CARLYLE

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5 Questions for 2025

EXECUTIVE SUMMARY

#1 Are U.S. Policy Rates "Restrictive"?

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#2 What is the Purpose of Tariffs?

Trade policy designed to serve the "consumer" lost touch with the interests of the "worker." The old regime is dead; the next 12 months will help inform us of the ambitions of those seeking to birth something new in its place.

#3 Will the U.S. Election Result Spur Reform in Europe?

Commissioned by European Commission President Von der Leyen 14 months before the U.S. election, former ECB President Draghi's report on "the future of European Competitiveness" has grown more resonant in its aftermath. Will reform materialize on the scale Draghi envisions?

#4 Will Big Tech's Data Center Investments Pay Off?

Data center investment has risen 8x since the onset of the pandemic. For the arithmetic to work for investors and the economy, these "AI factories" had better prove to be highly productive.

#5 ...And What Could That Mean for the Future of Software?

Could AI replace conventional enterprise software, including Software-as-a-Service (SaaS) as AI agents interact directly with databases, performing the complex business logic that currently depends on coding and related maintenance?

1 Are U.S. Policy Rates "Restrictive"?

In the press conference following the "hawkish" December FOMC meeting, Chair Powell insisted that monetary policy remains "meaningfully restrictive." Though policymakers keep using that word ("restrictive"), it may not mean what they think it means.

In 1993 Congressional testimony, Alan Greenspan introduced the concept of an "equilibrium," or "neutral," interest rate as the baseline from which to measure the stance of monetary policy.[1] When the short-term *real* interest rate rises above this level, policy is "restrictive," exerting downward pressure on demand and inflation in proportion to the deviation from neutrality. (Likewise, the Fed engineers an "accommodative" policy stance when real rates fall below neutral).

While this has become the standard framework for analysis, the innovation proved highly controversial at the time. Most analysts then preferred to target the growth rate in the money supply, embracing Friedman's dictum that inflation was caused "only" by a "more rapid increase in the quantity of money than in output."[2] With households holding more of their savings in stocks, bonds, and other financial instruments, Greenspan was skeptical that monetary aggregates (deposits in banks and money market mutual funds) provided a useful guide to the stance of policy.[3] Henceforth, the Fed made no reference to the quantity of money in its communications or projections.

The post-Greenspan framework suffers from a major drawback: the neutral rate is not directly observable. It can only be estimated, and the techniques for doing so often yield discrepant results. Social sciences are prone to reification, a fallacy where an abstraction is mistaken for something "real." Since the neutral rate cannot be observed, it does not exist in any concrete sense; it's just a hypothetical construct that can be empirically useful when it's *stable over time*.[4]

Such stability was a hallmark of the Greenspan era (August 1997 through February 2006). The evolution of the real fed funds rate over his 18-year tenure as Fed Chair closely matched that implied by a naïve cyclical model, oscillating around a fixed 2.2% mean with constant amplitude and periodicity (Figure 1, page 4). But something changed following Lehman Brothers' bankruptcy filing in September 2008. Suddenly, rates that one would have thought to be highly accommodative failed to stimulate economic activity. Years of sluggish growth and below-target inflation led analysts to revise their estimates of neutral downward, with our naïve cyclical model suggesting the neutral rate fell by over 300bps (Figure 1, page 4).

In the pandemic's aftermath, the neutral rate appears to have rebounded. Real overnight rates have averaged 2.1% over the past 18 months, but rather than suffocating economic activity, real GDP has grown nearly twice as fast as most forecasters' estimates of the economy's "potential." The annual rate of core CPI inflation remains above 3%. And when accounting for the dramatic easing of financial conditions – frothy valuation ratios in the stock market and credit spreads tighter than at any point in the last 17 years – policy hardly feels "restrictive" as Greenspan would have understood it.

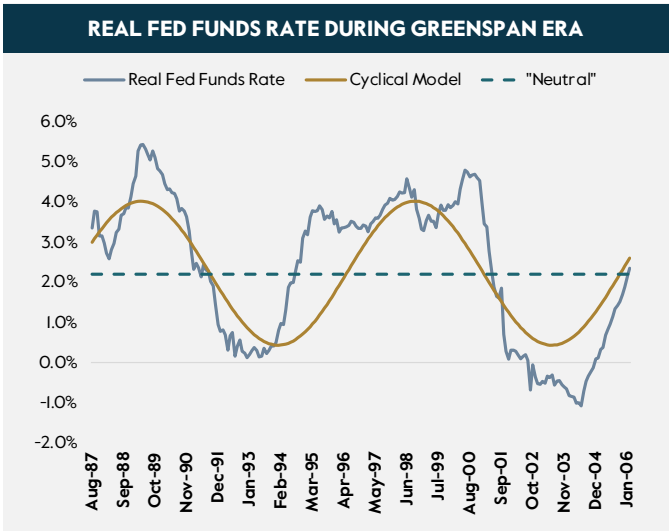
To this one must add the recent back-up in bond yields, a development without precedent across each of the seven prior easing cycles (Figure 2, page 4). Though attributed by many to potential changes in trade, immigration, and

1. Greenspan, A. Testimony Before the House Banking Committee, July 20. 1993.
2. Friedman, M. (1970), "The Counter-Revolution in Monetary Theory."
3. Meeting of the Federal Open Market Committee, July 6-7, 1993. https://www.federalreserve.gov/monetarypolicy/files/FOMCI9930707meeting.pdf
4. With a constant intercept term, the original "Taylor Rule" implicitly assumed a constant neutral rate of 2% (in real terms).

fiscal policy, this may simply reflect the market's belated realization that base rates may not be as "restrictive" as previously supposed.[5] Forward rates now imply that real short-term interest rates will be higher in five years' time than they are today, largely reverting to their average during the Greenspan era (Figure 2).

It may be time for the Fed to leave well enough alone and retire the presumption that this economy cannot withstand rates at these levels.

Figure 1. "Neutral" Rates Over Different Regimes



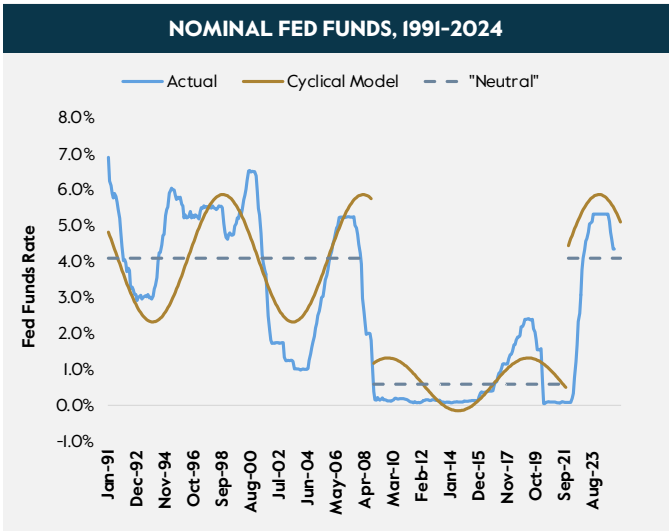
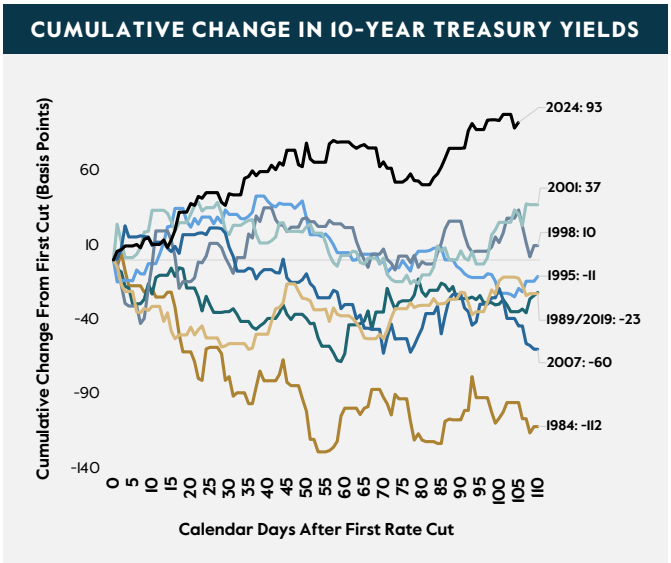


