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AI Boom or Bubble? Lessons from the Dot-Com Period

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Abstract

The rapid growth of artificial intelligence has led investors to question whether the recent rally in AI-related stocks is a sign of a speculative bubble. This paper compares the current AI-driven market to the dot-com boom of the late 1990s. Using a proprietary methodology, we identify AI exposure within the S&P 500 Index and construct AI and ex-AI portfolios. We apply a similar framework to the dot-com period, building TMT and ex-TMT portfolios. Then, we compare the performance, concentration, momentum dynamics, valuation, and financial characteristics of the S&P 500 Index, TMT, ex-TMT, AI, and ex-AI portfolios.

Even if there are a lot of similarities between the AI and dot-com booms, our analysis suggests that the current AI episode lacks the hallmark "explosive valuation dynamics" typically associated with late-stage bubbles. However, this does not imply that the theme is low risk. The primary concern is concentration risk, explaining that a narrow group of AI-related stocks has driven a disproportionate share of index-level returns. This implies that standard equity allocations embed significant implicit exposure to the AI factor and to long-duration growth. Consequently, risk management should focus less on timing a potential "bubble pop" and more on mitigating drawdown amplification. Meanwhile, it remains crucial to assess the sustainability of earnings and capital expenditure dynamics while monitoring indicators such as market breadth, issuance activity and any re-acceleration in valuations, as these could signal a transition toward genuinely speculative behavior.

Keywords: Speculative bubble, artificial intelligence, dot-com bubble, momentum dynamics, contrarian patterns, market concentration, valuation, capex.

JEL classification: G01, G12, D84.

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Monica Defend is Head of the Amundi Institute, which was created in February 2022, and a member of Amundi's Executive Committee. Embedded in the heart of the global investment process, the Amundi Institute provides thought leadership, advice, and training for all its clients. Monica's team offers geopolitics expertise, quantitative research, macro and market strategy and asset allocation advisory activities. She leads the creation of engaging and accessible proprietary research that delivers cross-asset thought leadership and investment strategy ideas to internal and external clients. A distinctive feature of her approach is the close collaboration that she has forged with the investment division to generate actionable investment ideas. She is also director of Amundi Japan, member of Amundi Japan and Amundi SGR Advisory Boards.

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Prior to his current position, he was Head of Research and Development at Lyxor Asset Management (2009-2016), Head of Investment Products and Strategies at SGAM AI, Société Générale (2005-2009), and Head of Risk Analytics at the Operational Research Group of Crédit Agricole SA (2004-2005). He was also a member of the Industry Technical Working Group on Operational Risk (ITWGOR) from 2001 to 2003. Thierry started his professional career at Crédit Lyonnais in 1999 as a financial engineer. Previously, Thierry was a researcher at the University of Bordeaux and then a research fellow at the Financial Econometrics Research Centre at Cass Business School. During his five-year academic career, he also worked as a consultant on option pricing models for several banks.

Since February 2017, he has been a member of the Scientific Advisory Board of the AMF, the French securities and financial markets regulator, while from 2014 to 2018 he was a member of the Group of Economic Advisers (GEA), ESMA's Committee for Economic and Market Analysis (CEMA). Thierry is also an Adjunct Professor of Economics at the University of Paris-Saclay (Evry), Department of Economics. He holds a Ph.D. in Economics from the University of Bordeaux, France. He is the author of numerous academic articles in scientific journals and has published several books on risk and asset management. His last two books are "Introduction to Risk Parity and Budgeting", published by Chapman & Hall in 2013 and translated into Chinese by China Financial Publishing House in 2016, and "Handbook of Financial Risk Management", published by Chapman & Hall in 2020.

1 Introduction

The rapid expansion of artificial intelligence (AI) has fueled a sharp revaluation of equity markets, with AI-related firms driving a substantial share of recent gains in the S&P 500 Index. Recent developments have led some investors to question whether these dynamics signal the emergence of an AI speculative bubble[1]. In what follows, we contribute to this debate by examining whether current AI market trends exhibit the statistical and structural characteristics typically associated with asset price bubbles. Specifically, we conduct a systematic comparison between today's AI-driven market environment and the dot-com boom of the late 1990s.

Box 1: Identifying the AI stocks

We identify and quantify AI exposure with a five-step process:

1. Step 1 uses fundamental analysis to identify AI-specific names and classify them by economic position (Leader, Adjacent, Pure Player) and economic function (Applications & Services, Data & Intelligence, Compute & Infrastructure).

