J.P.Morgan

EYE ON THE MARKET BIENNIAL ALTERNATIVE INVESTMENTS REVIEW 2025

# The Deep End

On the surface, not much has changed since our Alternative Investments Review two years ago: top quartile buyout and venture funds are beating public markets, hedge funds are delivering strong risk-adjusted returns and private credit is delivering returns over leveraged loans. But many alternative investment managers are swimming in the deep end of the pool: buyout and venture portfolios are full of unmonetized companies dating back to the middle of the prior decade; hedge funds maintain record levels of crowding, concentration and high beta exposure; and private credit funds have loosened underwriting standards after a deluge of committed capital.

By **Michael Cembalest** | Chairman of Market and Investment Strategy for J.P. Morgan Asset & Wealth Management

## The Deep End: 2025 Alternative Investments Review

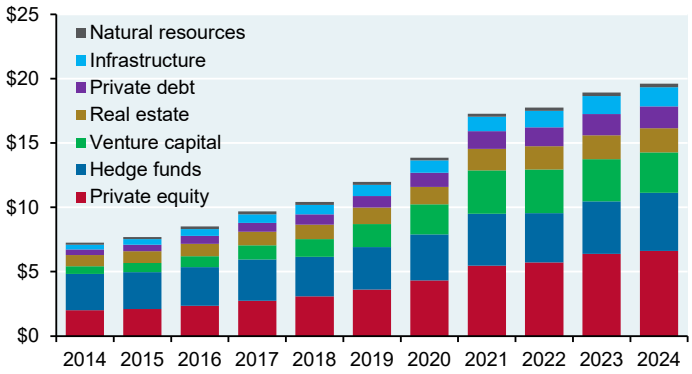
I began writing this Alternative Investments review a decade ago. The primary focus: performance, underwriting standards and portfolio risk in buyout and venture capital funds, hedge funds, private credit and real estate. Alternative assets continue to attract a lot of capital; private equity and venture assets as a share of world equity market cap have doubled over the last decade, while private credit assets have grown by 10x. The banks have played a significant role in financing private equity and private credit growth, as shown at the lower right.

On the surface not much has changed since our last review two years ago: top quartile buyout and venture funds continue to outperform public markets while median funds tread water in relative terms; diversified hedge fund portfolios still outperform risk-adjusted benchmarks; and private credit funds deliver higher returns than broadly syndicated leveraged loans. **That said, many alternative investment managers are swimming in the deep end of the pool**: **buyout and venture portfolios are full of unmonetized companies dating back to the middle of the prior decade; hedge funds maintain record levels of crowding, concentration and high beta exposure; and private credit funds have loosened underwriting standards after a deluge of committed capital**.

We conclude with a section on the litigation risks associated with the retail democratization of alternative assets, and a summary of recent academic research.

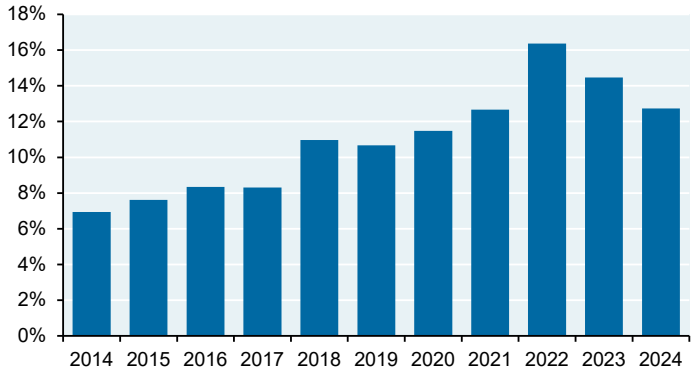
Michael Cembalest
JP Morgan Asset Management

**Global alternative assets under management**
US$, trillions




Source: Preqin, Callan, JPMAM, 2024

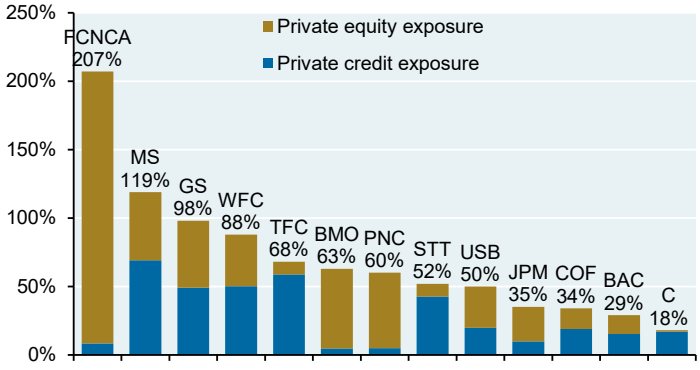
**Private equity & venture capital assets under management as a share of MSCI World market capitalization,** Percent




Source: Preqin, Bloomberg, JPMAM, 2024

An alternative version of the cover art; IYKYK

**Bank loan exposure to private credit and private equity intermediaries,** % of legal entity Tier 1 bank capital




Source: Fitch Ratings, FDIC call reports, March 31, 2025

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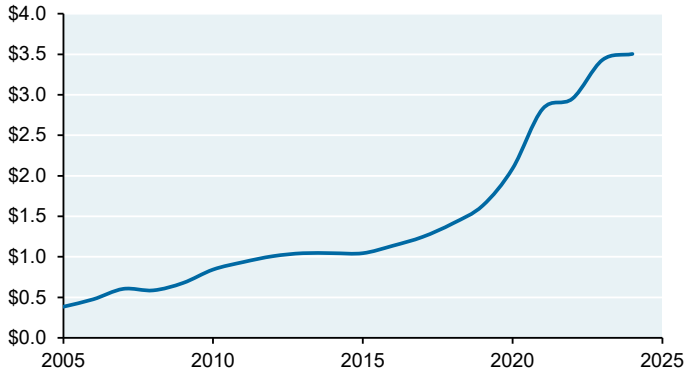
## The Deep End: an update on buyout and venture monetization

Our Alternatives Review two years ago was called "Paper Moon", which referred to the large share of reported private equity and venture capital gains that were still "on paper". In other words, all the portfolio companies that had not been sold to strategic buyers, IPO investors or continuation funds but affect reported LP returns. At the end of 2025, many private equity and venture managers are still swimming in the deep end: their pool is still full of portfolio companies that have not yet been monetized.

