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GLOBAL MARKETS ANALYST

AI Versus the 1990s—The Path from Macro Boom to Macro Bubble

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- The continued appreciation of AI-related equities is again prompting questions about whether the US equity market is in a "bubble", as it was in the late 1990s. Our equity strategists have argued that, although valuations are high, we are not yet clearly in bubble territory.
- "Macro bubbles"—asset price distortions with large economy-wide consequences—have generally involved not just overvalued asset prices but also dramatic impacts on spending and capital flows that have been both clues that a bubble is under way and forces that serve to undermine it. The 1990s was a classic example. Alongside soaring equity prices, investment spending boomed, leverage rose, capital poured in, and profitability and balance sheet strength declined, while credit spreads and equity volatility moved higher.
- The macro and market imbalances that we saw then, particularly from 1998 onward, are not generally visible yet. On many metrics, the current AI-related boom has more in common with the tech boom in 1997/1998 than in 1999 or 2000. Although this does not guarantee that returns on capital will be sufficient to justify current asset prices, it suggests that, barring exogenous shocks or constraints, there may still be plenty of room for the AI investment boom to run.
- We see a growing risk that the imbalances that built up in the 1990s will become more visible as the AI investment boom extends. There have been echoes of the inflection point in the 1990s boom lately: a greater reliance on debt finance; an erosion of the corporate sector financial surplus; more complicated vendor financing arrangements; and a Fed that is cutting rates into a non-recessionary period.
- Finding ways to protect or identify those risks should help investors benefit from potential ongoing upside from the AI theme without making portfolios excessively vulnerable. Using options to capture further upside is a more viable strategy than in 1998-2000. And positioning for wider credit spreads or higher longer-dated equity volatility over the next year or two may make sense even if the AI boom remains firmly on track. We may also see more competition for capital between the private and public sectors, though if the AI boom stumbles, rates could ultimately end up much lower.

AI Versus the 1990s—The Path from Macro Boom to Macro Bubble

The continued appreciation in US equities—and AI-related companies in particular—is again prompting questions about whether assets are moving into "bubble" territory. And focus on the impact of AI on macro markets has increased. On both fronts, comparisons with the tech/telecom bubble of the late 1990s have become increasingly common.

The defining feature of a financial bubble is asset prices that have detached from any notion of fundamental value. Our equity strategists have recently argued that, although valuations are high, unlike in the late 1990s, they are not yet clearly in bubble territory.

But "macro bubbles"—asset price distortions with large economy-wide consequences—have generally involved more than just highly overvalued asset prices. In these episodes, inflated asset prices have had dramatic impacts on spending and capital flows. Those macroeconomic responses have been important clues that asset prices are genuinely misaligned. They also unleashed forces that served to undermine those bubbles and saw booms turn to busts as imbalances were unwound.

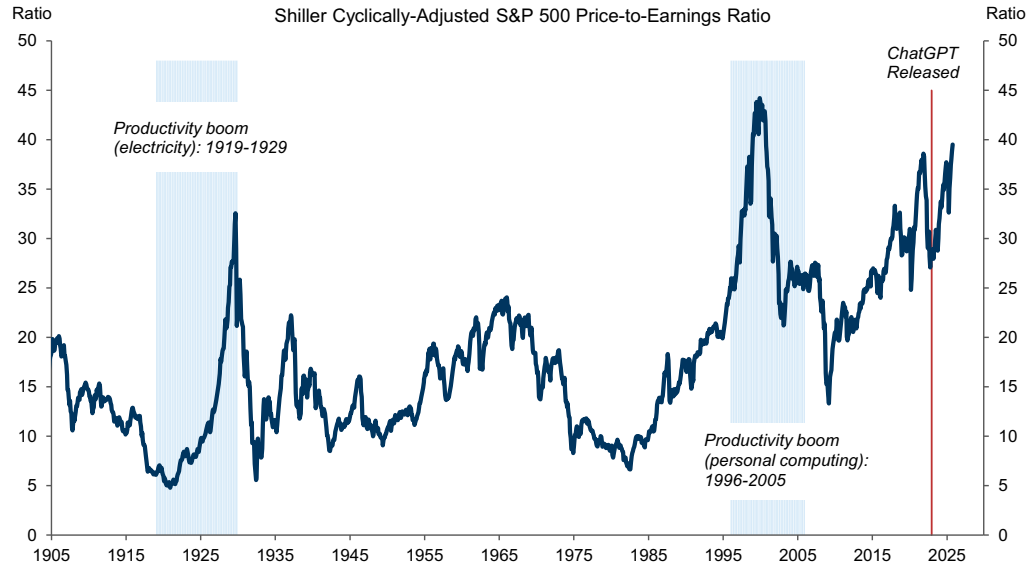
The 1990s bubble was a classic example of a macro bubble. Alongside soaring asset prices, investment spending surged, leverage increased, capital poured into the relevant sectors, and profitability and balance sheet strength declined. When asset prices went into reverse, so did those spending and capital flows, precipitating a recession.

We look here at how the current situation compares in terms of the macro bubble dynamics that we saw in the late 1990s. The macro and market imbalances that we saw then, particularly from 1998 onwards—record investment, declining profitability, deteriorating corporate balance sheet health, and a reset in credit spreads and equity volatility—are not yet generally visible yet. But there is a growing risk that these kinds of signals become more visible as the AI investment boom extends.

Back to the 1990s macro bubble

Valuation has been the dominant lens through which to examine whether an AI-related bubble is already under way. Many measures of US equity valuation are as high as they have been outside the end of the tech/telecom bubble period from 1998-2000. So far, the situation looks better than it did then. To a much greater extent than in the late 1990s, robust earnings have underpinned equity performance, and the balance sheets of the largest players are still meaningfully stronger than they were then.

Exhibit 1: Equity valuations are at their highest since the late 1990s

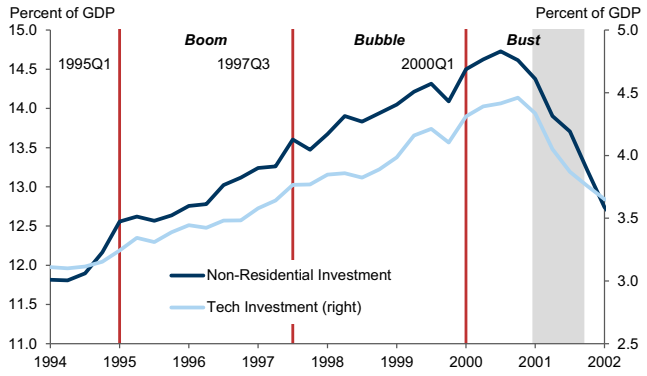


Source: Haver Analytics, Robert Shiller, Goldman Sachs Global Investment Research

But although surging equity prices and extreme valuations were central to the 1990s tech/telecom bubble, the macro stories that lay behind it were important contributors to and reflections of it. Five key macro and market developments stand out that signaled potential bubble issues.