2. Step 2 constructs a thematic equally-weighted AI portfolio from those names to serve as the AI benchmark. As of December 2025, this thematic portfolio comprises 26 stocks.

3. Step 3 orthogonalizes the thematic return series by removing its CAPM (market) component. The resulting residual defines the pure AI risk factor, explicitly orthogonal to the broad market beta.

4. In Step 4, each stock in the investment universe[a] is regressed against the AI factor using a rolling window of excess returns. This produces a time series of AI betas, measuring the stock's dynamic sensitivity to the AI factor.

5. Step 5 forms the AI portfolio by market-cap weighting the stocks whose estimated AI beta exceeds a predefined threshold. The ex-AI portfolio is formed from the remaining constituents of the investment universe not included in the AI portfolio. Like the AI portfolio, it is market-cap weighted using the same methodology as the parent index that defines the investment universe.

AI stock selection is performed monthly. By construction, the parent index can be decomposed into the market-cap-weighted combination of the AI portfolio and the ex-AI portfolio.

[a] It generally corresponds to the constituent universe of a parent index (*e.g.*, S&P 500 Index).

[1] The '*AI bubble*' already has its own dedicated Wikipedia page: `https://en.wikipedia.org/wiki/AI_bubble`.

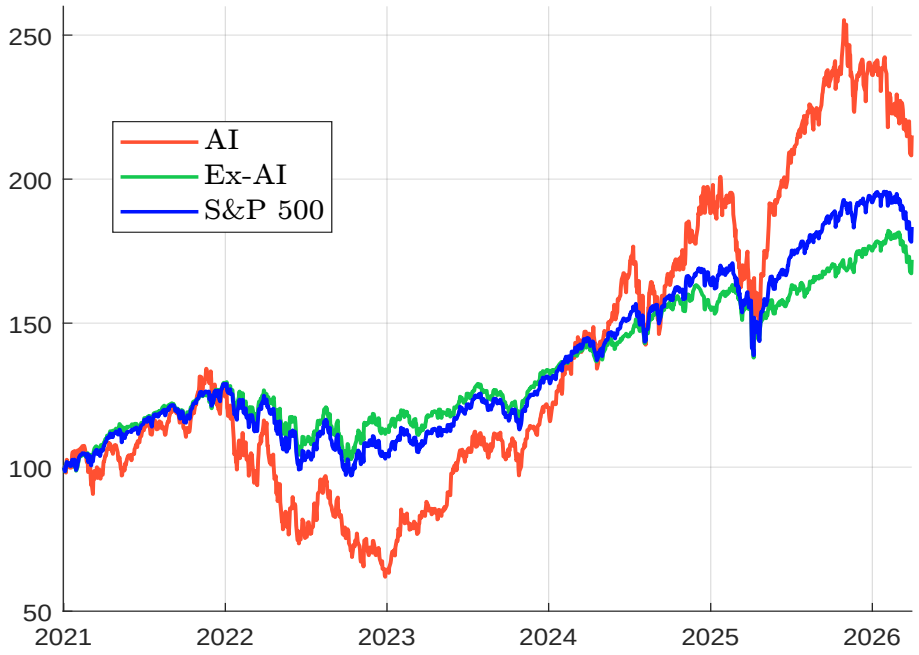
2 The performance of the S&P 500 AI portfolio

In Figure 1, we show the cumulative performance of the S&P 500 Index and its two components:

- the S&P 500 AI portfolio;
- the S&P 500 ex-AI portfolio.

Between 2021 and 2026[2], the S&P 500 delivered exceptionally strong returns, with much of this growth driven by companies at the forefront of artificial intelligence. Over this period, stocks linked to AI achieved a cumulative gain of 115.2%, far outpacing both the S&P 500 Index and the ex-AI portfolio, which returned 83.4%, and 72.0%, respectively. However, it is worth noting that such periods of leadership by a particular group of stocks are not unusual in equity markets. Strong performance alone does not necessarily signal the presence of a speculative bubble.

Figure 1: Cumulative returns of the S&P 500 Index, S&P 500 AI and S&P 500 ex-AI portfolios



Source: Amundi Investment Institute (2026).

