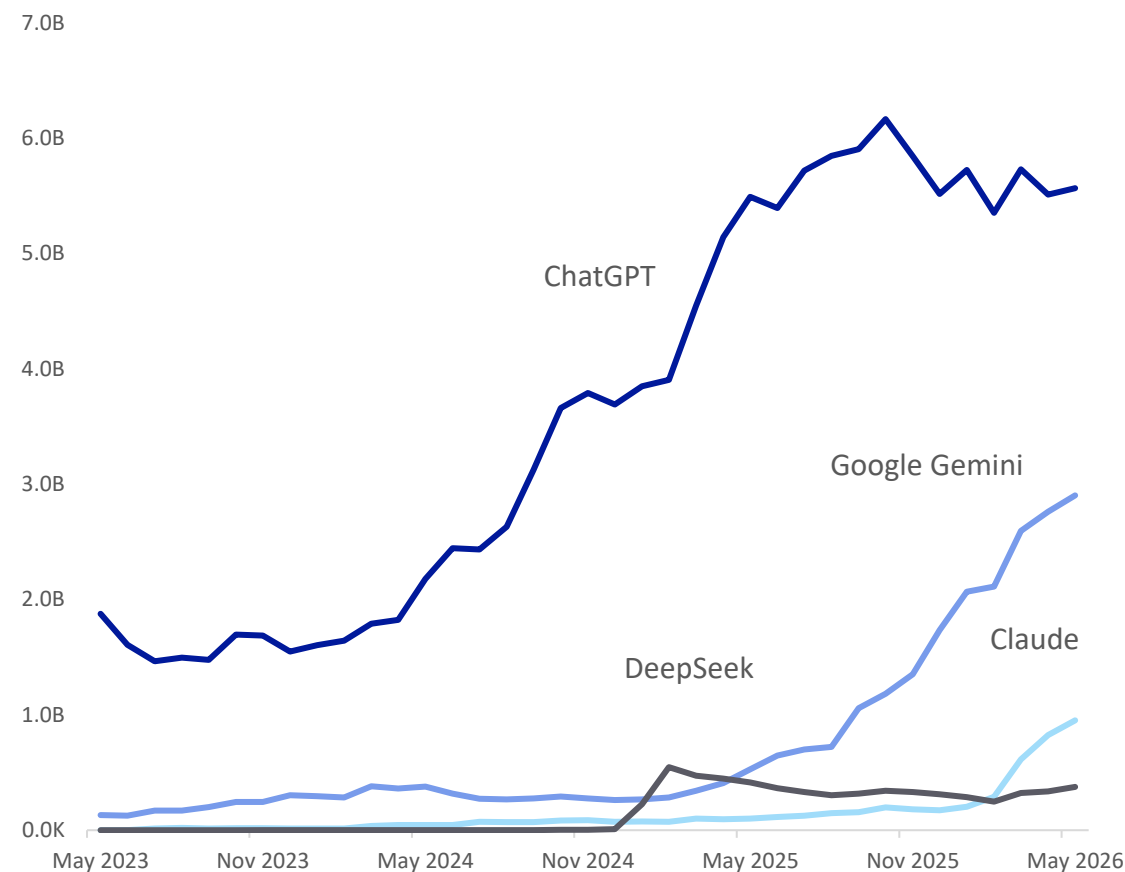
For example, top browser Internet Explorer overtook Netscape, then it too was overtaken



Browser market shares (%) (2009 to today)