1. Investment spending saw a sustained boom, reaching unusually high levels. From a low base in the early 1990s, investment soared through the decade. Investment in tech equipment and software rose from a little more than 3% of GDP in early 1995 to 4.5% of GDP by early 2000, a record level. As the race to build fiber-optic networks accelerated, telecom investment rose sharply, with investment by the Information sector rising to over 2% of GDP in 2000. These shifts fueled a surge in corporate investment, with non-residential investment rising from around 11% of GDP in 1992 to nearly 15% in 2000. Over the five years to the peak of the bubble in 2000, corporate investment contributed a post-war record of 1.3ppt per year to GDP growth, over half from tech equipment and software. Highly valued asset prices thus had significant consequences for real spending decisions.

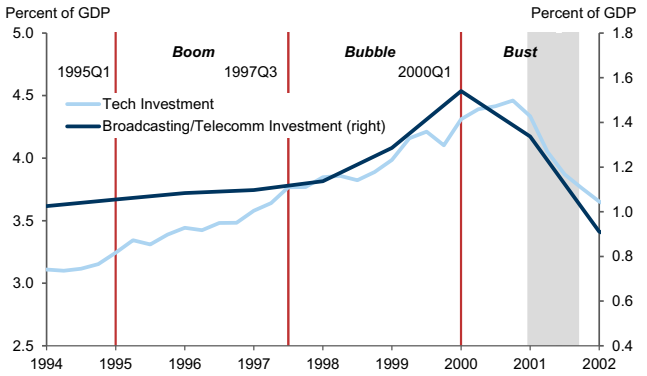
Exhibit 2: A broad-based investment boom...



Shading indicates NBER recessions. Tech investment includes private nonresidential fixed investment in software and information processing equipment.

Source: Haver Analytics, Goldman Sachs Global Investment Research

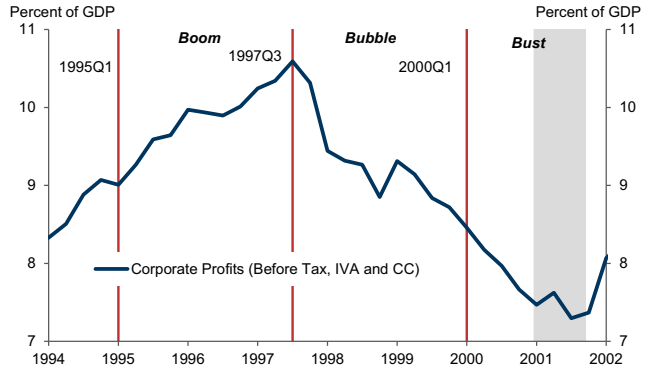
Exhibit 3: ...with a boom and bust in telecom investment



Shading indicates NBER recessions. Tech investment includes private nonresidential fixed investment in software and information processing equipment.

Source: Haver Analytics, Goldman Sachs Global Investment Research

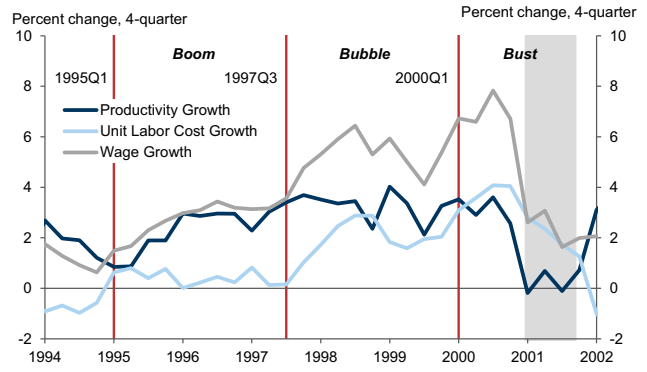
Exhibit 4: The profit share rose but peaked in late 1997



Shading indicates NBER recessions.

Source: Haver Analytics, Goldman Sachs Global Investment Research

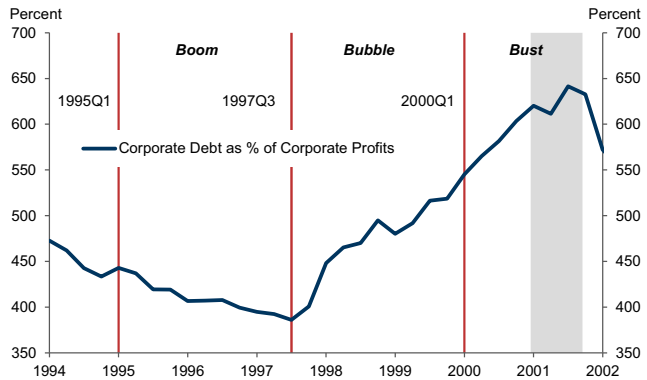
Exhibit 5: High productivity growth but unit labor costs eventually rose with higher wage growth



Shading indicates NBER recessions. Data are for nonfinancial corporations.

Source: Haver Analytics, Goldman Sachs Global Investment Research

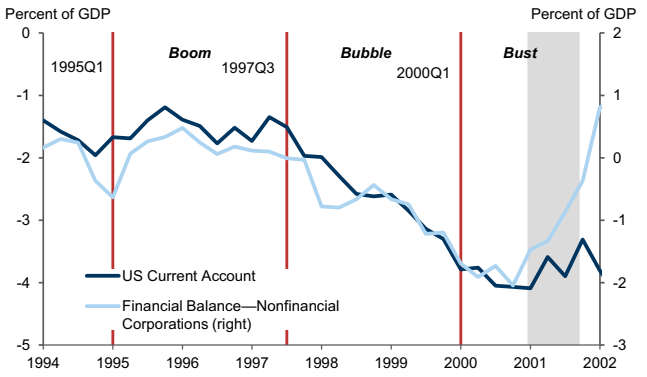
Exhibit 6: Corporate debt rose sharply from late 1997



Shading indicates NBER recessions.

Source: Haver Analytics, Goldman Sachs Global Investment Research

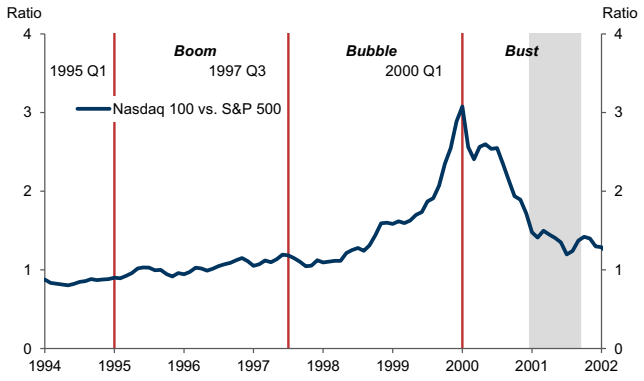
Exhibit 7: Corporate sector, current account positions worsened after 1997-98 EM crises



Shading indicates NBER recessions.