Figure 2. Bond Market Reassesses "Neutrality"



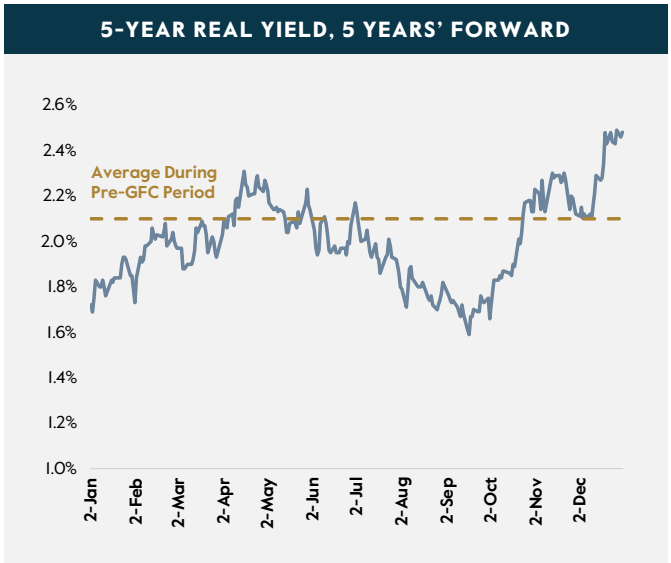


Figure 1. Source: Carlyle Analysis; Federal Reserve Board of Governors, December 2024. There is no guarantee any trends will continue.
Figure 2. Source: Carlyle Analysis, Federal Reserve Board of Governors, Bloomberg, January 2025. There is no guarantee any trends will continue.

5. Reasons for this shift are enumerated here: https://www.carlyle.com/sites/default/files/2024-09/the-end-of-the-beginning-global-insights.pdf

2 What is the Purpose of Tariffs?

We can say, with a high degree of certainty, that tariffs are coming. But their economic effects will hinge on the purpose they intend to serve, which is not yet apparent.

With the lowest average tariff rate in the world and no border-adjusted value-added tax like most of its trading partners,[6] the U.S. could reasonably impose new tariffs to raise supplementary revenue during a period of massive fiscal deficits. The Congressional Budget Office (CBO) estimates that tariff increases of the sort President Trump discussed during the campaign would raise $2.7 trillion over the next decade, equal to roughly 0.7% of GDP.[7] This would be sufficient to offset nearly 70% of the cost of extending the TCJA provisions that expire at the end of the year, which is also a priority of the incoming Administration.[8]

In combination, these policies would effectively shift the tax base from domestic (labor) income to imports,[9] trading higher disposable personal income for what CBO estimates would be a 1% increase in the 2026 price level, or a 0.1% increase in the 10-year annualized rate of inflation.[10] (The price impact could be larger or smaller depending on the size of the offsetting foreign exchange adjustment and the extent to which tariffs result in lower import prices.)

Tariffs have also been advertised as a mechanism to reverse the decline in U.S. manufacturing employment and rising geographic disparities in prosperity and mortality. In this case, the tariffs would be passed through to consumers, but higher prices would make it more economic to meet more domestic demand through domestic output. Foreign manufacturers could respond by siting facilities in the U.S., potentially lowering prices in proportion to any productivity advantage.[11]

But if tariffs result in import substitution, they won't generate much revenue. Reindustrialization and revenue maximization are at cross purposes; the optimal tariff regime to achieve the first goal would erode the tax base necessary for the other. Perhaps additional domestic output would generate taxable income to fill the gap, but that's far from certain.

Consumer goods account for just over one-third of U.S. imports. The rest consists of capital goods (machinery, equipment, etc.), intermediate goods (components, parts, chips, etc.), and raw materials.[12] By increasing domestic businesses' input costs, higher tariffs could compromise their competitiveness in foreign markets, resulting in fewer export sales and reduced foreign earnings.

Tariffs can also serve non-economic ends. Linked explicitly to fentanyl and migration, the proposed 25% tariffs on imports from Canada and Mexico don't seem intended to raise revenue or facilitate reindustrialization but influence the policies of foreign governments. One could imagine tariffs as a bargaining chip to achieve more equitable sharing of the defense expenditure burden with allies or to address security concerns with rivals. Some trading partners may respond by cooperating, while others could choose to retaliate with tariffs and export controls of their own. Contingency planning becomes virtually impossible.

There's also the question of how tariffs will address disparities between the gross value of imports (on which tariffs are generally assessed) and the foreign contribution to it. Analysis of customs data reveals that Mexican exports destined for the U.S. tend to have a

6. WTO, World Tariff Profiles, 2024.
7. Carlyle Analysis, CBO: https://www.cbo.gov/system/files/2024-12/61112-Tariffs.pdf
8. Carlyle Analysis, CBO: https://www.cbo.gov/publication/60271
9. CBO estimates that individual income tax provisions account for 82% of the cost of extending the TCJA's expiring provisions.
10. CBO expects that after 2026, "the tariffs would not have additional significant effects on prices."
11. C.f. https://www.bloomberg.com/news/articles/2024-07-19/trump-welcomes-china-to-build-cars-in-us-in-departure-from-biden
12. WITS Database, December 2024.

much higher share of American-made inputs than exports to other countries.[13] For example, nearly three-quarters of the foreign inputs in Mexican autos destined for the U.S. rely on American inputs, like engines, compared to just 18% for Mexican auto exports to Germany (Figure 3, page 7). When accounting for these cross-border linkages, about 30% of the value of U.S. goods imports from Mexico is produced in the U.S., on average (Figure 4, page 7).

Inflation's salience to the 2024 campaign colored the discourse surrounding tariff proposals. Inflation may have been voters' acute concern, but underneath it lied a more chronic disenchantment with the overall direction of the economy. Trade policy designed to serve the "consumer" lost touch with the interests of the "worker." The old regime is dead; the next 12 months will help inform us of the ambitions of those seeking to birth something new in its place.

"The U.S. could reasonably impose new tariffs to raise supplementary revenue during a period of massive fiscal deficits."