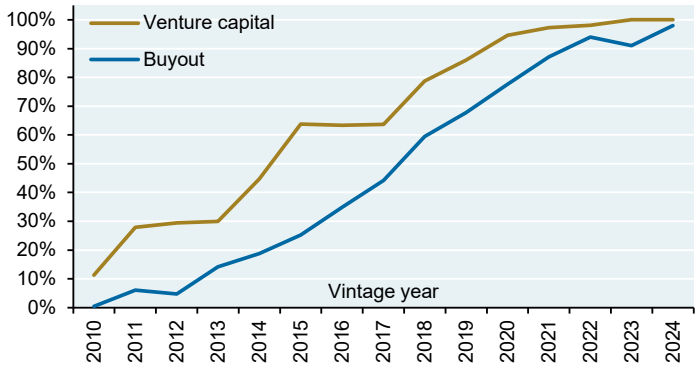
The first chart captures the general trend by showing global unrealized buyout value which began to rise in 2019. The next three charts track unmonetized positions in US buyout and venture funds as a share of total value by vintage year[1]. As per the second chart, for 2016-2019 vintage years, unsold portfolio companies account for 35%-68% of buyout returns and 65%-90% of venture returns. Think about that: despite the SPAC boom and buoyant market conditions in 2020-2022, monetized venture companies represent less than a third of the value reported to LPs in the median 2018 vintage fund. The last two charts illustrate the improvement in monetization by vintage year since our last piece in 2023.

**Global buyout unrealized value**
US$, trillions



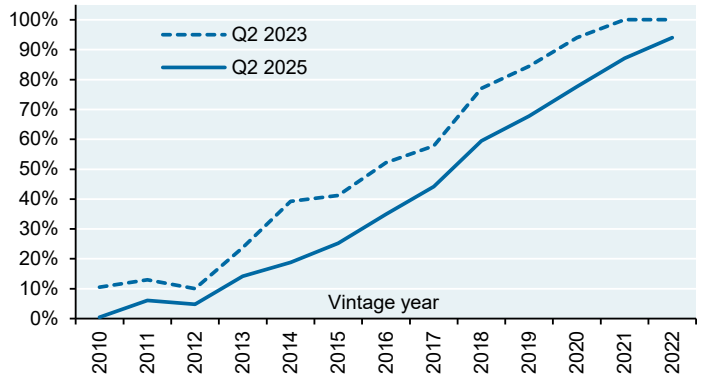

Source: "Global Private Equity Report 2025", Bain, JPMAM, 2025

**Waiting for Godot: unmonetized venture and buyout shares,** Median remaining value as a % of fund value + distributions



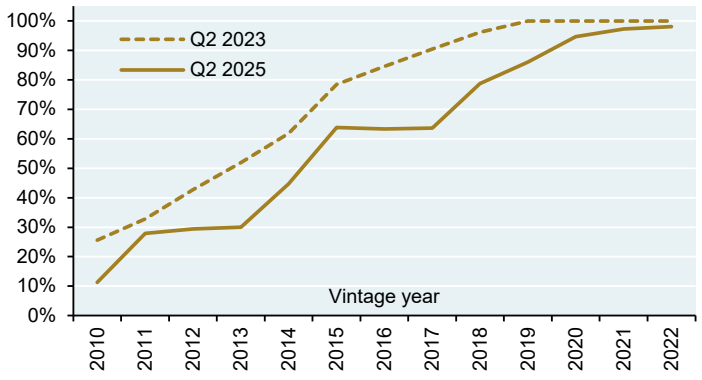

Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**US buyout share of investments yet to be monetized**
Remaining value as a % of fund value + distributions




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**US VC share of investments yet to be monetized**
Median remaining value as a % of fund value + distributions

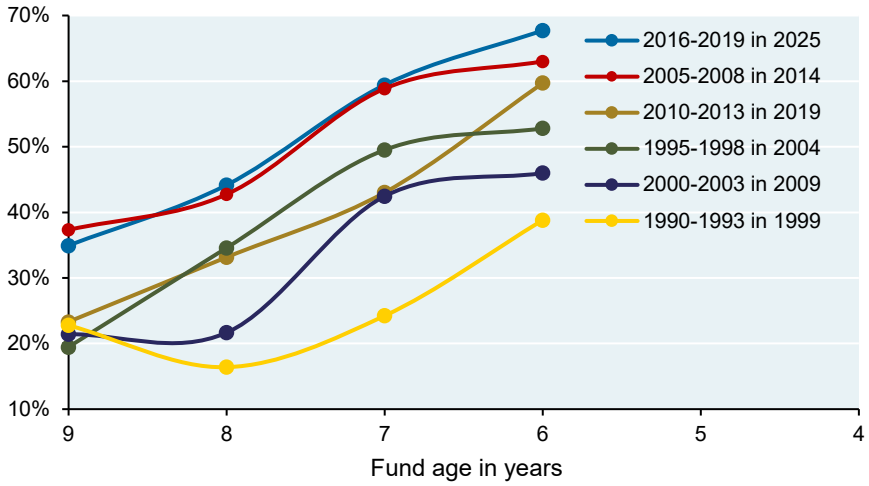



Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

[1] Buyout and venture performance data shown above is generously provided by Steve Kaplan, the Neubauer Family Distinguished Service Professor of Entrepreneurship and Finance and Kessenich E.P. Faculty Director at the Polsky Center for Entrepreneurship and Innovation at the University of Chicago. Steve's figures are derived from the MSCI/Burgiss database, which includes 13,000 funds and $12 trillion in AUM. Note: Steve's dataset cites top quartile managers as being in the 75th to 100th percentile of performance rather than in the 25th to 1st percentiles; this is a stylistic choice and we use his approach to be consistent with his research.

*The speed of buyout monetization*. Is the current pace of buyout monetization slower than usual? We mention above that 2016-2019 vintage year buyout funds have 35%-68% of their total value still to be monetized. We checked a few prior market cycles using five year intervals to see if the pace of monetization was any different for funds that were 6 to 9 years old. As shown below, the current cycle ending in 2025 is in fact the one with the slowest median buyout monetization speed of those analyzed.