Source: Bureau of Economic Analysis, Federal Reserve, Haver Analytics, Goldman Sachs Global Investment Research

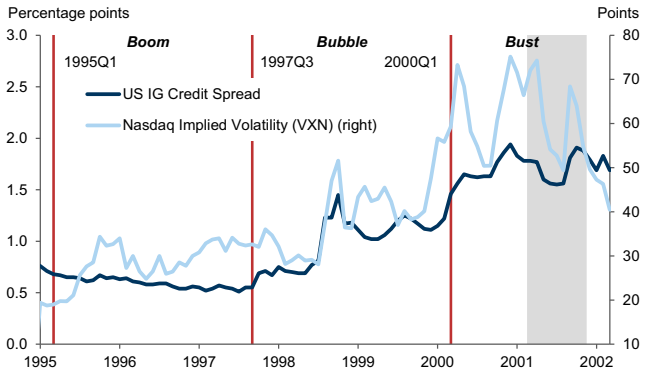
Exhibit 8: The Nasdaq decoupled from the S&P 500 in late 1998



Shading indicates NBER recessions.

Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 9: Credit spreads and Nasdaq vol reset in 1998



Shading indicates NBER recessions.

Source: Bloomberg, G. William Schwert, Goldman Sachs Global Investment Research

2. Profitability peaked well before the boom ended. Although profitability improved for several years, corporate margins—as measured by the national accounts—peaked in late 1997, including in the tech sector itself. Despite a sustained rise in productivity growth, wages picked up steadily from mid-1997 onward in a tight labor market, pushing unit labor cost growth higher. While reported profit margins were more robust, declining profitability in the macro data in the later years of the boom came alongside accelerating equity prices.

3. Corporate borrowing and leverage rose sharply, and household savings fell. The combination of rising investment and falling profitability pushed the corporate sector financial balance—the difference between savings and investment—into deficit. Against that backdrop, and alongside record equity issuance, corporate debt growth accelerated. The telecom investment boom was notably financed by significant public debt issuance, but debt was also used to buy back equity, increasing balance sheet leverage. In the process, measures of balance sheet health deteriorated. The value of household equity holdings soared, helping to fuel a steady decline in the household savings rate.

4. Crises elsewhere fueled massive capital inflow and insurance cuts. The Asian financial crisis erupted in 1997 and the pressures on commodity-producing EM economies culminated in the Russia default and LTCM collapse in September 1998. As capital abruptly left these economies, it flowed into US markets, and the US current account deteriorated sharply. As insurance against the risks from financial stresses, the Fed cut the funds rate by 75bp in late 1998. Disinflation in goods prices and an appreciating USD—both side-effects of the EM crises—eased the path to rate cuts and masked the impact of the US domestic boom. Lower rates and capital inflows added fuel to the equity market.

5. Credit spreads widened and equity volatility picked up, even as stocks kept rising. Other asset markets took note of the deteriorating trends even as equity price appreciation accelerated. Increased leverage—especially in the telecom sector—and the financial risks that the Russian default laid bare helped push credit spreads substantially higher from mid-1998 onwards. Implied volatility in equity markets also rose sharply around the same time, especially for the Nasdaq. As a result, both corporate spreads

and volatility markets were signaling a higher risk premium even as equity valuations continued to rise.

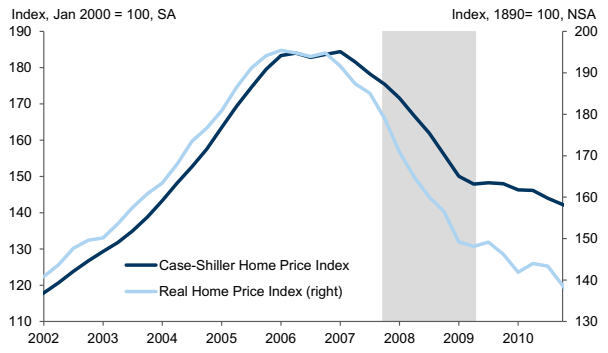
These forces set the stage for the bust. When the booming economy led to rising rates and the economy started to slow, falling equity prices helped turn the investment boom to bust. As corporate financial balances moved back from deficit to surplus, the economy fell into recession. And the debt-financed telecom investment bubble ended in large-scale bankruptcies. While the US was the focal point of the bubble, sharp valuation increases—and some of the same macro imbalances—were visible in other economies, including parts of Europe.

Similar macro imbalances emerged in the US housing bubble

The tech bubble is far from the only example of a classic macro bubble. The Japanese real estate bubble of the late 1980s featured both extreme valuations and a prolonged investment boom/bust. The US housing bubble has even clearer parallels. Soaring housing prices and extreme valuations in 2004-06 again led to large macro responses along the same five dimensions as the tech bubble. That period saw an unprecedented surge in residential investment; signs of rising vacancy rates as soon as late 2005/early 2006; a sharp deterioration in household sector financial deficits and a sharp rise in household leverage and a deteriorating current account, this time associated with the global "savings glut".

As with the tech bubble, those macro warning signs were visible well before the bubble truly burst. Markets were generally slower to respond. Although housing-related areas underperformed sharply from the middle of 2005, the upward shift in credit spreads and equity volatility came later, in the summer of 2007, when levered losses from housing-related assets began to show up on financial balance sheets. This was still ahead of the peak in equity markets and the economy, but by a smaller margin than in 1998-2000. As with the tech bubble, frothy housing markets—and their macro consequences—were features of a number of other developed markets.

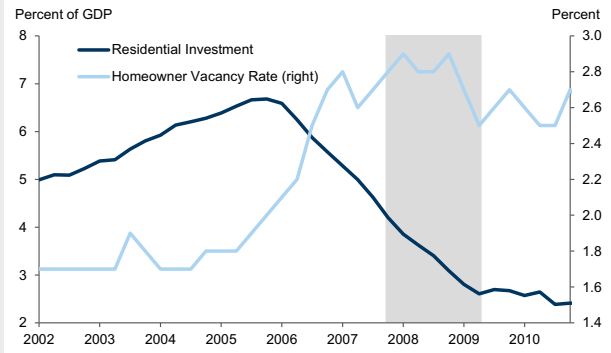
Exhibit 10: House prices peaked in early 2006



Shading indicates NBER recessions.