13. Disentangling Global Value Chains, NBER Working Paper 5868: https://www.nber.org/papers/w25868

Figure 3. Foreign Content in Mexican Auto Exports

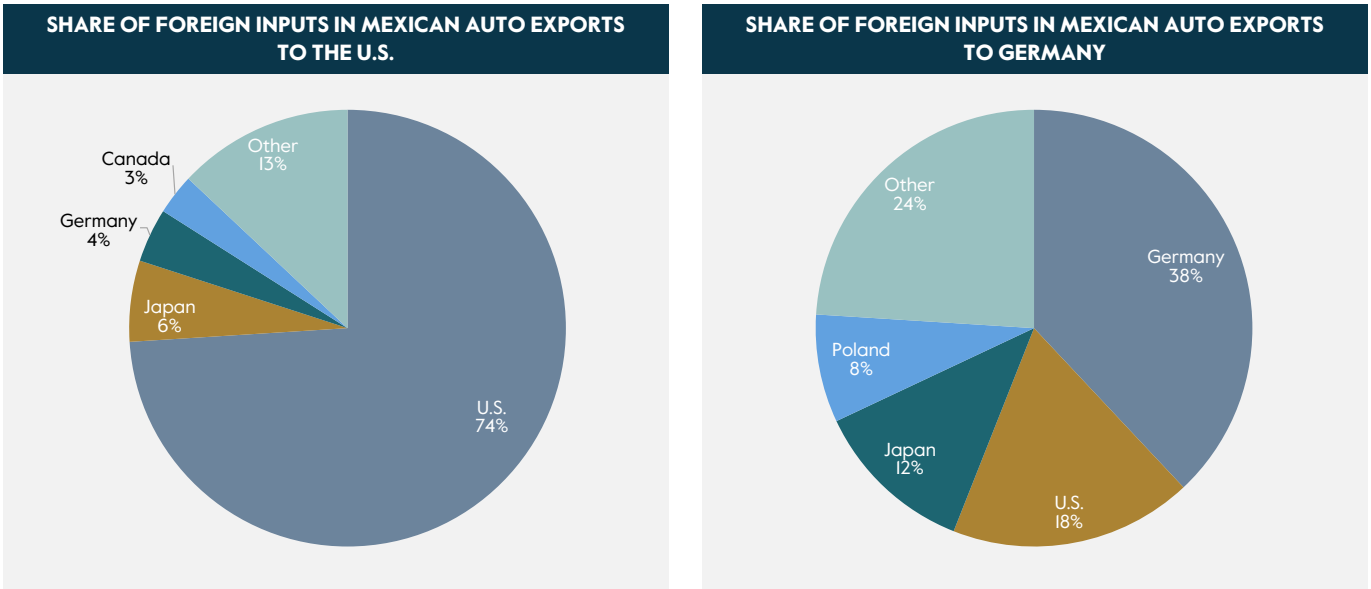


Figure 4. Gross Value Differs from Value-Added

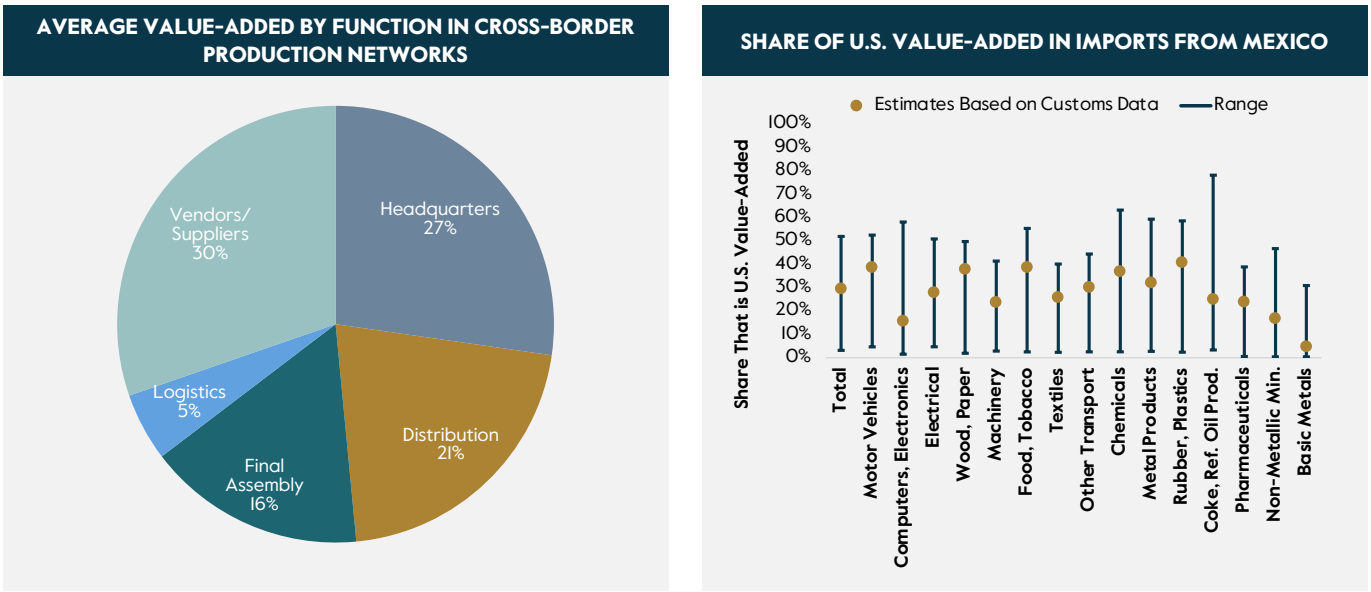


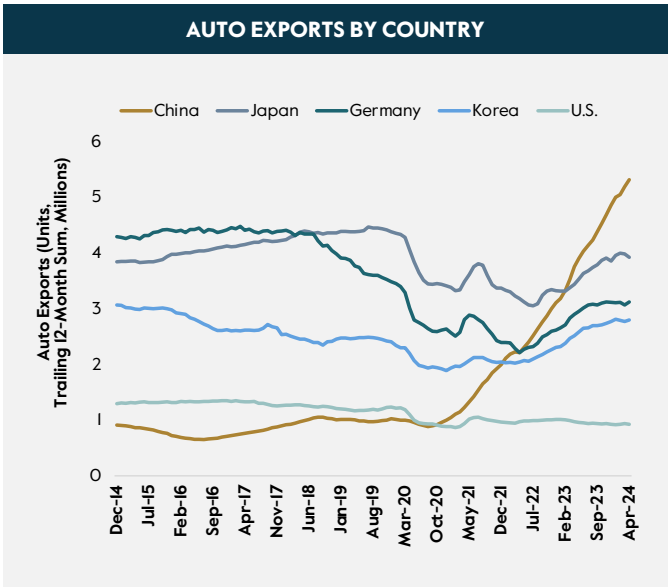
Figure 3. Source: Federal Reserve Bank of Dallas, de Gortari Alonso (2019). "Disentangling Global Value Chains," December 2024. There is no guarantee any trends will continue.
Figure 4. Source: Federal Reserve Bank of Dallas, The Berkeley Roundtable on the International Economy, de Gortari Alonso (2019). "Disentangling Global Value Chains," December 2024. There is no guarantee any trends will continue.

3 Will the U.S. Election Result Spur Reform in Europe?

Though commissioned by European Commission President Von der Leyen 14 months before the U.S. election, former ECB President Draghi's report on "the future of European Competitiveness" has grown more resonant in its aftermath. As EU exports to China have flatlined over the past four years due to the stunning emergence of China's auto sector, Europe has grown increasingly dependent on American demand (Figure 5). EU officials face the prospect that the incoming Trump Administration will not only "leave European security to Europe"[14] but also impose new tariffs to curtail those exports.

Written in a tone that at times approaches the apocalyptic, Draghi's report rebukes European leaders for embracing the "illusion that only procrastination can preserve consensus," which has only slowed growth and deepened political division. Since 2008, the U.S. lead over the EU in terms of per capita income and wealth has widened at an increasing rate (Figure 6, page 9). U.S. living standards are now 40% higher and the value of the U.S. stock market is nearly 3.5x that of Europe's. For years, Europeans could cite the superiority of their social model to excuse inaction, but Draghi warns that without significant restructuring the EU may no longer be able to finance that social model.

Figure 5. Europe Increasingly Dependent on U.S. Demand



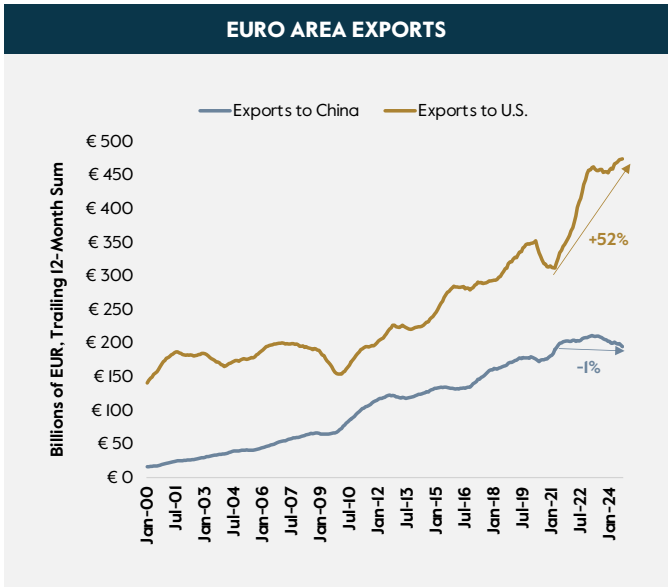
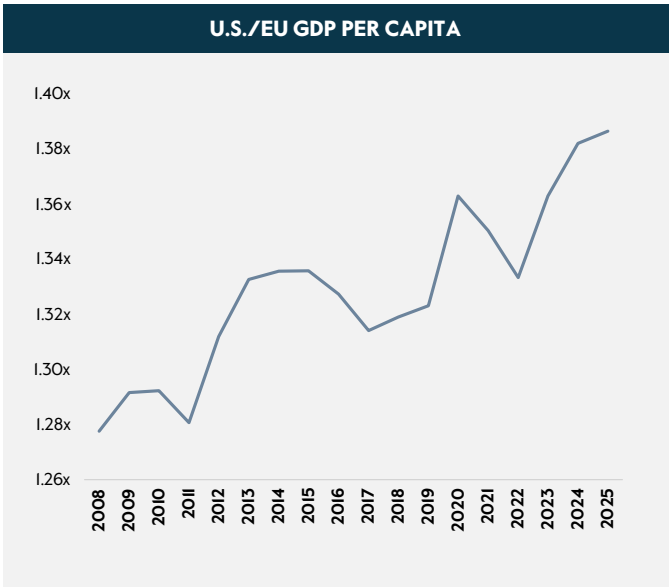
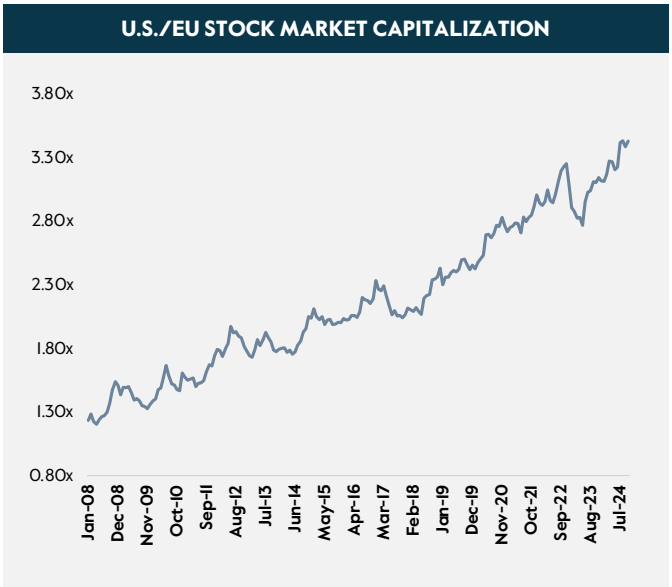