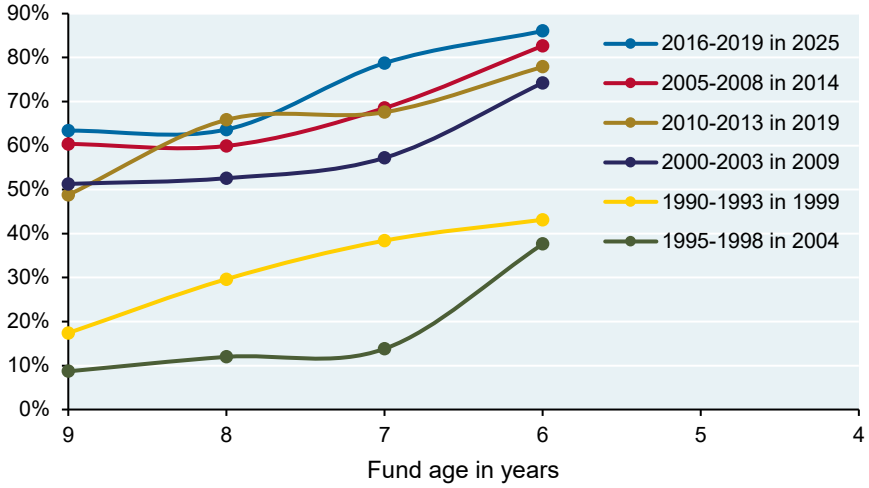
**The speed of monetization in buyout funds**
Median remaining value % of total value




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, 2025

For venture, the current cycle also shows the slowest monetization pace on record and with even higher unsold amounts. For example, for the 2017 vintage year (8 years ago), the unsold portion is 45% for the median buyout fund compared to over 60% for the median venture fund.

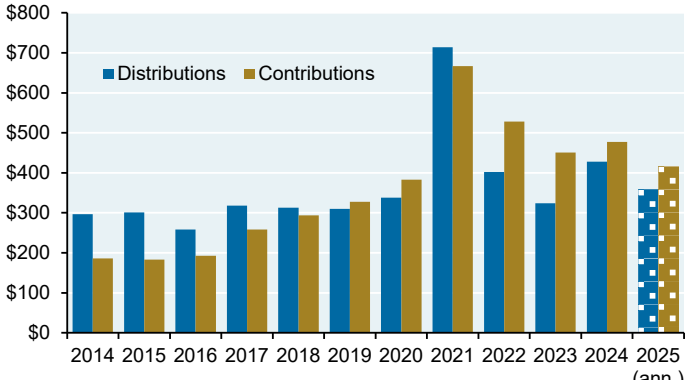
**The speed of monetization in venture funds**
Median remaining value % of total value




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, 2025

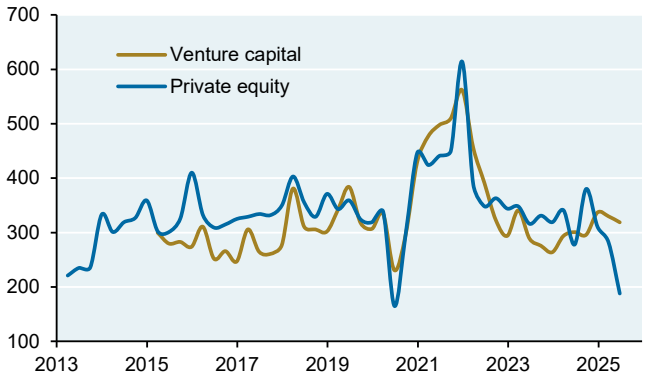
These dynamics have resulted in the following: ignoring the anomaly of 2021, global private equity distributions have been roughly flat despite a growing amount of AUM invested; private equity exits have declined in number terms; average buyout holding periods are rising; continuation funds have emerged as a means for fund managers to meet distributions; and secondary funds are growing in size as a share of AUM. See Appendix II for more information on the performance of secondary funds.

**Global private equity cash flows by year**
US$, billions



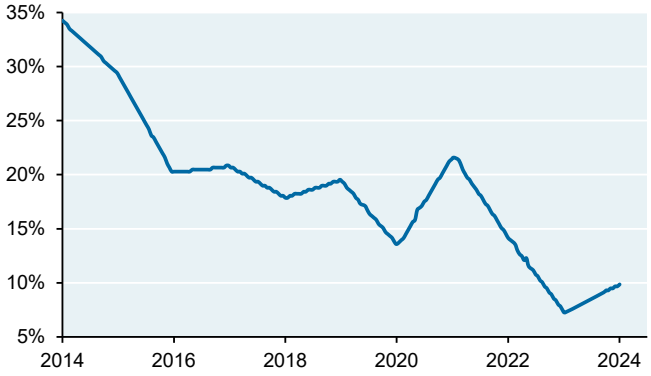

Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**US private equity and VC exit activity**
Number of exits per quarter