Source: Haver Analytics, Goldman Sachs Global Investment Research

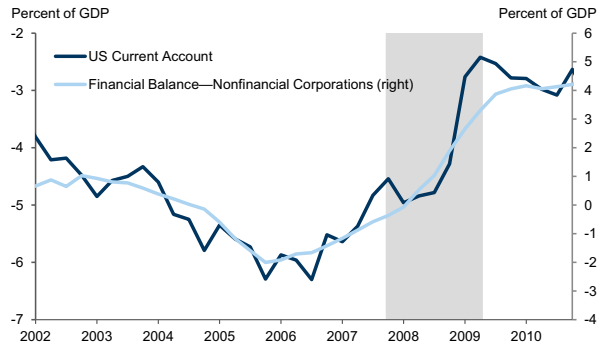
Exhibit 11: A sharp rise in investment led to signs of overcapacity



Shading indicates NBER recessions.

Source: Haver Analytics, Goldman Sachs Global Investment Research

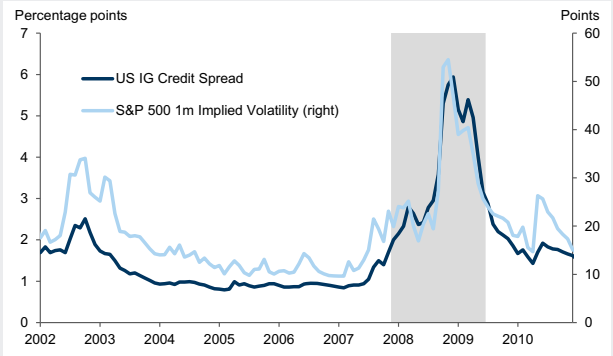
Exhibit 12: The household financial balance and current account deteriorated



Shading indicates NBER recessions.

Source: Bureau of Economic Analysis, Federal Reserve, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 13: Volatility and spreads rose but not until "levered losses" appeared in mid-2007



Shading indicates NBER recessions.

Source: Bloomberg, Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

An inflection in 1997-98

Within this broad timeline of macro shifts, two related features stand out.

First, the trajectory of the boom changed markedly from 1997-98 onwards. Not only was this the period of frothiest equity prices (the Nasdaq decoupled sharply from the broader S&P 500 in late 1998) and the most dramatic increase in valuations, but, relative to 1995-97, signs of a bubble also became more visible in macro dynamics. As Exhibits 2-9 show, the period from late 1997 to early 2000 saw investment spending rise to unprecedented levels, a shift from rising to falling profit margins, a sharp pickup in wage growth, the clearest deterioration in the current account and corporate financial balances, and a reset in credit spreads and equity volatility for the Nasdaq—the heart of the bubble—to higher levels.

Second, these shifts meant that there were clear warning signs in the real economy and markets well before the bubble itself came to an end. In particular, declining profitability, rising leverage, and increased credit spreads and equity volatility were all challenges to the narrative that underpinned the equity boom and appeared at least two years ahead of the peak in stock prices.

The other major macro bubble of the last 30 years—the US housing bubble—mirrored most of the five macro dynamics seen in the tech bubble. Again, many of the macro warning signs were visible well ahead of the collapse in equity markets and the economy (see box above).

Few signs of macro bubble dynamics yet

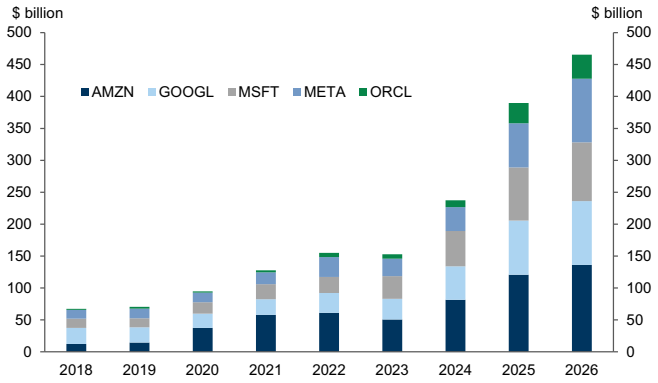
How does the current AI-related boom compare to the tech bubble in terms of those 5 macro dynamics?

1. Investment spending on AI and tech has picked up, but the rise is less sustained and less broad-based so far. Spending on tech equipment and software investments

has risen sharply over the last 18 months, and capex spending from "AI hyperscaler" companies is set to have doubled since ChatGPT was launched in late 2022. But while the level of broad tech investment is comparable to the peak of the tech bubble in 2000, the investment boom is so far more modest. Tech's share of the economy is larger, so the rise in IT investment spending is so far smaller than in the late 1990s. AI-related investments are only a subset of that overall spending and estimates of either AI investments or total hyperscaler capex are meaningully smaller shares of GDP than the peak spending during the tech/telecom investment boom. Our global economics team has shown that the peak historical investment impulse from AI is currently well below those seen in other innovation-led infrastructure buildouts. Nor has that investment growth yet been sustained for anything close to the multi-year boom that we saw in the late 1990s.

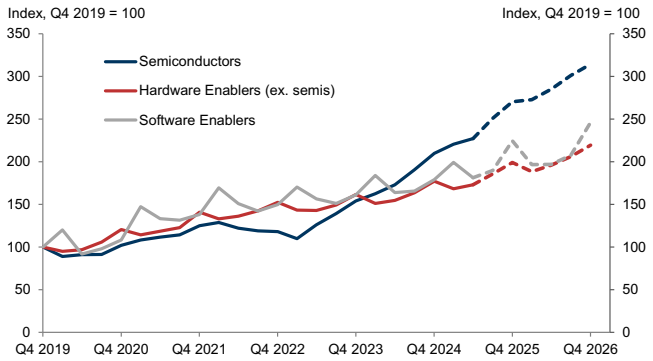
2. There is no clear sign yet that profitability is deteriorating. Corporate profit margins from the national accounts have been relatively stable and reported earnings growth remains solid. Productivity growth has picked up recently (though it is likely too soon for this to be AI-related), but wage growth has been decelerating, so unit labor cost growth has also fallen sharply, at least for the non-financial corporate sector.