Figure 5. Source: Carlyle Analysis; Bloomberg, IMF DOTS, January 2025. There is no guarantee any trends will continue.

14. C.f., "The United States Now Wants European Strategic Autonomy," CSIS, November 8, 2024.

Figure 6. Widening Gap with the U.S.





Those disparities with the U.S. have a common origin: an underdeveloped tech sector and an inability to commercialize innovations at scale.[15] The problem is not a lack of human capital or entrepreneurial initiative, but "inconsistent and restrictive regulations" that hinder growth at every stage.[16]

When it comes to defense, the problem is not just inadequate spending – the combined EU defense budget is about one-third of U.S. levels – but that less than one-fourth of that spending is sourced domestically. To the extent that NATO member states meet their 2% of GDP defense commitment, it's largely through importing hardware developed and manufactured in the U.S. (Figure 7, page 10).

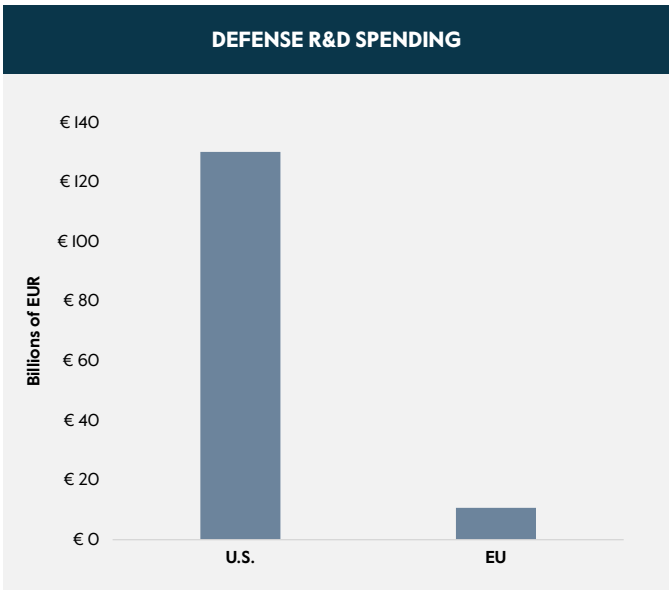
Rebuilding the defense industrial base may first require stabilizing industrial activity more broadly. The sudden disruption to European energy supplies caused by Russia's invasion of Ukraine was described by some observers as a "blessing in disguise."[17] A look at the data nearly three years on suggests that blessing has been well disguised indeed. Energy-intensive manufacturing output in Germany has fallen 20% below pre-invasion levels and the manufacturing job market is weaker than at any time outside of the GFC and onset of the pandemic (Figure 8, page 10). The outlook is unlikely to improve as long as energy prices remain 3x to 5x higher than in the U.S.

Battery storage and market reforms should reduce power prices, but electricity only accounts for 21% of the EU's primary energy consumption[18] and just over 10% of the energy consumed by the industrial sector.[19] Since 2010, electricity's share of total EU energy consumption has increased by just over two percentage points, twice as much as the U.S. but five percentage points less than the progress China has made on electrification. And while the EU derives

Figure 6. Source: IMF WEO Database, CRSP, Compustat, December 2024. There is no guarantee any trends will continue.

15. There is not a single EU company with a market capitalization of over €500 billion that has been set up from scratch in the past 50 years, while the seven most valuable U.S. businesses have all be founded during this period.
16. "Between 2008 and 2021, close to 30% of the "unicorns" founded in Europe relocated their headquarters abroad, with the vast majority moving to the US."
17. C.f. "Why stopping Russian gas imports could be a blessing in disguise for the climate and European energy independence," BI Business Review and Hockenos, P. "Good riddance Nord Stream 2. Now Europe has a golden opportunity," among others.
18. Ember (2024); Energy Institute - Statistical Review of World Energy (2024).
19. Carlyle Analysis, Energy Information Administration, December 2024.

Figure 7. Europe's Dependence on U.S. Defense Industry



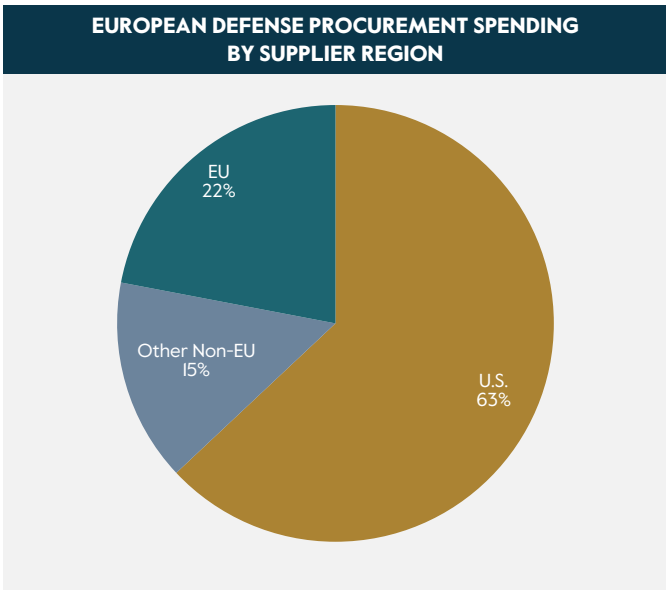
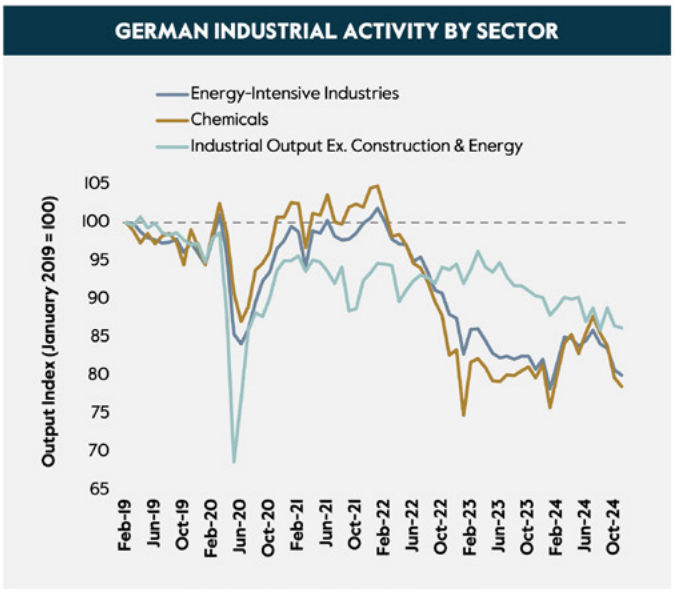