The picture changes when focusing on the most recent three-year period. From January 2023 to December 2025, AI stocks outperformed non-AI stocks by 212 percentage points[3] (Table 1). The AI portfolio delivered annual returns of 87.7%,

[2]The study period is from December 31, 2020 to 2026†, where 2026† denotes March 31, 2026.
[3]The cumulative performance of AI stocks is 267.3% vs. 55.2% for the other stocks.

55.8%, and 25.5% in 2023, 2024, and 2025, respectively, compared with 18.4%, 16.2%, and 12.8% for the S&P 500 ex-AI portfolio over the same years. Regarding these figures, this scale of outperformance is highly unusual and raises legitimate questions about whether we are seeing the formation of a speculative bubble in AI-related stocks.

Table 1: Annual performance of the S&P 500 Index, S&P 500 AI and ex-AI portfolios

	S&P 500	AI	Ex-AI
2021-2026†	83.4%	115.2%	72.0%
2021	28.2%	24.4%	28.9%
2022	−18.5%	−48.3%	−12.4%
2023	25.7%	87.7%	18.4%
2024	24.5%	55.8%	16.2%
2025	17.4%	25.5%	12.8%
2026†	−4.4%	−8.9%	−1.8%

Source: Amundi Investment Institute (2026).

3 What is an asset bubble?

An asset bubble is defined as a significant and persistent deviation of an asset's market price above its fundamental value[4] driven by speculative forces rather than economic fundamentals. From a theoretical standpoint, Tirole (1985) showed that rational bubbles can emerge in economies, where the interest rate is lower than the growth rate, allowing self-fulfilling price expectations to sustain prices beyond their intrinsic value. Scheinkman and Xiong (2003) attribute the formation of bubbles to investor overconfidence and heterogeneous beliefs. When agents disagree about fundamentals and short-selling is restricted, asset prices can include a speculative premium that reflects the option of reselling to a more optimistic future buyer. This can systematically push prices above fundamentals. Moreover, this mechanism can be amplified when asset float is limited, as a smaller pool of tradable shares concentrates pricing power among the most optimistic investors. Empirically, identifying bubbles remains challenging (Flood and Hodrick, 1990). While many statistical detection methods rely on testing for regime shifts in price volatility or explosive autoregressive behavior, bubble formation cannot be reduced solely to a structural break in market prices. Such shifts can also reflect unobserved changes in fundamentals.

Asset bubbles have been extensively studied by Academics such as Charles Kindelberger and Robert Schiller. Contrary to popular perception, however, large-scale speculative bubbles are relatively rare in financial history. The two most frequently cited episodes are the seventeenth-century Dutch tulip mania and the internet bubble of the late 1990s and early 2000s. In particular, the latter has become

[4]Defined as the present discounted value of expected future cash flows.

a benchmark for modern research on asset bubbles. Figure 2 shows the cumulative performance of the S&P 500 from 1995 to December 2004. We can observe five main periods that correspond to the speculative bubble phases defined by Kindleberger (2000):

1. Substitution (or displacement) stage: This stage is characterized by accelerating IPOs, rising valuations, and substantial venture capital investments in new technologies.

2. Takeoff (or boom) stage: Market capitalization in the technology sector increases sharply as investor attention intensifies.

3. Exuberance (or euphoria) stage: A period of euphoria marked by IPOs, stretched valuations, soaring trading volumes, and substantial inflows of retail and institutional capital into internet-related stocks.

4. Critical (or profit-taking) stage: Some buyers begin to sell.

5. Crash (or pop/panic) stage: The dot-com bubble bursts.

Figure 2: Cumulative returns of the S&P 500 Index during the dot-com bubble

Source: Amundi Investment Institute (2026).

4 How do we compare to the dot-com bubble?

Since the dot-com bubble has become a benchmark, we compare the current period with the internet episode to assess whether present market dynamics exhibit characteristics consistent with an AI bubble.