Exhibit 14: Capex spending has increased sharply since ChatGPT emerged
Hyperscaler annual capex ($ billion). 2025 and 2026 reflect consensus estimates



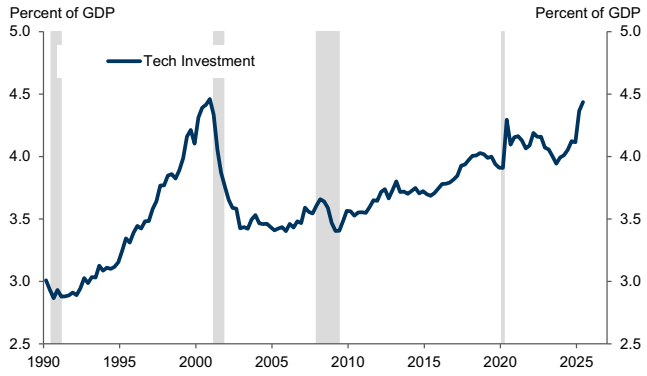
Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 15: AI investment has grown sharply across major categories
Actual and forecasted revenues by AI-exposed sectors of Russell 3000



Source: FactSet, Goldman Sachs Global Investment Research

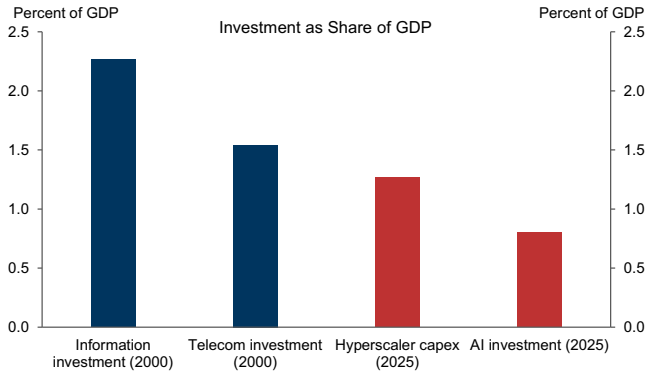
Exhibit 16: Tech investment up but from a higher base



Shading indicates NBER recessions. Tech investment includes private nonresidential fixed investment in software and information processing equipment.

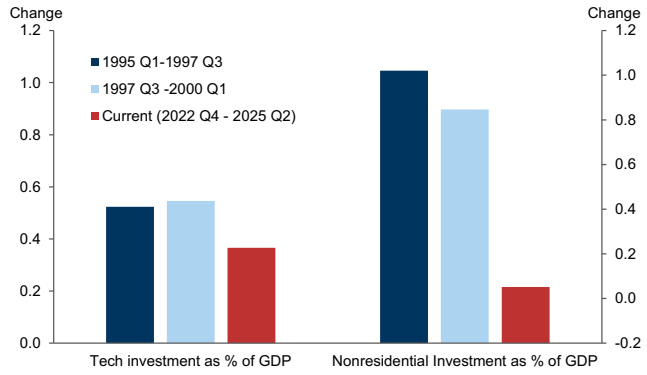
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 17: AI capex smaller than in prior booms



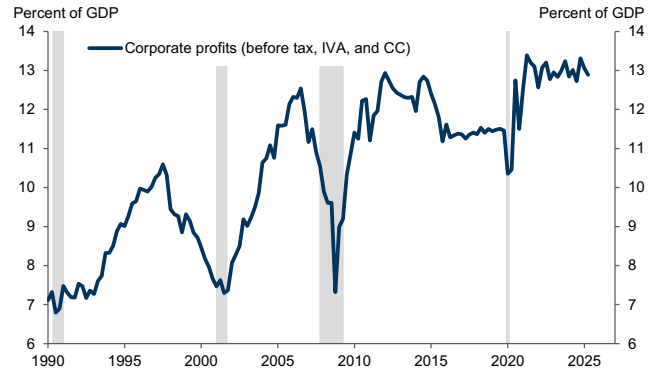
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 18: No broad-based investment boom yet



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 19: Profit share has remained high so far



Shading indicates NBER recessions.

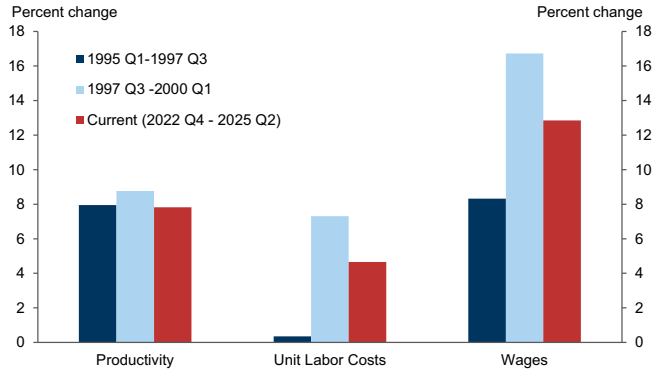
Source: Haver Analytics, Goldman Sachs Global Investment Research

3. The corporate sector financial balance remains marginally in surplus and leverage has been more subdued, while household savings have been stable. The sharp rise in investment spending has eroded the corporate sector's financial balance. But a big difference relative to the late 1990s is that the sector is in surplus, not deficit, and the large companies have generally been financing their capex more out of free cash flow and less with debt. Credit growth has also remained much more subdued and balance sheets are generally much stronger than at the end of the tech/telecom bubble. Leverage measures—including for the hyperscaler companies—have deteriorated lately, but from extremely robust levels. The value of household equity holdings has risen sharply, though the savings rate has not so far declined in the way that it did in the late 1990s.

4. The current account deficit is large but stable. As in 1998, though for different reasons, the Fed has begun a fresh series of rate cuts that has been characterized as "insurance easing". But there is so far no equivalent capital account inflow to the 1997-99 period. As a result, the current account—while in large deficit—has remained broadly stable recently.

5. Credit spreads remain tight, and equity volatility has not reset permanently higher. Without the clear signs of rising leverage and significant net issuance of the late 1990s, credit spreads have so far remained very tight. There are no warning signs from that area yet (though as we saw in 2007, those may come late). Implied volatility in equities has spiked periodically over the last couple of years in response to a variety of shocks. But even here we have not yet seen the kind of sustained rise that we saw from mid-1998 onwards, particularly for tech-related areas.

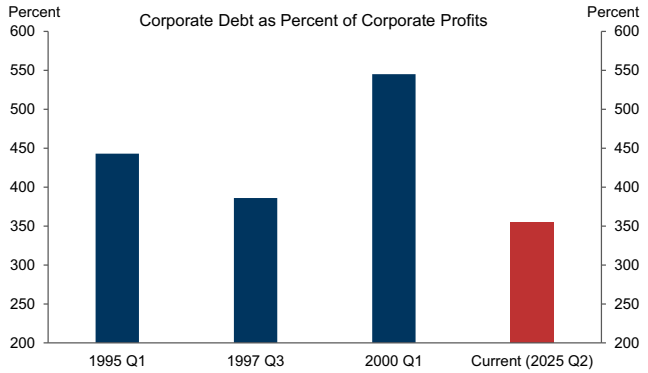
Exhibit 20: Unit labor cost growth more subdued



Data are for nonfinancial corporations.