Figure 8. Deindustrialization in Germany



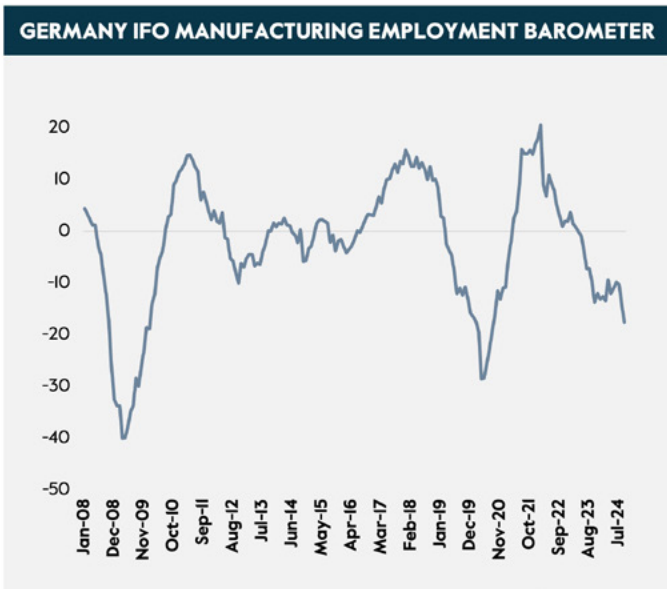


Figure 7. Source: Carlyle Analysis; European Commission, November 2024. There is no guarantee any trends will continue.
Figure 8. Source: Carlyle Analysis; Bloomberg, January 2025. There is no guarantee any trends will continue.

far less of its electricity from carbon fuel, the rate at which it's decarbonized its grid since 2010 has lagged both China and the U.S. (Figure 9, page 12). These are not results commensurate with their costs.

The picture may look bleak, but as Draghi makes clear, the EU has the tools and resources at its disposal to cure these ills. A genuine capital markets union would translate more of Europe's enormous pool of household savings (Figure 10, page 12) into productive investment, particularly in energy and cleantech. Fiscal reforms could increase the investment share of aggregate EU public expenditure and mutualize more of that investment (and associated borrowing) to improve its efficiency and scalability. Aggressive deregulation in competition and technology policy could allow Europe's prodigious innovation potential to manifest as scalable, commercial realities.[20] And the EU must respond to changed geopolitical circumstances not only by increasing defense outlays but prioritizing the development of a continent-wide defense industry, providing a direct boost to industrial production and employment, and generating commercial spillovers in space and AI. The proposed €500 billion joint fund to catalyze defense industrial production would be a good place to start.

Will reform materialize on the scale Draghi envisions? With forward price-to-earnings ratios on European stock indexes 40% below U.S. levels,[21] investors are well compensated for the risk they do not. Low valuations create attractive entry points for astute investors able to navigate disrupted markets and see through dislocations.

February's federal election in Germany will provide an early glimpse of the electorate's appetite for change, or perhaps alert policymakers to the types of changes that could be in store if reforms aren't undertaken.

"Aggressive deregulation in competition and technology policy could allow Europe's prodigious innovation potential to manifest as scalable, commercial realities."

20. The EU has around 100 tech-focused laws and over 270 regulators active in digital networks across all Member States.
21. Bloomberg, December 29, 2024.