4.1 Similarities and divergences

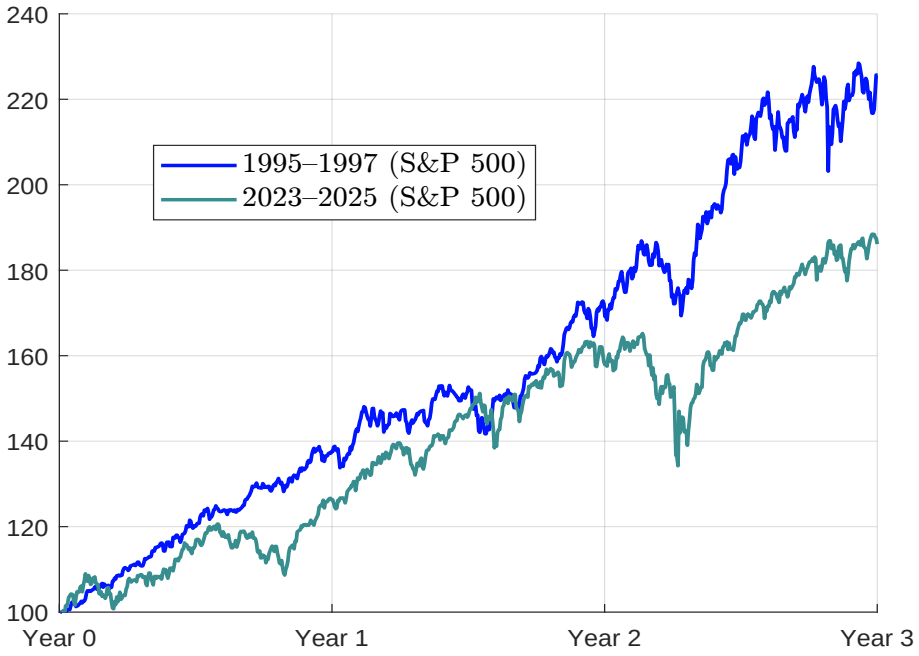
Direct comparison suggests that the period from 2023 to 2025 bears significant resemblance to the dot-com period from 1995 to 1997 (Figure 3). Therefore, the current period does not appear to correspond to the second or third stages of a speculative bubble, characterized by exuberance and euphoria. Rather, it appears to correspond to the first stage, displacement, where new technology begins to attract investor attention. However, two significant differences emerge when comparing the current AI-driven rally to the displacement stage of the internet bubble:

- First, the scale of returns is lower today. The 1995–1997 period saw cumulative returns that were approximately 39.5 percentage points higher than those observed during the 2023–2025 AI boom. This suggests that, while significant, the current rally is more moderate in scale than its dot-com counterpart at the same stage.

- Second, the two periods differ somewhat in their statistical properties. In the asset bubble literature, the start of a speculative episode is often characterized by a shift from a random walk process to an explosive autoregressive dynamic. In addition, equity markets are typically viewed as exhibiting short-run contrarian behavior, with negative autocorrelation at short horizons. An examination of the autocorrelation and partial autocorrelation functions[5] suggests that the absence of short-run contrarian effects is more supported during the 1995–1997 dot-com phase than during the 2023–2025 AI boom period. Said differently, return persistence, and therefore trend-following behavior, was more pronounced in the early internet cycle than in the recent AI-driven market rally.

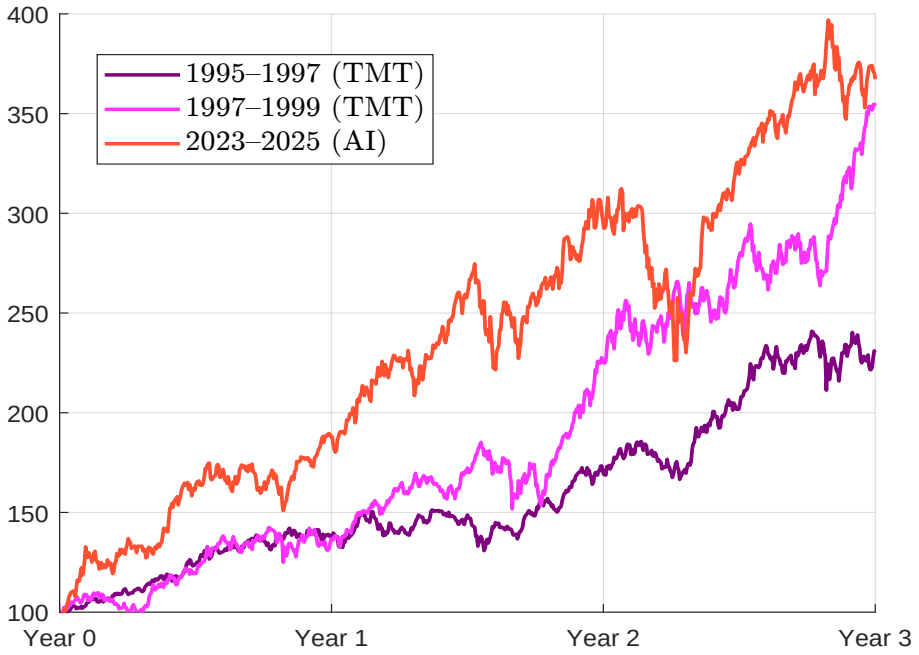
However, the previous analysis is subject to a composition bias, since the comparison is conducted at the level of the broad S&P 500 Index, which implicitly incorporates the behavior of non-AI stocks and can mask the real trends in AI-related equities. To address this, we break down the S&P 500 Index into TMT (technology, media, and telecom) and non-TMT stocks, and compare the performance of the S&P 500 TMT portfolio with the S&P 500 AI portfolio. Results are shown in Figure 4. This approach reveals a different picture. The performance of AI stocks from 2023 to 2025 is more similar to the TMT portfolio during the 1997–1999 period, which aligns with the takeoff and exuberance phases of a speculative bubble. This suggests that, in absolute terms, the current AI rally is closer to the bubble cycle than was previously indicated.