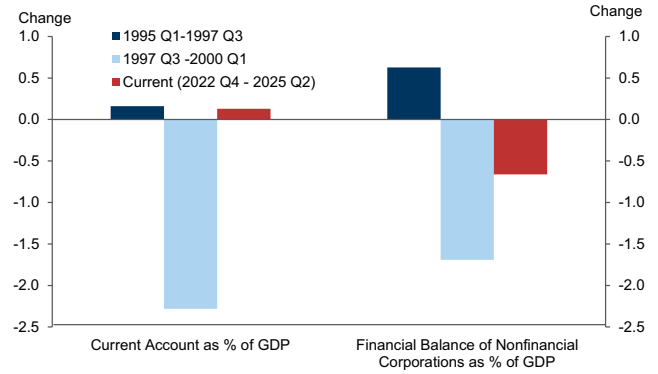
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 21: Corporate debt to income still low



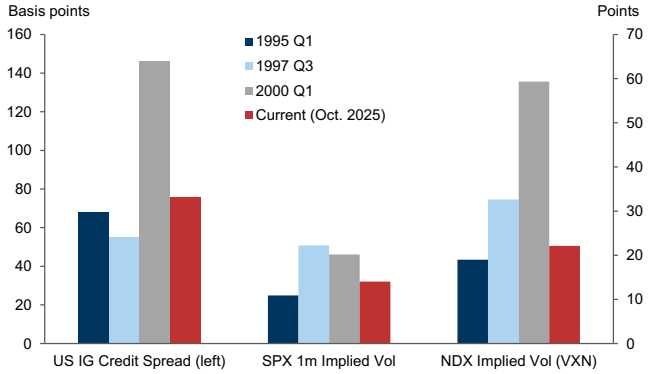
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 22: More modest shifts in current account and corporate sector balance than in the bubble



Source: Bureau of Economic Analysis, Federal Reserve, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 23: Credit spreads and volatility more like 1997 than 1999



Source: Bloomberg, Goldman Sachs FICC and Equities, G. William Schwert, Goldman Sachs Global Investment Research

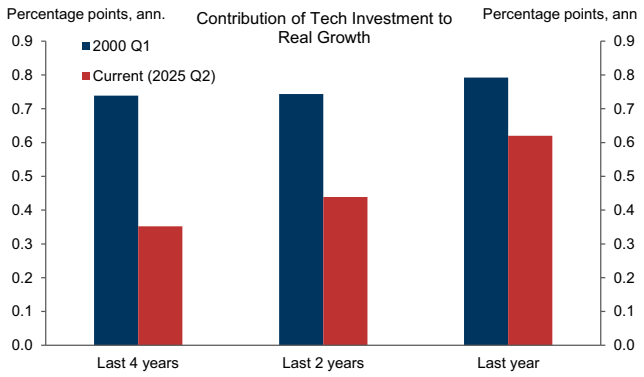
Partying like it's 1997

The high-level story is that, although the macro footprint of AI-related spending and financing has become much clearer over the last two years, many of the elements that characterized the macro dynamics in the late stages of the tech bubble (and to some degree the housing bubble) are not yet clearly visible. On many of those metrics, as Exhibits 16-23 show, the current AI-related boom has more in common with the tech boom in 1997/98 than in 1999 or 2000.

AI-related investment spending has risen sharply and is now clearly economically relevant. But the scale and longevity of that investment cycle still suggest that it is at a

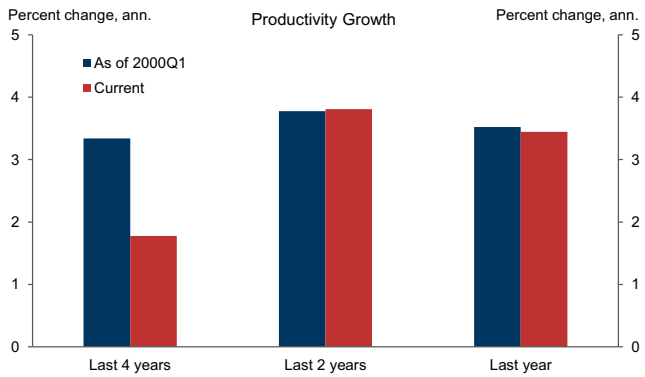
fairly early stage relative to the late 1990s experience. The rise in productivity growth is also at a much earlier stage, so if we follow the 1990s template there would be substantial room still ahead. Work by our global economics team suggests that both trends have plenty of scope to continue. Specifically, their work shows that under realistic assumptions the Present Discounted Value (PDV) of generative AI capital revenue comfortably exceeds projections of AI-related capex, so continued high levels of investment can be readily justified on that basis.

Exhibit 24: Tech investment contribution not yet as sustained as in the late 1990s



Source: Haver Analytics, Goldman Sachs Global Investment Research

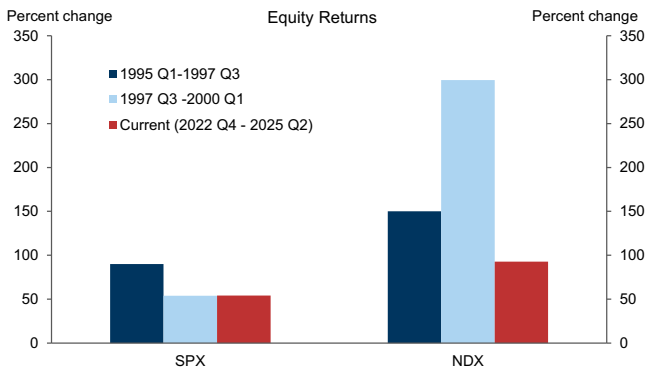
Exhibit 25: Productivity boom also at an earlier stage



Source: Haver Analytics, Goldman Sachs Global Investment Research

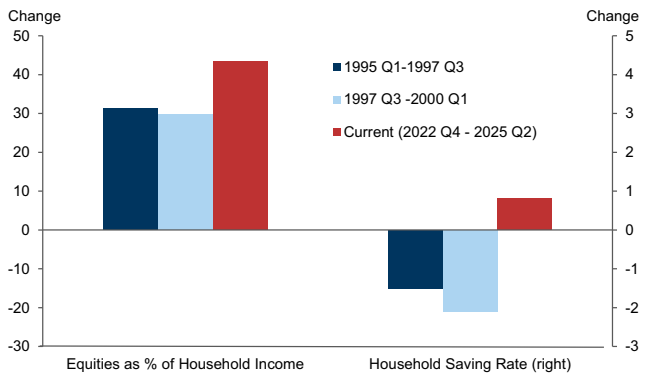
While it has become common to hear that AI is holding up the US economy, our US economics team's estimates imply a more modest role so far, with our estimates that AI investment has contributed roughly 0.1ppt to reported US growth on an annualized rate since 2022, with a true impact of still only 0.3ppt on annualized GDP growth. Higher estimates than this generally rely on counting all tech spending as AI; on over-weighting equipment investment that was frontloaded ahead of potential tariffs; or on ignoring the high import content of that spending, which offsets the contribution of investment to GDP growth. The sharp rise in equity values on household balance sheets does look more in line with the experience of the 1990s, and is providing some support for consumer spending, though not all those gains are attributable to AI. But the overall contribution of AI to GDP growth looks more like the early stages of the 1990s tech boom.