Figure 9. Electrification & Decarbonization by Economy

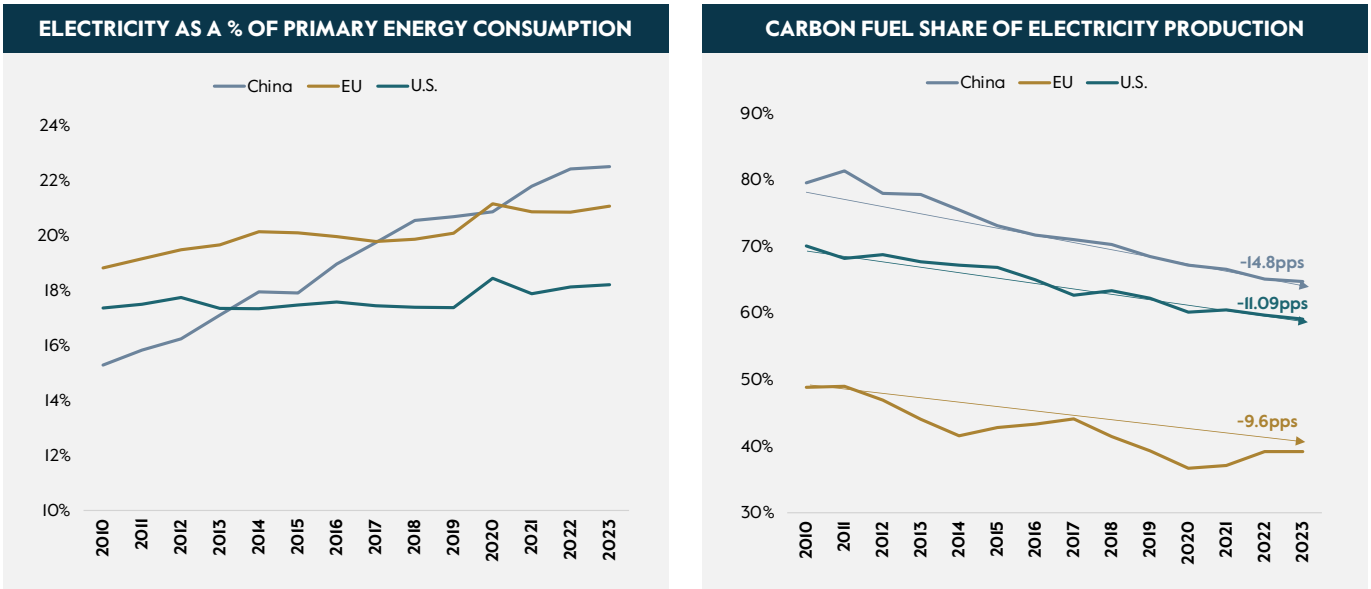


Figure 10. More Savings, Less Participation in Capital Markets

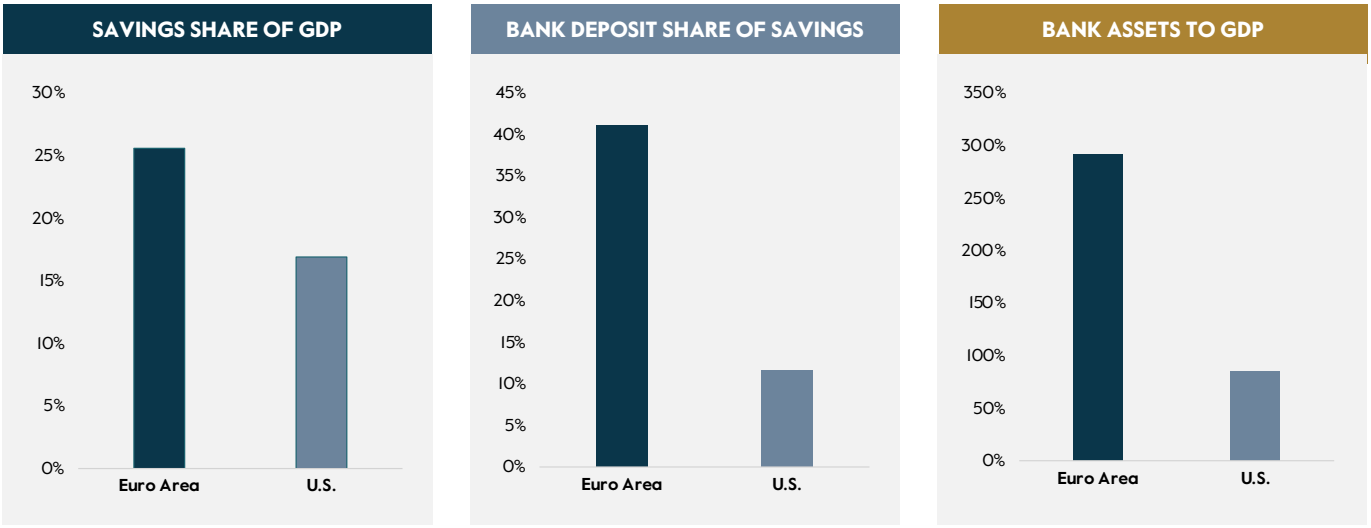


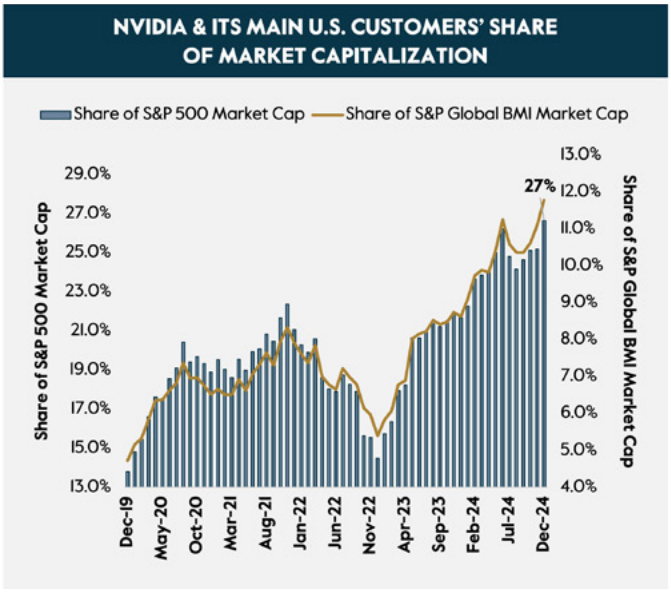
Figure 9. Source: Carlyle Analysis; Ember (2024); Energy Institute - Statistical Review of World Energy (2024), December 2024. There is no guarantee any trends will continue.
Figure 10. Source: Carlyle Analysis; EFAMA, January 2024. There can be no assurance these market conditions will continue to be achieved.

4 Will Big Tech's Data Center Investments Pay Off?

In its 10-Q filing for the quarter ending June 30, 2024, Nvidia revealed that four customers accounted for 46% of its revenues.[22] The following quarter, just three generated 36% of sales.[23] Analysts warned of "concentration risk." The same could be said for the U.S. stock market and broader economy.

Nvidia and its five largest U.S. customers[24] combine to account for 27% of the value of the S&P 500 and an astonishing 12% of global stock market capitalization (Figure II). In just five years, their combined share of domestic and global indexes has more than doubled. Over the same period, U.S. economic growth has come to depend increasingly on fixed industrial investment, largely the construction of warehouses, electrical generation and transmission capacity, manufacturing facilities, and – especially – data centers. Total spending across these categories has risen nearly 4x from pre-pandemic levels (Figure II).

Figure 11. Data Centers' Increasing Macro Significance



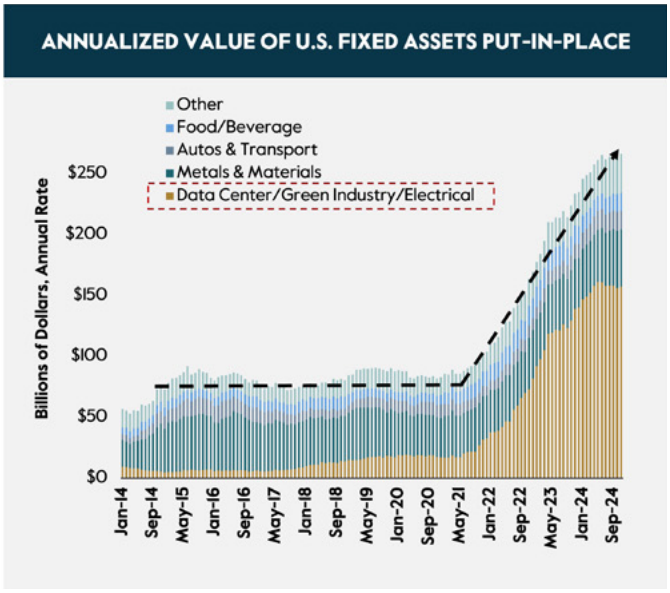


Figure II. Source: Carlyle Analysis; Bloomberg, BEA, U.S. Census Bureau, January 2025. There is no guarantee any trends will continue.

22. https://dl8rn0p25nwr6d.cloudfront.net/CIK-0001045810/7850ce3-78f6-4c4d-8688-53ddf40df456.pdf
23. https://dl8rn0p25nwr6d.cloudfront.net/CIK-0001045810/ed2a395c-5e9b-44ff-8b4a-a7f8df92f55a.pdf
24. Microsoft, Meta, Amazon, Alphabet, and Tesla. C.f. https://www.ft.com/content/e85e43df-5ce4-453f-94ff-9e9cfc5b4ff1

These two developments share something in common: AI. Spending on the hardware (like Nvidia GPUs), infrastructure, and applications necessary to train generative and foundational models has exploded. Data center investment has risen 8x since the onset of the pandemic; the aggregated capex of Amazon, Microsoft, Meta and Alphabet is expected to approach $290 billion this year, up 90% from 2023 levels. A decade ago, these four companies' combined capex was equal to just 0.1% of U.S. GDP and 0.8% of private nonresidential investment. These ratios have risen more than 6x since then (Figure 12).[25]

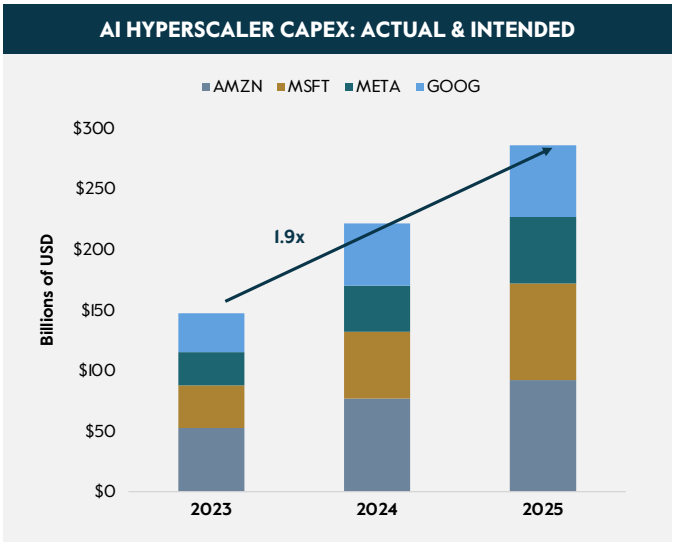
Data centers have been dubbed "AI factories,"[26] and as these "virtual" businesses have scaled investment in them, their balance sheets have begun to resemble those of industrial firms. Eight years ago, on-balance sheet cash and short-term investments typically covered 80% or more of these companies' book values. Today, the typical cash-to-book value ratio is just 30%. Property, plant, and equipment (PP&E) has grown in its place, increasing from 22% to 69% of book value (Figure 13, page 15).

Though prodigious operating cash flow allows these businesses to scale capital spending without any external finance, relations have changed. Since the onset of the pandemic, aggregated capex has grown at a 25% annualized rate, 1.5x faster than revenue and 1.3x operating cash flow. Eight years ago, these four businesses generated enough cash from operations to replace their fixed capital stock in just 11 months. Today, it would take closer to two years (Figure 14, page 15).

As these businesses' physical footprint has grown, they've not suffered any attendant decline in valuations. In the five years prior to the pandemic, price-to-book ratios averaged 6.6x, roughly 3x the median for the broader market.[27] Over the past five years, their price-to-book ratios have increased to 8.4x, on average, nearly 4x the market median.