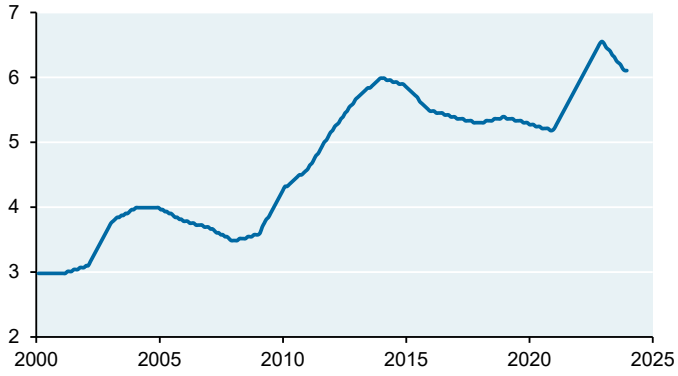

Source: Pitchbook, Q2 2025

**Global buyout exits as a share of global buyout AUM**
Percent



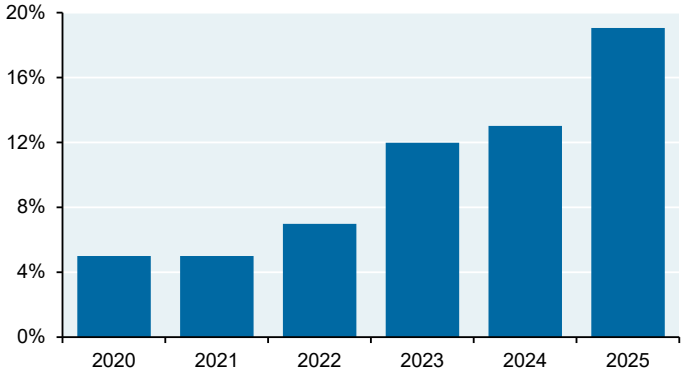

Source: Satori Insights, Bain, 2025

**Global buyout median holding period**
Years



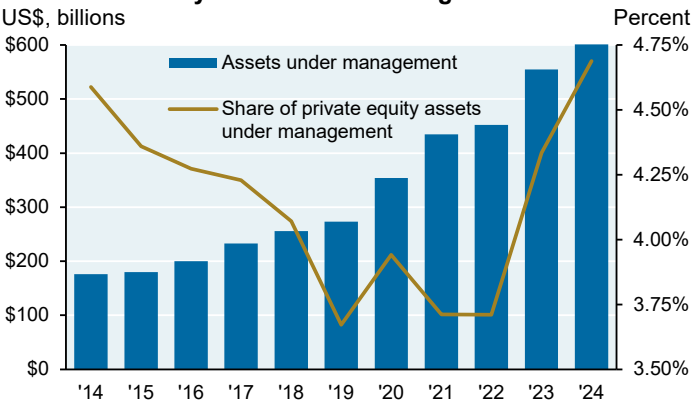

Source: Satori Insights, Bain, PitchBook, Preqin, 2025

**Continuation vehicle share of global private equity exits**
Percent




Source: Satori Insights, Jeffries, Bloomberg, 2025

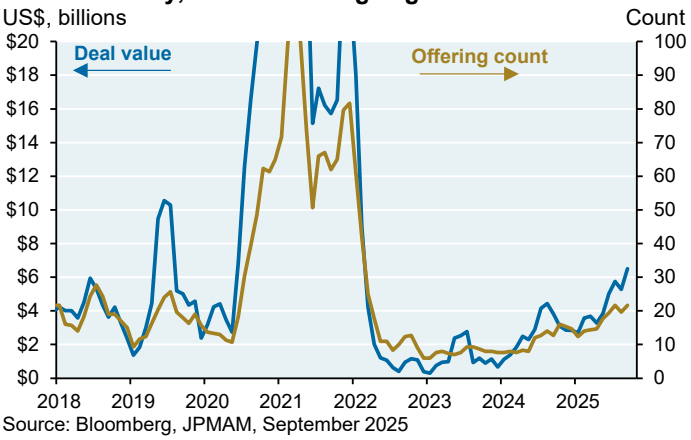
**Global secondary assets under management**
US$, billions




Source: "Global Private Equity Report 2025", Bain, June 2024

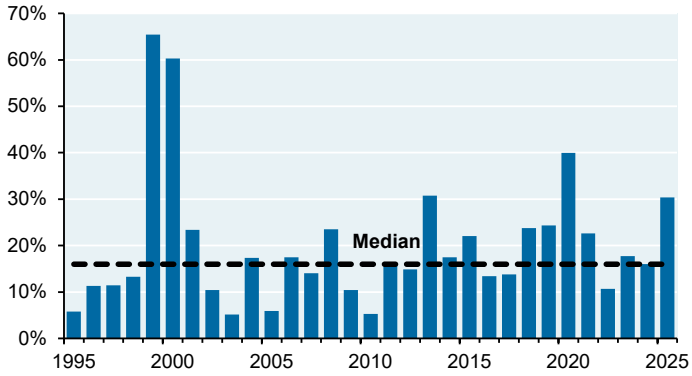
**For private equity and venture managers swimming in the deep end, the current recovery in IPO activity, secondary IPO issuance and announced M&A deal volumes could not come at a better time**. The last two charts look at new money in high yield and leveraged loan markets funding M&A activity, and the amount of equity block trades linked to financial sponsors selling down positions.