Exhibit 26: Equity returns not yet matching the bubble



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 27: Equity gains have boosted household assets, but savings decline smaller so far



Source: Haver Analytics, Goldman Sachs Global Investment Research

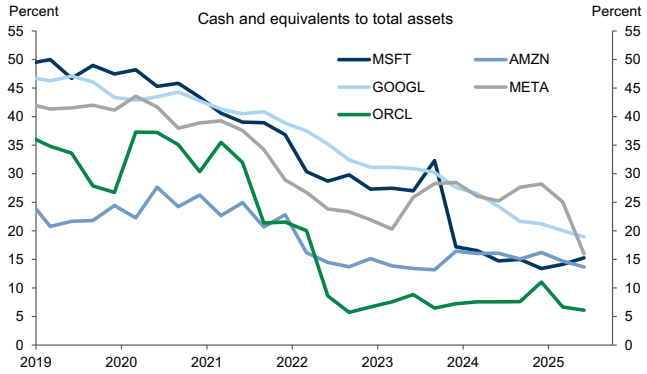
The use of credit and the financial positions of the corporate sector also look more like the 1997 period than the final years of the bubble. The strength of earnings in the big tech companies means that most investment spending has been financed internally and balance sheets there generally look much stronger than in the late 1990s. The use of Special Purpose Vehicles, and the important role played by large private companies in the AI complex may be flattering these comparisons to a degree. But the differences with the late 1990s are still real.

The macro environment is also missing key ingredients of the late 1990s too. Fed "insurance cuts" may be providing some tailwind for US equities as they did in 1998, but the massive capital inflows from the rest of the world have no clear counterpart so far. The domestic economy is also less robust than it was in 1997 and 1998, when annualized real demand growth was running closer to 5%. Today's economy features a softer labor market and more weakness in consumer and housing-related spending. While this may make the economy more fragile to even a smaller shock, it reduces the risk of wage pressure and renewed Fed tightening relative to the late 1990s.

Although the macro footprint from AI does not yet resemble the later stages of the 1990s bubble, there are some echoes of the inflection point in that boom that we highlighted earlier, particularly accounting for announced intentions. Much of this activity is planned, not realized, but has the potential to shift the macro profile further.

- Capex growth plans from the hyperscalers—and from private companies like OpenAI—suggest rapid growth in AI-related investment is likely to continue, moving us further along the 1990s path.
- The corporate financial sector balance is close to shifting into deficit for the first time in nearly 20 years (excluding a single quarter in 2022). Credit issuance by tech and utility companies has been rising and the balance sheets of the tech giants are no longer distinctively stronger than the broader market.
- Data center investment has been increasingly debt-financed over time and the rapid expansion of a large fixed-asset network mirrors aspects of the telecom investment boom, even if looks to be at an earlier stage. And the latest round of deals in the AI space makes it more likely that debt issuance will need to increase while also fueling a proliferation of what are essentially vendor-financing arrangements.

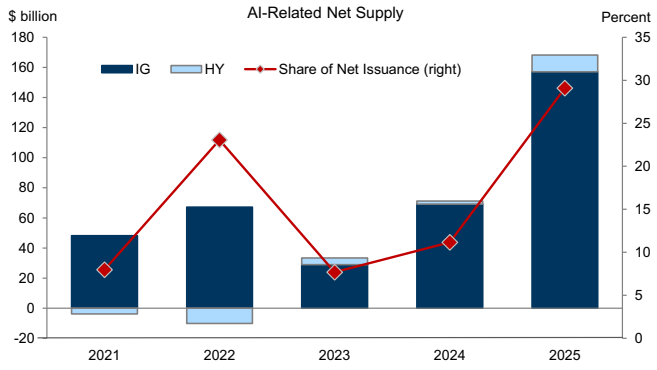
Exhibit 28: A notable decline in cash-to-assets for the five largest AI hyperscalers



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 29: USD net credit supply from AI-related issuers is much larger this year

AI-related issuers refer to the constituents of the GS TMT AI Basket (GSTMTAIP) and RPLDCI, WULF, VOLTAG



GSTMTAIP developed by GBM.

Source: Bloomberg, Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

A macro force, not yet a macro bubble

The fact that the macro consequences of the AI boom do not yet mirror the late 1990s bubble does not necessarily imply that asset prices are not overvalued or that the returns on AI will justify the investments being made. Alan Greenspan's famous "irrational exuberance" speech was given in December 1996 and valuations at the bottom of the bust ultimately retraced beyond the levels seen at that time. And measures of equity valuation look to be somewhat further along the 1990s path than many of the macro indicators. But the lack of clear macro imbalances so far does provide some qualified reassurance in three different areas.

1. The absence of the large macro imbalances seen from 1998 to 2000 (and in the later years of the housing bubble) means that some of the clear red flags of an asset price bubble are still missing so far. That in turn suggests at a minimum that any asset value overvaluation is not yet nearly as large or persistent as it was then, though comparing outcomes to March 2000—the largest US equity bubble on record—is an undemanding benchmark.
2. The economic and market consequences of a premature end to the AI asset boom at this point would probably be more modest than the end of the bubble in 2000. While the macro impacts are large enough now for a reversal to be painful, the extent of the investment boom, corporate financial imbalances and debt accumulation point to a more limited impact than in the early 1990s. The market consequences, including in credit, would also likely be smaller. The caveat is that broader economic growth is weaker than it was in the late 1990s and the risks of a jobless recovery seem higher. Because equities have underpinned a sharp improvement in household balance sheets, a significant correction— from AI or other sources—could also lead to meaningful drag on household spending. So a smaller shock might be enough to tip the economy into recession.
3. The macro backdrop AI does not yet appear to have reached the point where it may

collapse under its own weight, so the main vulnerability at this point may be to "event risk". In the late stages of the tech bubble (and the housing bubble), macro responses to asset prices helped to undermine the bubble itself. Massive investments eroded profitability and created excess capacity, while increased leverage added vulnerability to any stalling in asset prices. Those issues do not appear to be visible yet this time round.

On watch for macro risks ahead

None of this guarantees that the returns on the capital being invested will be sufficient to justify current asset prices. The 1990s bubble highlights the risk that, even if the innovation is real, today's leaders may struggle to capture those returns. But given the relatively earlier stage of the AI investment boom, it may be some time before those issues become pressing. In the meantime, the bigger near-term risks may come from exogenous shocks or constraints. A technological breakthrough or competitive threat might appear that challenges the current market leaders or reduces the need for the massive investments that are under way. Operational constraints that limit the speed of investment or the power needed to fuel it could unexpectedly become more binding. But without those kinds of events, there may still be plenty of room for the AI investment boom to run, as our team has illustrated.