This seems curious. In the past, elevated price-to-book ratios were justified by the value of intangible assets not included in accounting statements. Just as you wouldn't value a money-printing machine based on the cost of the

Figure 12. Explosive Growth in AI-Related Capex



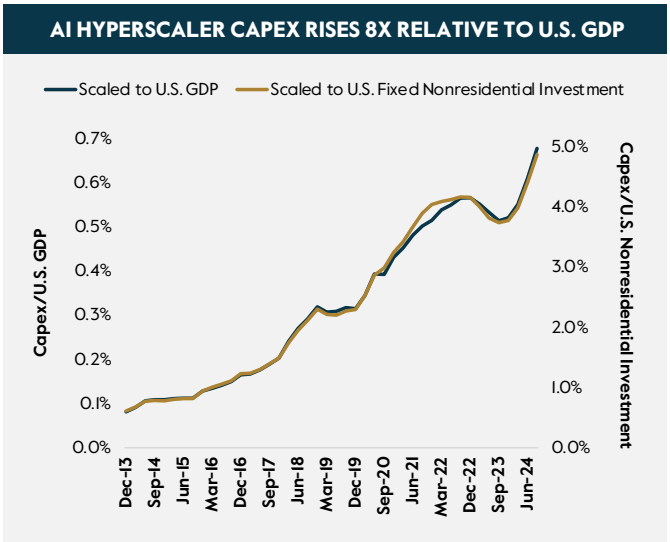


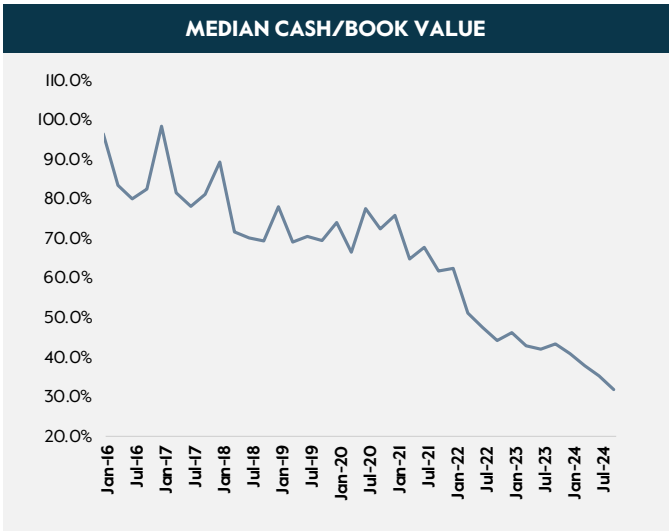
Figure 12: Source: Carlyle Analysis; Bloomberg, S&P Capital IQ, Federal Reserve, January 2025. There is no guarantee any trends will continue.

25. Not all of this spending occurs in the U.S. The denominators are used to provide a sense of the scale and macroeconomic significance of the increase.
26. https://www.wsj.com/tech/ai/nvidia-ai-servers-data-centers-ab7ad6a0
27. CRSP Database, December 2024.

paper and press, it didn't make sense to link the market value of "virtual" companies to the cost of their physical assets. But why would P/B ratios expand at the same time these businesses increase the rate at which they're acquiring physical, on-balance sheet capital? Each $100 invested rather than distributed today effectively costs the shareholder $840.

For the arithmetic to work for investors and the economy, this new capital had better prove to be highly productive. Years of stellar financial performance have earned management teams the benefit of the doubt. But we all get carried away from time to time.

Figure 13. Changes in AI Hyperscalers' Balance Sheets



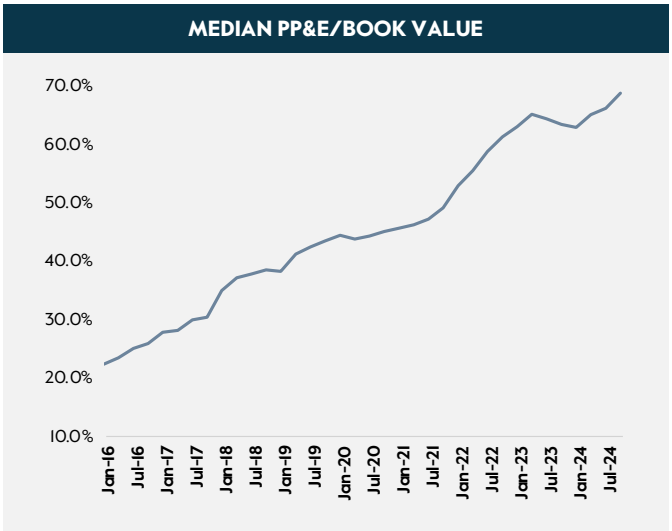
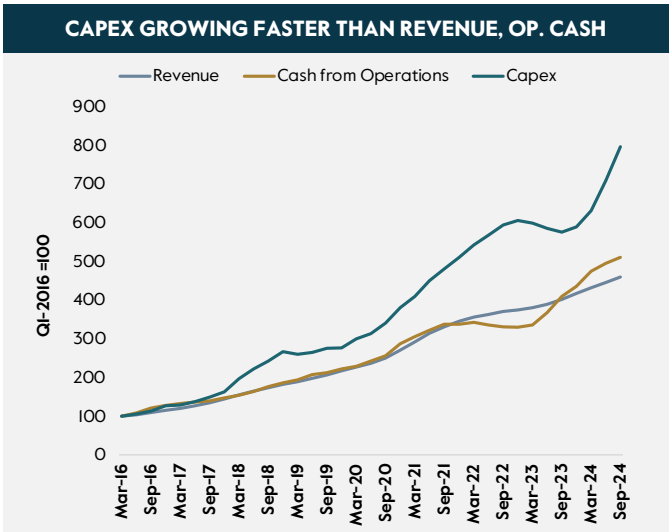


Figure 14. Cash Outflows Growing Faster than Inflows



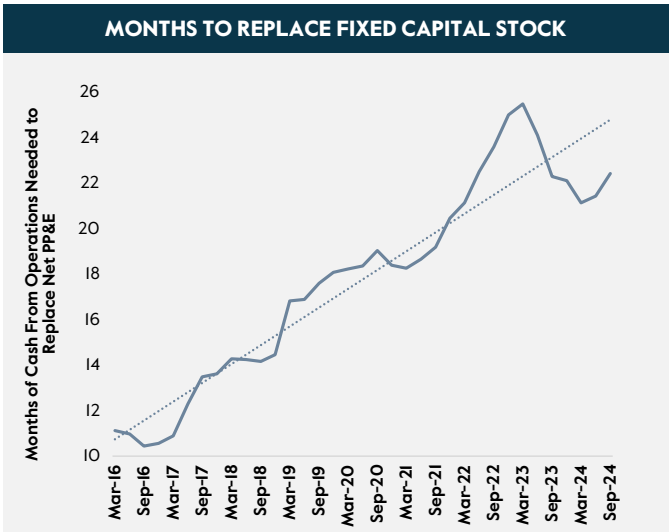


Figure 13. Source: Carlyle Analysis; S&P Capital IQ, January 2025. There is no guarantee any trends will continue.
Figure 14. Source: Carlyle Analysis; S&P Capital IQ, January 2025. There is no guarantee any trends will continue.

5 ...And What Could That Mean for the Future of Software?

In the middle of last year, several analysts looked skeptically on "AI factory" investment, questioning whether the downstream applications and revenues would materialize on the scale necessary to justify the enormous outlays.[28] As the constraint on AI buildout transitioned from GPU shortages to concerns about electric generation capacity, prospective costs continued to balloon while the revenues remained largely speculative.

Management teams initially responded to analysts' concerns with vague assurances that the risks of underinvestment far outweighed the risk of overinvestment.[29] But as the year went on, their ambitions became more concrete: AI would replace conventional enterprise software, including Software-as-a-Service (SaaS).[30] According to this vision, traditional business applications – and the associated $300 billion in annual gross profits – could become obsolete, as AI agents interact directly with databases, performing the complex business logic that currently depends on coding and related maintenance.

This would mark quite a reversal from the past decade, when enterprise software generated the highest returns in public and private markets. Astute investors recognized that traditional metrics could not appropriately value cloud-based, software subscription platforms. With costs largely incurred upfront, these businesses could scale revenue with virtually zero incremental hiring, investment, or distribution costs. Once the development costs are recovered, the revenue associated with each additional subscriber falls directly to the bottom line.

As these scale properties became apparent to the broader market, valuations skyrocketed. SaaS stocks returned more than 4x in the five years ending in 2019 and rates of appreciation accelerated during the pandemic, as the revenue of enterprise software companies exhibited growth rates and "stickiness" that contrasted favorably with the downturn experienced in other sectors of the economy (Table I, page 17).[31] By the middle of 2021, the median Enterprise Value-to-Revenue multiple of SaaS companies rose to 20x, roughly twice its pre-pandemic average.[32]

28. C.f. "AI's $600bn Question," https://www.sequoiacap.com/article/ais-600b-question/
29. https://www.economist.com/business/2024/07/28/what-could-kill-the-itrn-artificial-intelligence-boom
30. Satya Nadella, CEO of Microsoft, on B2G Podcast, December 2024. See summary here: https://www.cxtoday.com/data-analytics/microsoft-ceo-ai-agents-will-transform-saas-as-we-know-it/
31. EMCLOUD Index. Bloomberg. December 2024.
32. Aventis Advisors, "SaaS Valuation Multiples: 2015-2024."