**US IPO activity, 3 month rolling avg**



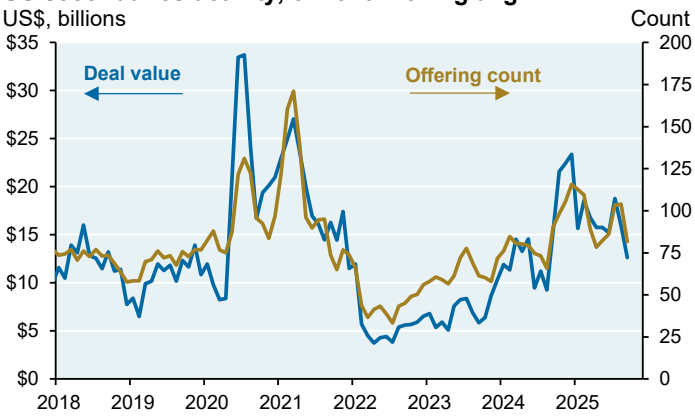

Source: Bloomberg, JPMAM, September 2025

**US average IPO return on first trading day**



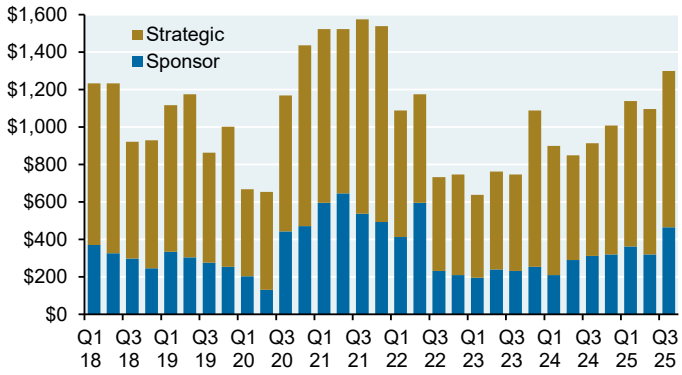

Source: GS Global Investment Research, September 2025

**US secondaries activity, 3 month rolling avg**



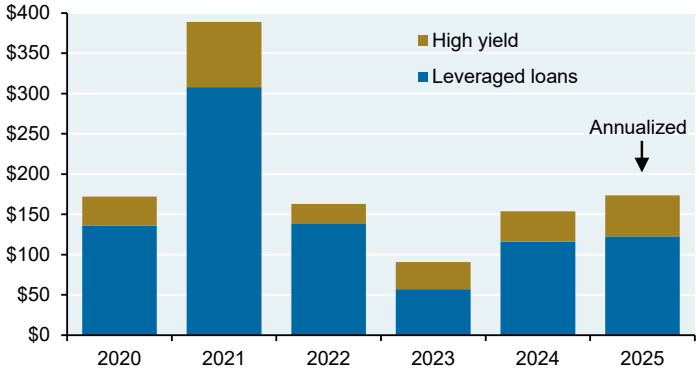

Source: Bloomberg, JPMAM, September 2025

**Total announced M&A volumes by quarter**



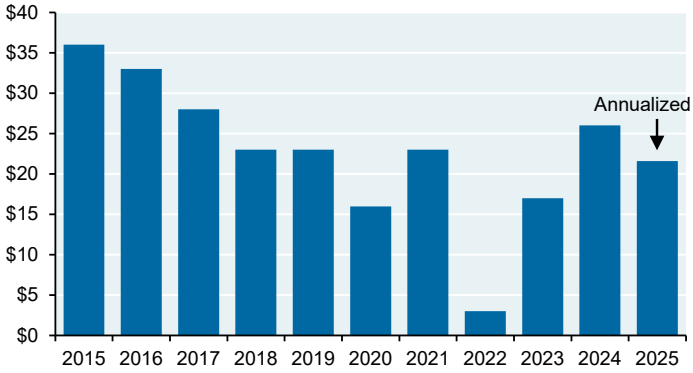

Source: Morgan Stanley Research, Q3 2025

**Leveraged loan and high yield issuance: M&A use of proceeds,** US$ billions




Source: JP Morgan, November 5, 2025

**Block trade volume linked to financial sponsors in registered blocks,** US$ billions




Source: JP Morgan, October 2025

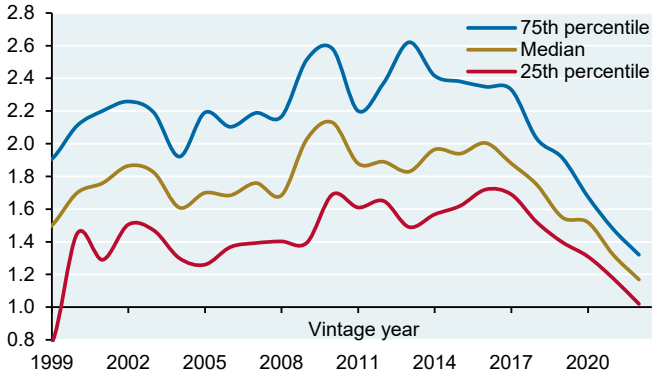
## Private equity and venture capital absolute performance

The charts below show multiples of invested capital (MOIC[2]) and internal rates of return (IRR) for median, 75th and 25th percentile managers for buyout and venture.

*Buyout*. From 1999 to 2019, the median buyout manager MOIC hovered around 2x with IRRs of 15%-20%. We show performance through 2022 vintage years; for 2021 and 2022 vintages, many funds are still in their original commitment periods and hold most investments at or close to cost. **In other words, it takes time to determine if the decline in recent vintage year MOIC/IRR is a performance issue or simply a J-curve issue**.

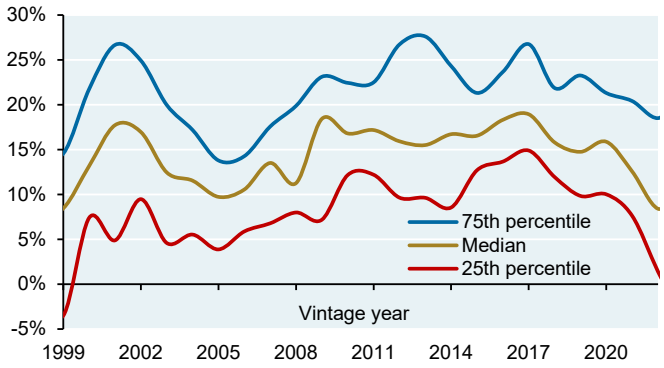
*Venture*. Venture performance has been less consistent than buyout for the median manager. For several years following the dot-com bust, the median venture fund barely generated positive absolute returns. Post financial crisis vintages showed improvement given lower valuations and scarcer capital: from 2009 to 2018, median MOICs ranged from 2.0x – 2.5x while median IRRs ranged from 13%-15%. Starting in 2019, venture performance declined again. **My sense is that this is not just a J-curve issue, but also a reflection of the Metaverse/SPAC investment cycle that saw a lot of capital destroyed**. As per the chart on page 3, the median 2019 vintage venture fund still holds 80% of its assets; eventual disposition prices could drive performance down further.

**US buyout performance**
Multiple on invested capital (MOIC)



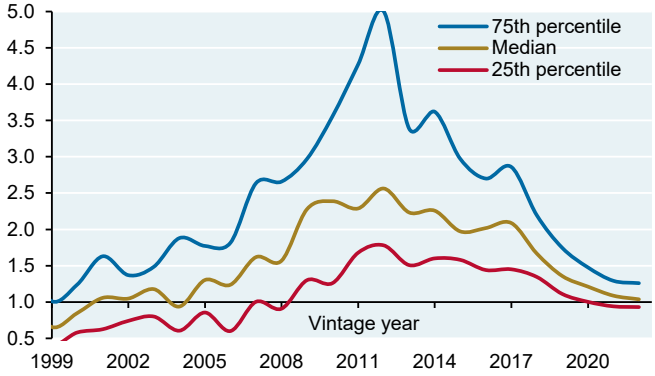

Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**North America median buyout IRR by vintage year**
Percent



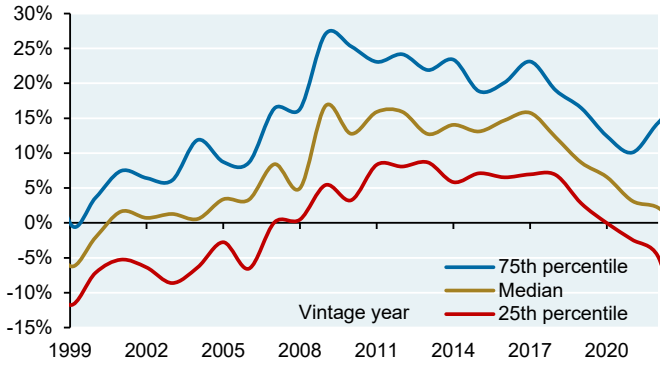

Source: MSCI/Burgiss, JPMAM, Q2 2025

**US venture capital performance**
Multiple on invested capital (MOIC)




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**North America median venture capital IRR by vintage year**
Percent




Source: MSCI/Burgiss, JPMAM, Q2 2025

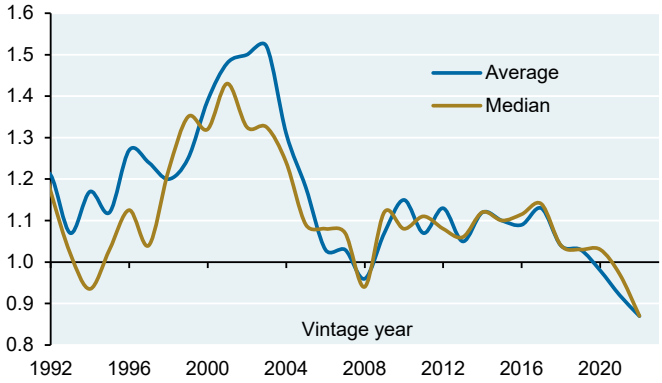
[2] We also compared MOIC to "total value paid in" (TVPI). While MOIC multiples are computed based on the fund's invested capital, TVPI multiples are computed based on when capital is called from LPs. The difference: some managers finance investments through temporary credit facilities in order to delay calling capital. The differences between MOIC and TVPI were very small for the median buyout and venture manager

**Performance relative to public equity markets**

*Buyout*. From the early 1990's to 2020 the median buyout fund outperformed the S&P 500 consistently and without much difference between average and median funds[3]. These findings are similar to outperformance results cited by academic papers #1 and #2 in Appendix III. As usual, top quartile managers did much better than median while fourth quartile managers underperformed public equity markets almost every vintage year.