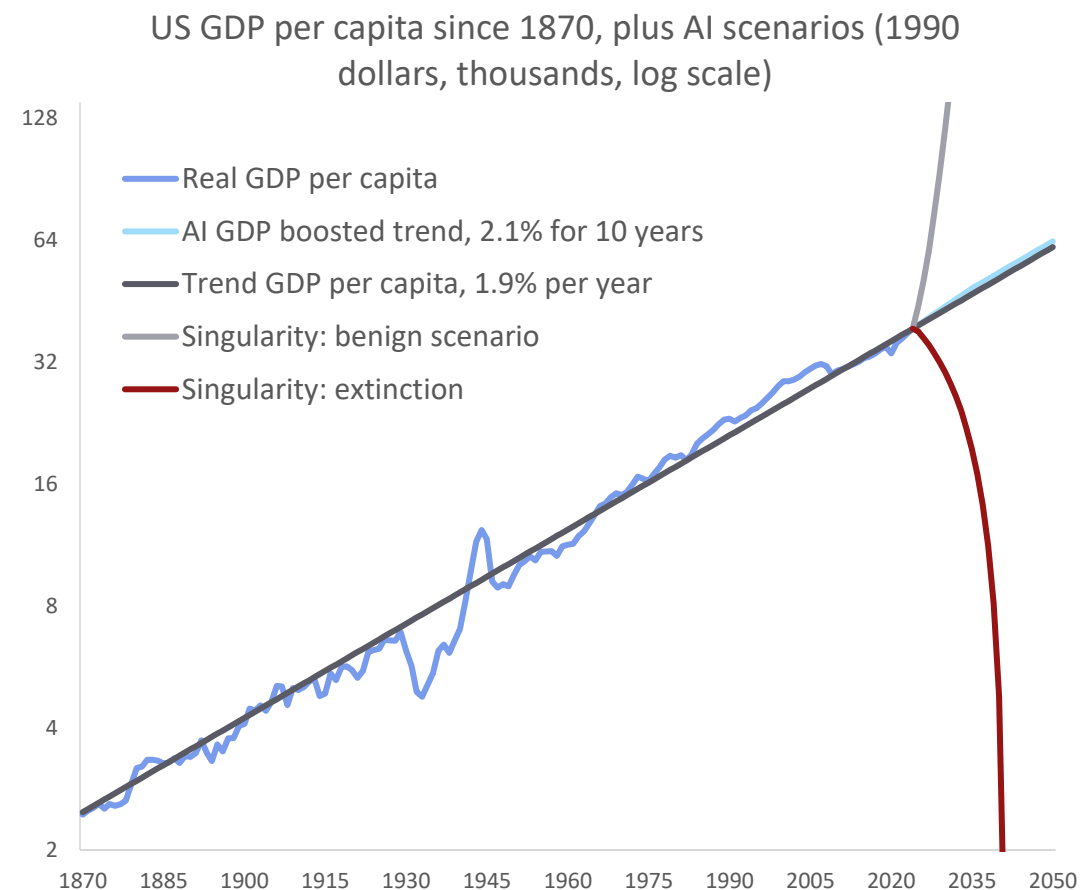
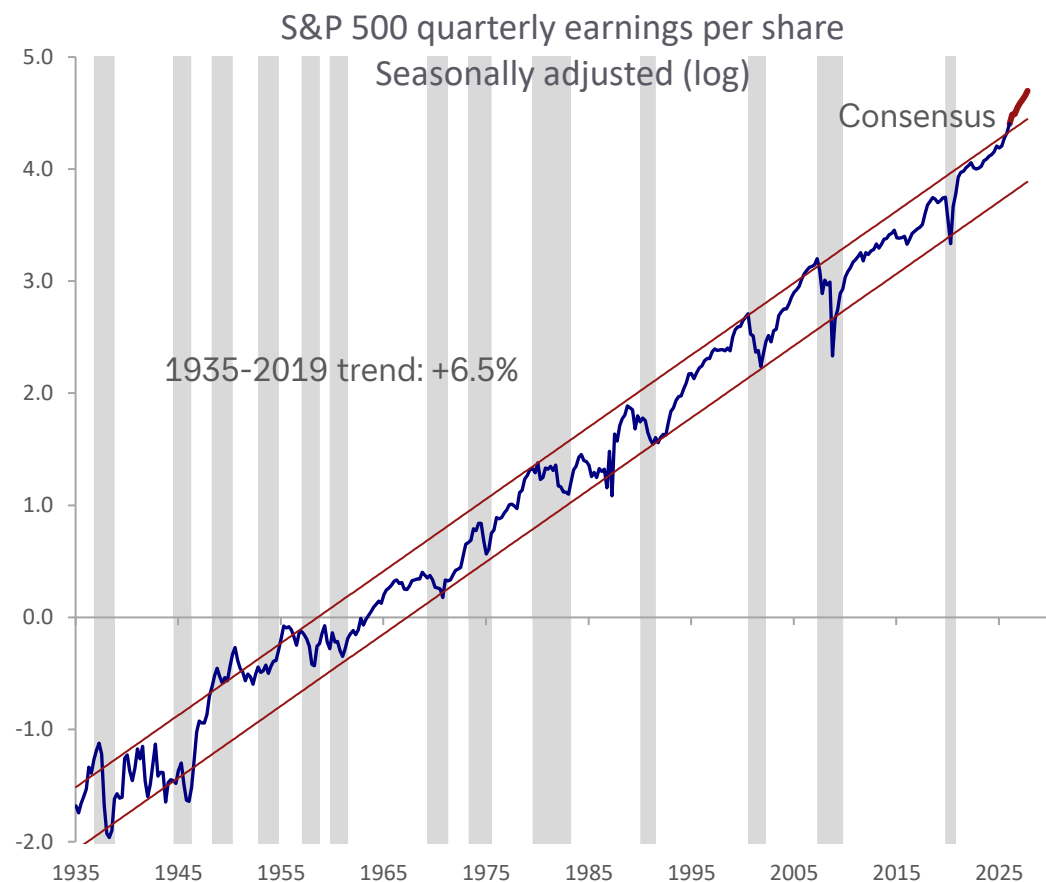
Top four generative AI platforms: monthly visits worldwide (desktop and mobile)



Source: Statcounter, Similarweb, Deutsche Bank Research

14. Long-term trends tend to persist through wars, recessions – and tech revolutions

Even so, some are considering more extreme scenarios this time... from utopia to extinction



Source: Bloomberg Finance LP, Federal Reserve Bank of Dallas, Deutsche Bank Research. Grey shaded bars in S&P quarterly earnings chart represent recessions



Appendix 1

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