Table 1.
Explosive Growth in AI-Related Capex

Year(s)	EMCLOUD	Nasdaq	Dow Jones	SPX
2014-2019	33.0%	13.6%	9.9%	9.4%
2020	110.0%	43.6%	7.2%	16.3%
2021	-2.7%	21.4%	18.7%	26.9%
2022	-51.8%	-33.0%	-8.6%	-19.2%
2023	43.3%	44.1%	13.5%	24.3%
2024	6.6%	29.1%	12.9%	23.5%
7Yr Annualized Return	16.8%	16.0%	8.1%	12.0%
Volatility	50.0%	28.4%	11.8%	18.7%

But the scalability coveted by investors proved to be a double-edged sword. First, any cash flow stream that trades upfront development costs today for profits in the distant future is going to be highly sensitized to the level of interest rates.[33] When rates rise, the opportunity cost of funding losses increases at the same time the present value of future profits declines. Since the Fed first announced its "pivot" away from easy money in November 2021 Congressional testimony, cloud software platforms have lost 40% of their value, on average, underperforming the broader market by 70% (Figure 15, page 18).

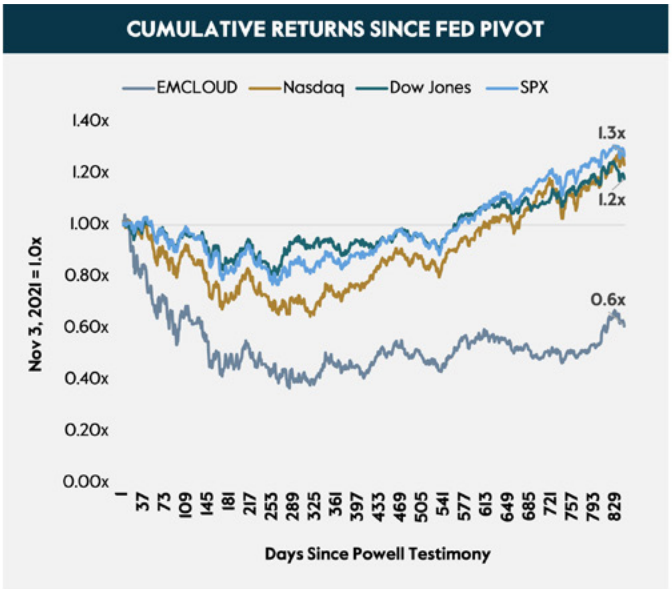
Second, the physical assets that constrain growth in traditional sectors tend to depreciate at predictable rates. Business equipment, structures, and logistics platforms all tend to have useful lives that are well understood. Intangible assets, by contrast, can suffer sudden and largely unforeseen declines in value, as we may witness over the next several years. Though software companies tried to insulate themselves from this risk by moving to subscription models, this merely forestalls the inevitable, as was the case for newspapers.

While growth rates among public SaaS companies have halved from the heady days of 2021, profitability has improved (Figure 16, page 18). Their customers are actively experimenting with AI, but the technology does not yet exhibit the reliability necessary for them to implement fully autonomous solutions, and hallucination rates could prevent that day from ever arriving. By pushing valuation ratios below pre-pandemic levels, excessive bearishness about the risk of AI disintermediation seems likely to create attractive capital deployment opportunities.

Table 1. Source: Carlyle Analysis; Aventis Advisors, S&P Capital IQ, January 2025. There is no guarantee any trends will continue.

33. "Ascending with Waxed Wings: Inflation & the Tech 'Bubble'": https://www.carlyle.com/sites/default/files/Carlyle_Research_Inflation_Tech_Bubble_Jason_Thomas_September_2021.pdf

Figure 15. Impact of the Fed Pivot



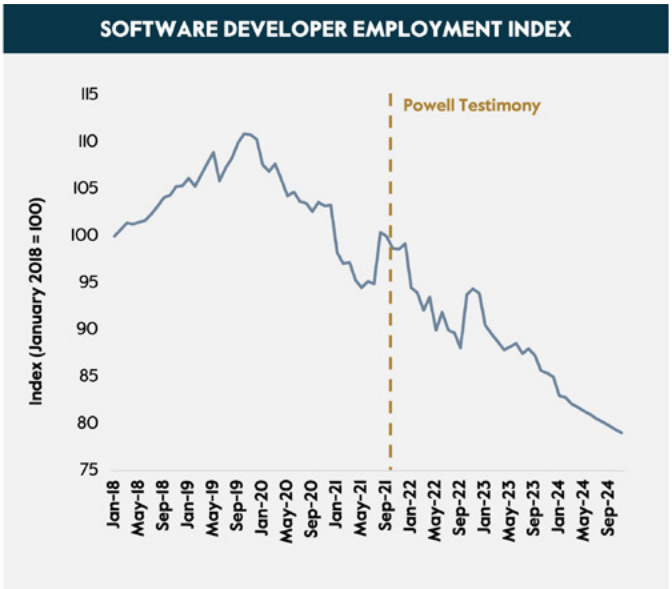
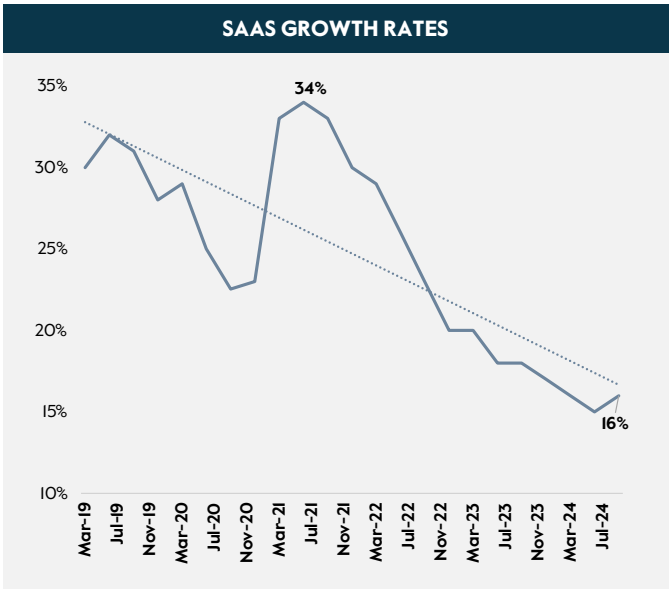


Figure 16. Public SaaS Financial Performance



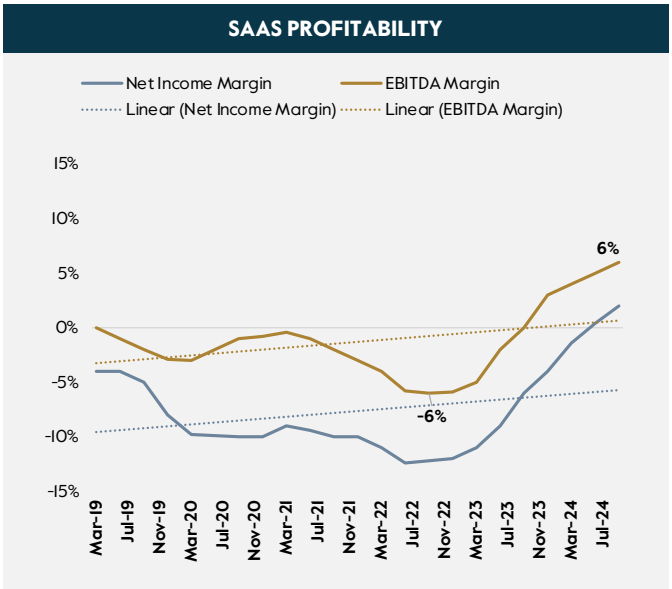


Figure 15. Source: Carlyle Analysis; Aventis Advisors, S&P Capital IQ, ADP, January 2025. There is no guarantee any trends will continue.
Figure 16. Source: Carlyle Analysis; Aventis Advisors, S&P Capital IQ, January 2025. There is no guarantee any trends will continue.

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