Figure 3: Comparison of the S&P 500 cumulative returns between the AI boom and the dot-com bubble



Source: Amundi Investment Institute (2026).

Figure 4: Comparison of the cumulative returns of the TMT and AI portfolios



Source: Amundi Investment Institute (2026).

Nevertheless, there is still an important difference. The rise in AI stocks has been steady and spread out, while gains in TMT stocks during the dot-com bubble were much faster and more concentrated at the end. Also, AI stocks show more signs of short-term corrections, while dot-com stocks mostly kept rising without pullbacks[6]. This means today's AI rally is less driven by hype and momentum than the TMT boom of the late 1990s.

Table 2: Weights and characteristics of the TMT portfolio

Date	Share in the index	Number of stocks	Average market capitalization ($ bn)	Average weight
30/12/1994	20.9%	68	10.3	0.31%
29/12/1995	21.2%	71	13.7	0.30%
31/12/1996	21.7%	79	15.5	0.27%
31/12/1997	22.7%	83	20.7	0.27%
31/12/1998	29.7%	86	34.4	0.35%
31/12/1999	41.1%	94	53.9	0.44%
29/02/2000	44.8%	96	53.9	0.47%
31/03/2000	44.7%	96	59.1	0.47%
29/12/2000	29.7%	104	33.5	0.29%

Source: Amundi Investment Institute (2026).

Table 3: Weights and characteristics of the AI portfolio

Date	Share in the index	Number of stocks	Average market capitalization ($ bn)	Average weight
31/12/2020	17.0%	39	138.10	0.44%
31/12/2021	14.7%	32	185.87	0.46%
30/12/2022	10.6%	39	87.61	0.27%
29/12/2023	21.7%	49	176.98	0.44%
29/02/2024	25.1%	52	206.54	0.48%
31/12/2024	28.8%	47	304.91	0.61%
30/09/2025	38.2%	44	495.10	0.87%
31/12/2025	27.7%	45	359.91	0.62%
31/03/2026	31.4%	48	365.43	0.65%

Source: Amundi Investment Institute (2026).

[5]The ACF and PACF of the two periods computed with the daily returns of the S&P 500 Index are given in Table 10 on page 19.

[6]These differences are reflected in the autocorrelation and partial autocorrelation structures of the two portfolios (see Table 10 on page 19). While the AI portfolio exhibits mean-reverting behavior at the monthly frequency, which is consistent with short-term contrarian dynamics, this property disappears for the TMT portfolio beyond a weekly horizon. This suggests that trending and momentum dynamics dominated the dot-com cycle, not the AI market rally.

4.2 Concentration and contribution of TMT and AI portfolios

Tables 2 and 3 report key market structure statistics for the TMT and AI portfolios, respectively[7]. These statistics include portfolio weight in the S&P 500 Index, the number of constituent stocks, the average market capitalization, and the average stock weight. At their respective peaks, both portfolios represented a significant share of the S&P 500. TMT stocks reached a maximum weight of 44.8% in February 2000, while the AI portfolio peaked at 38.2% in September 2025. Despite this difference in aggregate weight, the AI portfolio is notably more concentrated than the TMT portfolio, comprising approximately 45 stocks compared to around 100 for the TMT portfolio. This higher concentration is reflected in the average individual stock weights. At their respective peaks, AI stocks carried an average weight of 87 basis points versus 47 basis points for TMT stocks. In summary, while AI stocks now make up a large share of the market, this is driven by a smaller group of companies, which increases concentration risk.