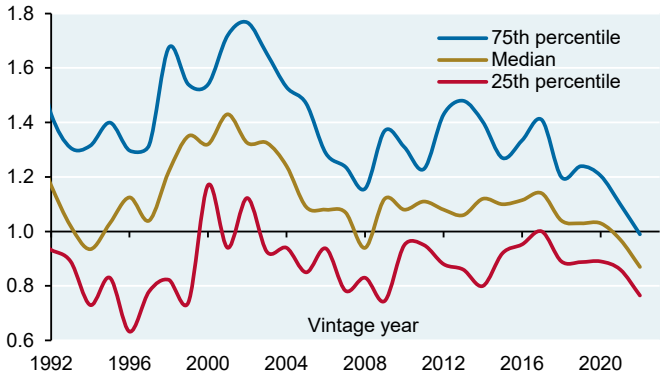
For post-2020 vintages, buyout performance relative to the equity market has declined, a function of (a) the soaring US stock market driven by a few megastocks that have little in common with companies that buyout firms typically acquire (more on that on the following page), and (b) the normal J-curve process mentioned on the prior page. In other words, I don't think relative buyout performance post 2020 is telling us much just yet.

**US buyout performance**
Public Market Equivalent ratio vs S&P 500




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**US buyout performance**
Public Market Equivalent ratio vs S&P 500

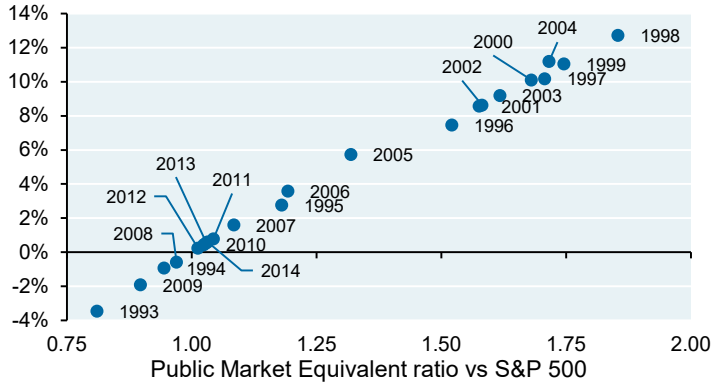



Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

[3] The **Public Market Equivalent ratio (PME)** has become the standard for industry analysts and institutional investors to evaluate performance of buyout and venture funds relative to public equity markets. The PME compares private equity capital calls and distributions to investments in public equity markets in the same exact time periods. The result is a ratio of private equity returns vs the public equity benchmark used.

PME ratios can be converted into "direct alpha" which measures annual outperformance in percent. In other words, something similar to an IRR differential between the fund and the benchmark. Below we show the PME and direct alpha for a hypothetical fund based on its inception year. When the fund is assumed to begin in the early 2010's, PME and direct alpha are at their lowest given high subsequent returns on public equities.

**PME vs Direct Alpha for hypothetical fund by fund inception year,** Direct Alpha vs S&P 500, %

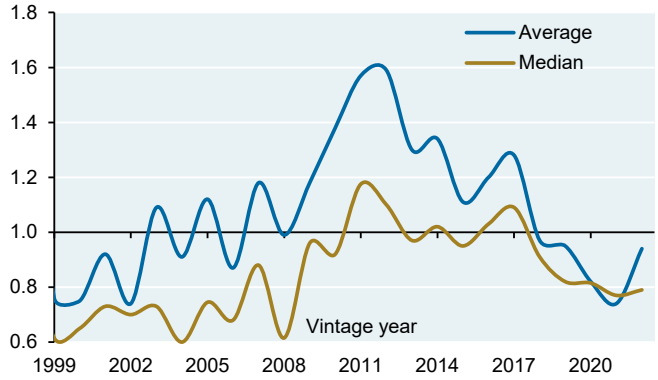



Source: JPMAM, 2025

Hypothetical fund: LP commitments of $25 mm in periods 1, 5, 9, 13 and 17; LP distributions of $40 mm in periods 21, 25, 29, 33, 37 and 41

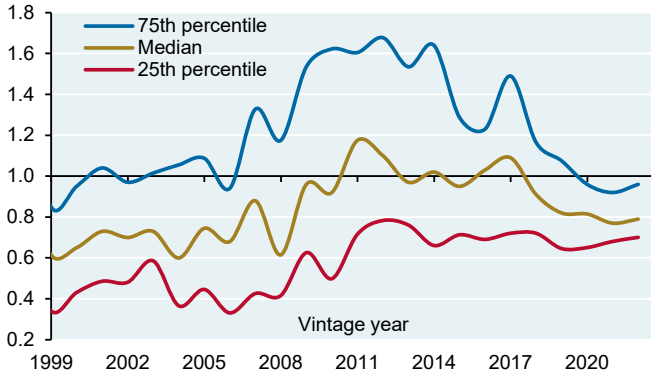
**For venture, the picture is not as positive for investors.** Limited partners needed to consistently invest with top quartile managers to outperform the S&P 500; unlike the buyout space, the median manager has at best matched the public equity markets. The large gap between the average and median manager is a clue that a select group of venture funds did very well with the rest trailing. Fourth quartile venture managers have been a money pit, destroying substantial value relative to the equity market every year since the late 1990's.