Historical analogues can give an exaggerated sense of inevitability to the path ahead. The AI boom may not follow the path from the late 1990s and the same imbalances may never emerge. Higher concentration in key markets may make it easier to sustain high profitability. It is possible, however, to see echoes of the inflection point that we described in the 1990s boom in the road ahead: a greater reliance on debt finance; more complicated vendor financing and cross-holding arrangements within the AI complex; and a Fed that is cutting rates into a non-recessionary period of improved productivity growth. Although the details are imprecise, foreign governments—principally from the Middle East and Japan—have announced investment commitments totaling more than $4tn, which if realized could play a similar role that the inflows from EM crises played in the late 1990s.

As a result, it is easy to envisage how some of the macro imbalances that we saw at that time might become more visible in the next year or two, increasing the risk of potential problems further down the road. The 1990s experience highlights the macro warning signs to watch for. A further sustained rise in investment rates, a clear peak in profit margins, and a further erosion in corporate financial (or current account) balances would be important flags that the AI cycle is entering a new stage. A further shift towards debt financing and leverage or a rise in equity volatility or credit spreads would be warning signs from the markets side.

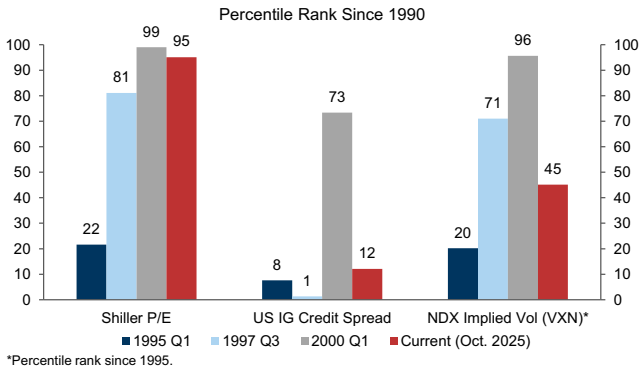
Protecting against the risks to add staying power

Equity valuations also look to have advanced further down the 1990s path than the macro story. Our global economics team's estimates that $8trn of PDV of capital revenue benefits from AI can certainly justify a large, prolonged investment cycle. But the increase in the market value of AI-related companies since late 2022 is already much larger than this. This means that it is possible that the bulk of that benefit may already have been built into equity prices, mostly in companies directly involved in the AI boom

who may not eventually capture all of it.

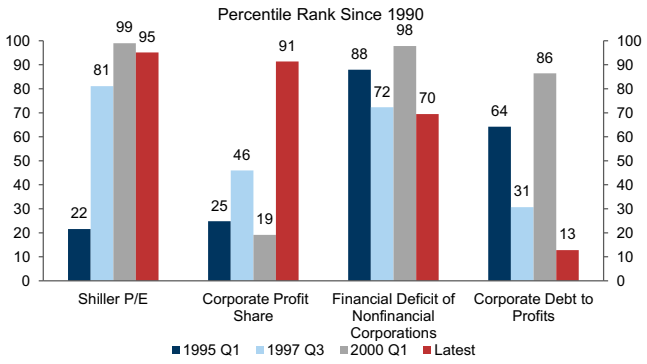
Even if that is true, there is nothing to stop markets from building in more upside. Indeed, a lesson of past bubbles is that investors may sacrifice considerable gains by stepping away too early, given that prices can rise well beyond fundamental value. But it is a reminder that the question of whether the investments are worthwhile and the question of whether the market has already incorporated that value into asset prices are distinct.

Exhibit 30: Equity valuations further along the 1990s track relative to spreads and volatility...



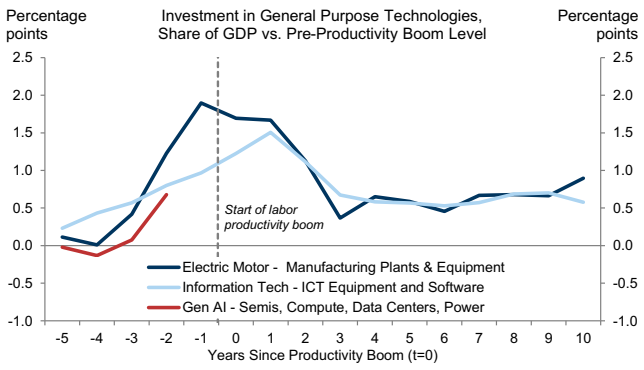
Source: Bloomberg, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 31: ...and versus the macro fundamentals



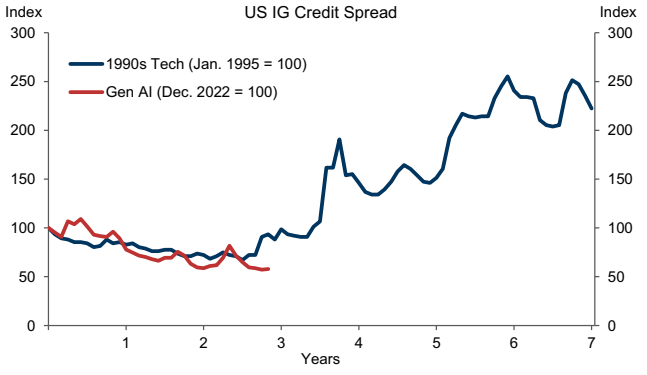
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 32: The rise in investment has not reached the peaks of previous productivity booms



Source: Bureau of Economic Analysis, Goldman Sachs Global Investment Research

Exhibit 33: But market adjustments could come earlier



Source: Bloomberg, Goldman Sachs Global Investment Research

The 1990s experience also gives some indications of how to protect against the risks. Unlike the later years of the 1990s bubble, credit spreads remain tight, and equity volatility has—outside of explicit stress periods—been below long-term averages. This means that using options to protect portfolios or using longer-dated call structures to capture potential further equity upside while limiting downside are all more viable strategies than they were from 1998 to 2000. At the same time, history suggests that today's tight credit spreads may be vulnerable not just to downside risks to the economy but to increased use of debt in an ongoing boom. Positioning for wider credit spreads or for a rise in longer-dated equity volatility over the next year or two may make sense even if the AI boom remains firmly on track.

The impact on rates markets is more ambiguous. If corporate sector financing demand does rise further, as it seems likely to do, we may see more competition for capital between those private sector demands and the ongoing need to fund the large US fiscal deficit. Over time, an ongoing investment boom could put upward pressure on longer-dated real and nominal yields, but significant labor displacement or productivity gains could also act as disinflationary forces. And if the boom stumbles, particularly after extending further, history shows that both policy rates and longer-term yields might ultimately end up much lower.

Looking for ways to identify or to protect against the risks should help investors to benefit from the potential ongoing upside from the AI narrative, or an ongoing increase in valuations, without making portfolios excessively vulnerable.

Dominic Wilson

Vickie Chang

Disclosure Appendix

Reg AC

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