Table 4: Performance and contribution of the TMT and ex-TMT portfolios

Date	Performance			Contribution	
	S&P 500	TMT	Ex-TMT	TMT	Ex-TMT
1995-2000‡	234.2%	550.5%	140.1%	33.0%	67.0%
1997-2000‡	97.6%	284.8%	40.9%	49.0%	51.0%
1995	37.6%	37.9%	37.5%	22.2%	77.8%
1996	23.0%	22.6%	23.9%	20.3%	79.7%
1997	33.4%	36.3%	32.8%	23.3%	76.7%
1998	28.6%	65.1%	18.0%	49.7%	50.3%
1999	21.0%	57.9%	4.5%	82.1%	17.9%
2000‡	− 4.8%	8.3%	−13.9%		

Source: Amundi Investment Institute (2026).

Table 5: Performance and contribution of the AI and ex-AI portfolios

Date	Performance			Contribution	
	S&P 500	AI	Ex-AI	AI	Ex-AI
2021–2026†	83.4%	115.2%	72.0%	15.1%	84.9%
2023–2025	83.7%	267.3%	55.2%	47.7%	52.3%
2021	28.2%	24.4%	28.9%	14.8%	85.2%
2022	−18.5%	−48.3%	−12.4%	41.8%	58.2%
2023	25.7%	87.7%	18.4%	42.9%	57.1%
2024	24.5%	55.8%	16.2%	51.6%	48.4%
2025	17.4%	25.5%	12.8%	57.3%	42.7%
2026†	−4.4%	−8.9%	−1.8%		

Source: Amundi Investment Institute (2026).

[7] 2000‡ denotes March 10, 2000, while 2026† denotes March 31, 2026.

TMT and AI stocks have played a major role in driving S&P 500 returns (Table 4 and 5). For example, TMT stocks made up 49% of the S&P 500's total gains from 1997 to 2000, and as much as 82% in 1999 alone. Recently, the AI portfolio has shown a similar impact, contributing about 50% of the index's performance since 2023. This high level of concentration is striking in both periods. However, despite these clear similarities, they are not enough to say that the current AI boom is an asset bubble. A true bubble happens when prices stay well above their fundamental value for a long time, and markets become inefficient, with hype and momentum taking over.

4.3 Earnings and valuation

To evaluate the potential overvaluation of the TMT and AI themes, we calculate the price-to-earnings (P/E) ratio, which relates a company's current share price to its earnings per share (EPS). This valuation multiple can be interpreted as a measure of investors' willingness to pay (WTP) for one dollar of net income. The P/E ratio can be calculated using two standard approaches. The last twelve months (LTM) P/E uses realized earnings and therefore represents a backward-looking valuation measure. By contrast, the next twelve months (NTM) P/E is based on forecasted earnings and thus reflects a forward-looking perspective. The gap between the LTM and NTM multiples primarily captures differences in earnings expectations.

Table 6 reports the annual averages of the LTM and NTM P/E ratios over the period 1997–1999. A consistent upward trend is observed across all three portfolios over these three years, with valuation multiples reaching exceptionally high levels for the TMT portfolio. The maximum LTM and NTM P/E ratios were 54.3× and 43.5×, respectively. Comparing Tables 6 and 7 shows that the LTM and NTM P/E ratios are similar across the different portfolios between the two periods. However, the peak multiples reached by the AI portfolio remain somewhat below those of the TMT portfolio: 49.1× versus 54.3× for the LTM ratio, and 36.9× versus 43.5× for the NTM ratio. The most striking difference between the two periods, however, lies in the time progression of valuation ratios. While the S&P 500 Index and the ex-AI portfolio exhibit an upward trend in P/E ratios between 2023 and 2025, the AI portfolio displays a downward trend during the same period. This divergence is particularly noteworthy. Therefore, TMT valuations expanded continuously between 1997 and 1999, while AI valuations compressed despite strong price appreciation. This suggests that earnings growth has outpaced price gains in the AI case, a pattern more consistent with fundamental re-rating than speculative excess.