**US venture capital performance**
Public Market Equivalent ratio vs S&P 500




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

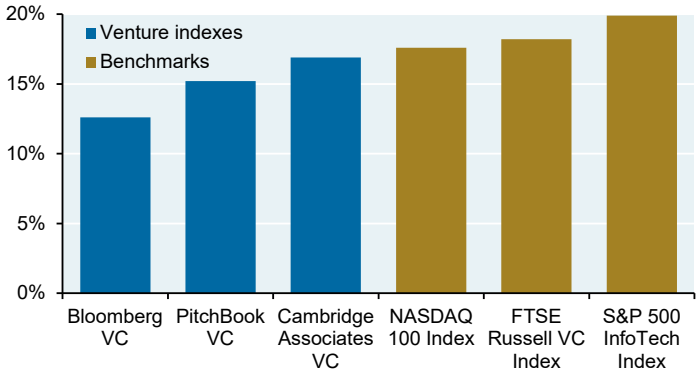
**US venture capital performance**
Public Market Equivalent ratio vs S&P 500




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

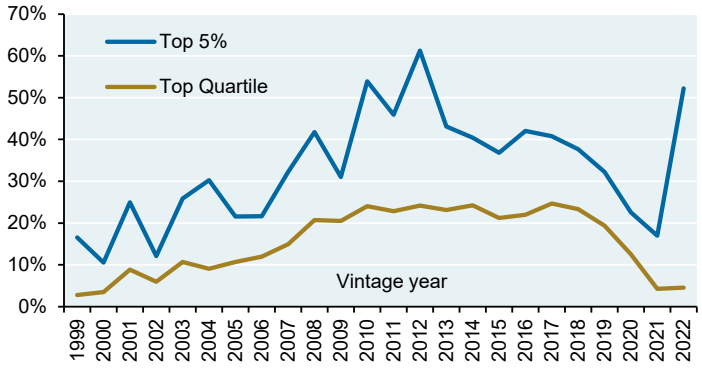
**These findings are similar to an analysis showing venture returns from self-reported databases trailing different public equity market benchmarks through 2023.** Part of the issue appears to be fees; the annualized NASDAQ 100 return since 1997 of 11.7% becomes 7.4% if a 2%/20% fee structure is applied to it. As shown in the second chart, top quartile venture performance is extremely skewed to the top 5% of managers.

**Ten year annualized return for venture capital & benchmarks through 2023,** Percent




Source: Atlas Capital Advisors, September 2023

**Top quartile vs Top 5% of venture funds**
IRR, percent

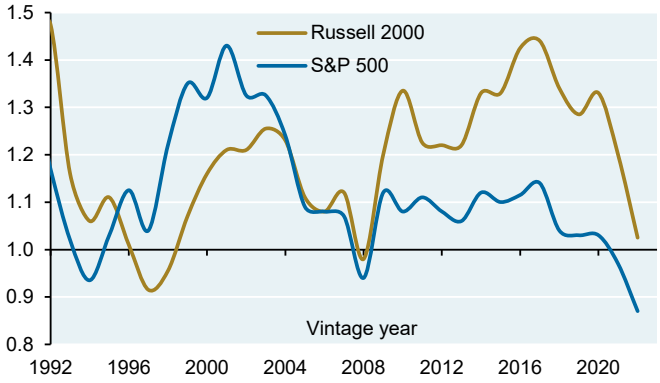



Source: Cambridge Associates, 2024

### Other performance benchmarks

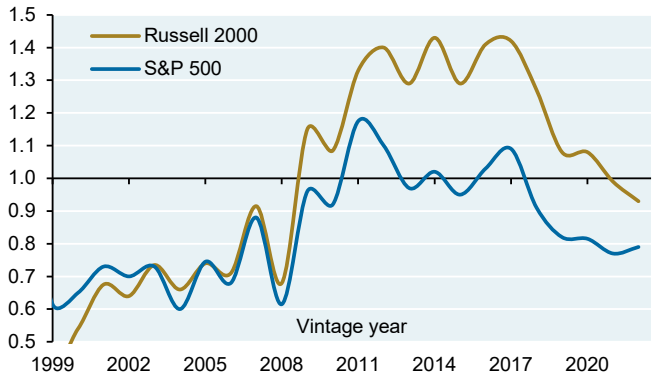
There's a lot of debate about proper benchmarking for buyout and venture funds given the wide gap between average US buyout enterprise value ($2-$4 billion[4]), average venture enterprise value ($35 million) and the enterprise value of the average and median S&P 500 company ($121 billion and $45 billion). The charts below show PME ratios using the Russell 2000 Index as well as the S&P 500 as a benchmark. Using the Russell 2000 boosts outperformance of median buyout and venture funds markedly since 2008.

**US buyout performance by benchmark**
Median Public Market Equivalent ratio




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

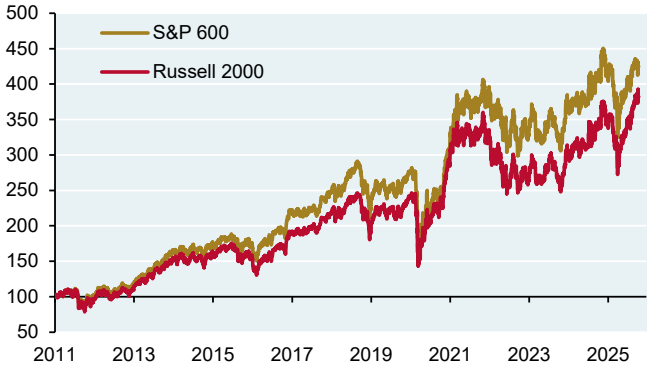
**US venture capital performance by benchmark**
Median Public Market Equivalent ratio




Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

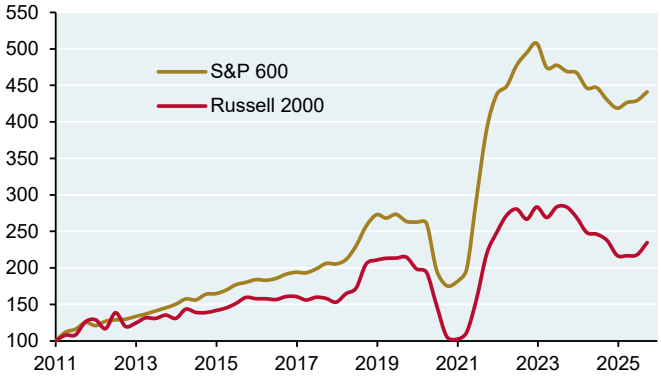
**On paper, the Russell 2000 is a better benchmark given its average and median enterprise value of $2.4 and $1.4 billion. Still, I would have preferred a different choice since the Russell 2000 is a poorly constructed index of unprofitable companies compared to the S&P 600 Index**. To be included in the S&P 600, a company's most recent earnings and trailing four quarters of earnings must be positive at time of inclusion, the stock must meet certain turnover criteria and the index is rebalanced quarterly. In contrast, the Russell 2000 includes small-cap stocks based solely on market cap (no earnings or turnover criteria) and is rebalanced annually. The results, from an analysis we did in 2024: **42% of Russell 2000 companies had negative net income while the same figure for the S&P 600 was only 23%**. Furthermore, Russell 2000 companies have generated much lower earnings growth than the S&P 600. Unfortunately, MSCI/Burgiss does not compute private equity performance vs the S&P 600 index, and the company did not accept our request to do so.