We have also conducted a statistical test for speculative bubbles by modeling the P/E ratios as an autoregressive process of order one and testing whether the autoregressive coefficient exceeds unity, which would be indicative of an explosive, non-stationary process consistent with bubble dynamics. The AR(1) coefficient and the corresponding t-statistic are reported in Tables 6 and 7, with a 99% critical value of 2.438. During the period from 1997 to 1999, the AR(1) coefficient exceeded one for all three portfolios. The null hypothesis of an explosive process cannot be

rejected for the TMT portfolio[8] at the 1% significance level, providing statistical evidence consistent with the presence of a speculative bubble. By contrast, during the 2023-2025 period, the AR(1) coefficients fall below one for all portfolios, and the hypothesis of an explosive autoregressive process is rejected even for the AI portfolio. These results provide substantial evidence that, unlike the dot-com period, the current AI boom does not exhibit the statistical characteristics of a speculative bubble in terms of valuation dynamics.

Table 6: Statistics of the LTM and NTM P/E (1997–1999)

	LTM			NTM		
	S&P500	TMT	Ex-TMT	S&P500	TMT	Ex-TMT
1997	18.9	21.4	18.3	16.4	17.7	16.1
1998	23.0	30.5	21.2	19.9	24.6	18.6
1999	26.9	43.7	22.3	22.9	34.5	19.4
Minimum	17.2	19.1	16.7	15.0	16.0	14.7
Maximum	28.4	54.3	23.4	24.1	43.5	20.4
AR(1)	1.029	1.078	1.006	1.028	1.078	1.005
Test	1.072	2.453	0.207	1.039	2.658	0.187

Source: Amundi Investment Institute (2026).

Table 7: Statistics of the LTM and NTM P/E (2023–2025)

	LTM			NTM		
	S&P500	AI	Ex-AI	S&P500	AI	Ex-AI
2023	19.8	40.4	18.3	18.5	30.7	17.2
2024	23.8	37.1	21.1	21.1	27.9	19.0
2025	24.9	34.2	21.5	22.0	27.4	19.4
Minimum	17.6	27.8	17.3	16.9	22.8	16.0
Maximum	26.3	49.1	23.3	23.1	36.9	20.6
AR(1)	0.990	0.991	0.993	0.993	0.995	0.994
Test	−1.742	−0.606	−1.334	−1.320	−0.365	−1.128

Source: Amundi Investment Institute (2026).

4.4 Debt-to-capital and capex intensity ratios

Below we report the debt-to-capital and capex intensity ratios. Regarding the debt-to-capital ratio, similar patterns emerge between the two periods. The TMT portfolio had higher gearing, which decreased from 1997 to 2000. The same conclusion applies to the AI portfolio. Regarding the capex intensity ratio, however, the results are different. The investment intensity ratio of the TMT and AI portfolios is higher than that of the Ex-TMT and Ex-AI portfolios, respectively. But the 1997-2000

[8]The coefficient of the AR(1) process is equal to 1.078.

Table 8: Debt-to-capital and capex intensity (1997–2000)

Date	DEBT / CAPITAL			CAPEX / ASSETS		
	S&P 500	TMT	Ex-TMT	S&P 500	TMT	Ex-TMT
31/12/1996	38.07%	30.83%	39.06%	7.00%	10.50%	6.02%
31/12/1997	38.41%	31.34%	39.54%	6.60%	9.40%	5.76%
31/12/1998	38.22%	26.96%	41.41%	6.31%	7.92%	5.61%
31/12/1999	35.16%	21.97%	42.21%	6.01%	6.40%	5.73%
31/03/2000	33.42%	20.60%	42.31%	6.19%	6.38%	6.04%

Source: Amundi Investment Institute (2026).

Table 9: Debt-to-capital and capex intensity (2023–2026)

Date	DEBT / CAPITAL			CAPEX / ASSETS		
	S&P 500	AI	Ex-AI	S&P 500	AI	Ex-AI
30/12/2022	54.27%	35.13%	56.04%	3.84%	6.82%	3.54%
29/12/2023	52.85%	27.31%	57.08%	4.25%	6.27%	3.78%
31/12/2024	49.53%	24.15%	57.80%	4.46%	6.52%	3.79%
31/12/2025	45.60%	26.13%	56.43%	5.23%	6.60%	4.88%
31/03/2026	44.76%	24.64%	54.84%	5.67%	8.58%	4.50%

Source: Amundi Investment Institute (2026).

period was marked by a decreasing capex intensity ratio, while the 2023-2023 period is marked by an increasing capex intensity ratio. In particular, the sudden increase in the gearing ratio of the AI portfolio is certainly one of the main risks of the AI bubble. In March 2026, for example, the capex intensity ratio of the AI portfolio was approximately twice the capex intensity ratio of the Ex-AI portfolio. Therefore, execution risk is more pronounced for the recent AI rally.

5 Conclusion

In our view, the AI boom from 2023 to 2025 does not qualify as a speculative bubble. Still, if we look only at price patterns, there are clear similarities with the dot-com era. For instance, the 2023–2025 trajectory of the S&P 500 closely resembles that of the 1995–1997 period, while the performance of the AI portfolio during the same period mirrors that of the TMT portfolio between 1997 and 1999. Similarly, both the AI and TMT portfolios have accounted for approximately 50% of the S&P 500's total returns during their periods of dominance. In addition, P/E ratios appear comparable at first glance across the two episodes. However, there are important differences. The dot-com bubble was driven by momentum and hype, while the AI rally shows more signs of investors reacting to fundamentals. Second, valuation trends are different. During the dot-com bubble, P/E ratios for TMT stocks rose rapidly and were unsustainable. In contrast, P/E ratios for AI stocks have actually been falling from 2023 to 2025. The real test will come in 2026, which will show whether this trend continues.

Overall, our diagnostics suggest that the current AI episode lacks the hallmark '*explosive valuation dynamics*' typically associated with late-stage bubbles. However, this does not imply that the theme is low risk. The primary portfolio concern is concentration risk. A narrow group of AI-related stocks has driven a disproportionate share of index-level returns. This implies that standard equity allocations embed significant implicit exposure to the AI factor and to long-duration growth. Consequently, risk management should focus less on timing a potential '*bubble pop*' and more on mitigating drawdown amplification. This involves managing concentration limits, maintaining disciplined rebalancing and implementing hedging strategies calibrated to interest rate-driven multiple compression and crowd-induced gap risk. Meanwhile, it remains crucial to assess the sustainability of earnings and capital expenditure dynamics while monitoring indicators such as market breadth, issuance activity and any re-acceleration in valuations, as these could signal a transition toward genuinely speculative behavior.

References

Cochrane, J. H. (2002). Stocks as Money: Convenience Yield and the Tech-stock Bubble. *NBER*, 8987, 30 pages.

Flood, R. P., and Hodrick, R. J. (1990). On Testing for Speculative Bubbles. *Journal of Economic Perspectives*, 4(2), pp. 85-101.

Homm, U., and Breitung, J. (2012). Testing for Speculative Bubbles in Stock Markets: A comparison of Alternative Methods. *Journal of Financial Econometrics*, 10(1), pp. 198-231.

Kindleberger, C.P. (2000). *Manias, Panics, and Crashes: A History of Financial Crises.* Fourth edition, Wiley.

Scheinkman, J. A., and Xiong, W. (2003). Overconfidence and Speculative Bubbles. *Journal of Political Economy*, 111(6), pp. 1183-1220.

Shiller, R. J. (2015). *Irrational Exuberance*. Third edition, Princeton University Press.

Tirole, J. (1985). Asset Bubbles and Overlapping Generations. *Econometrica*, 53(6), pp. 1499-1528.

Appendix

A Additional results

Table 10: ACF and PACF functions of the S&P 500 Index, TMT and AI portfolios

	S&P 500 Index				S&P 500 TMT vs. AI portfolio			
	1995-1997		2023-2025		1997-1999		2023-2025	
Frequency	ACF	PACF	ACF	PACF	ACF	PACF	ACF	PACF
One-day	1.0%	1.0%	−3.9%	−3.9%	−4.7%	−4.7%	−5.9%	−5.9%
Weekly	−6.1%	−6.6%	−1.7%	−1.9%	−2.5%	−3.0%	−1.1%	−1.5%
2-week	11.8%	10.4%	−2.9%	−2.3%	6.8%	5.6%	−4.7%	−3.7%
3-Week	−4.5%	−4.2%	−4.1%	−2.2%	5.2%	5.1%	−1.1%	−1.3%
Monthly	3.0%	0.7%	2.0%	0.4%	2.7%	3.0%	−1.3%	−1.9%

Source: Amundi Investment Institute (2026).

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