**Small cap performance by benchmark**
Total return index (100 = January 1, 2011)




Source: Bloomberg, JPMAM, October 19, 2025

**Small cap earnings growth by benchmark**
Index (100 = December 31, 2010)




Source: Bloomberg, JPMAM, Q3 2025

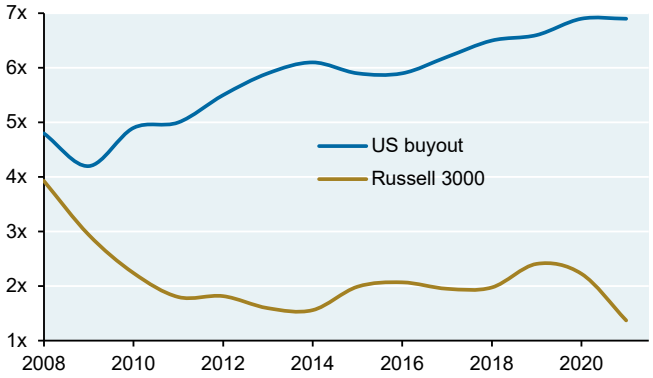
[4] US buyout enterprise values have increased according to Pitchbook, rising from ~$1 billion in 2007-2018 to $2-$4 billion in 2019-2023

**Other performance benchmark considerations: on the issues of leverage and GP marks**

Leveraged buyout funds use a lot of leverage, which is obvious from the name. As shown below, the net debt to EBITDA difference between the average US buyout and the average Russell 3000 company is very wide. Research paper #3 in Appendix III argues that private equity performance should be higher to compensate investors for this difference, possibly by leveraging the S&P 500 or Russell 2000 benchmark for comparison purposes.

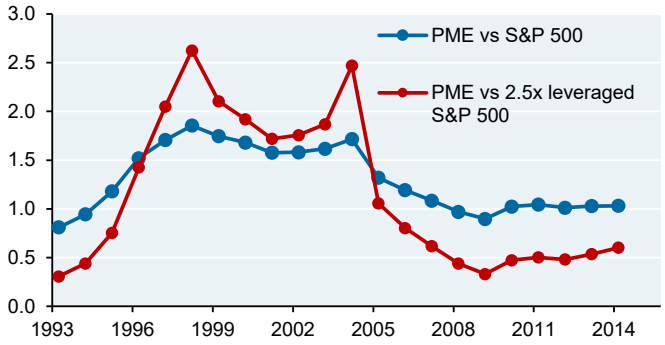
I don't think there's a right or wrong answer and have no objection to someone using a leveraged benchmark as long as you run the analysis through both up and down markets. I created a pro-forma sample private equity fund whose commitments and distributions result in an IRR of 12.7% and a 1.9x multiple on invested capital. Its excess return (PME) would be a function of equity market returns over its lifetime. The chart on the right shows the results of using different start dates for this pro-forma fund. Using a 2.5x leveraged S&P 500 benchmark *often* results in lower outperformance than the unleveraged S&P 500 benchmark, but not always. One final point: buyout leverage is typically deal-specific and not cross-defaulted against all assets; as a result, a buyout fund can only lose its equity, which entails less risk than leveraging an entire public market portfolio.

**US buyout vs comparable public equity debt ratios**
Net debt / EBITDA




Source: Lietz & Chvanov, Harvard Business School, Bloomberg, 2025

**Pro-forma excess returns on a sample private equity fund based on start year**
Public Market Equivalent ratio

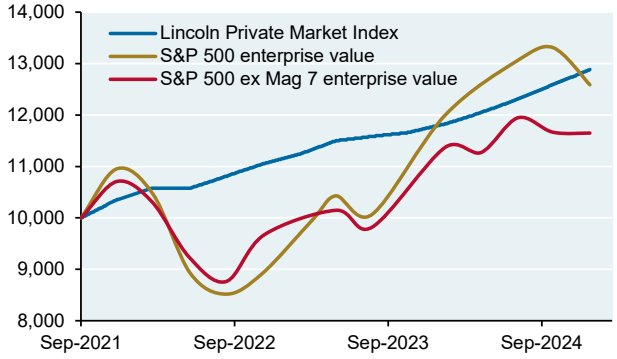



Source: JPMAM, 2025

**Are buyouts overleveraged?** A Federal Reserve analysis looked at optimal buyout leverage from a corporate finance perspective as discussed in research paper #4. The authors estimated theoretically optimal levels of debt for a buyout transaction and arrived at roughly the same amount of leverage that the LBO industry is currently using. The authors believe that higher buyout debt can be justified since (a) PE ownership lowers expected distress costs (since buyout firms often contribute capital in a downturn), (b) buyout companies exhibit lower sales volatility than comparable public companies and (c) the asset values of value buyout companies are less volatile than public equity counterparts.

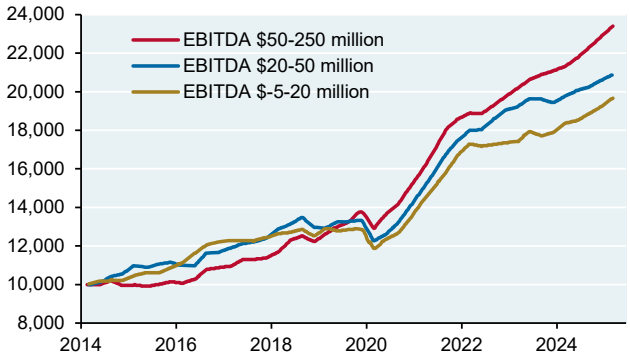
Another approach to measuring performance attempts to sidestep the issue of how GPs mark portfolios by estimating enterprise values for private equity companies and comparing them to the enterprise value of the public equity market. According to Lincoln International[5], larger private companies have outperformed mid-sized and smaller private companies since 2014. Regarding Lincoln's main LPMI Index, I consider the lack of variability in quarterly returns in the first chart to be a giant **red flag** for anyone who looks at risk-adjusted returns on private equity or venture. Below, we explain why.

**Lincoln Private Market Index vs public markets, 3Q21-1Q25**
Index (10,000 = Q3 2021)




Source: "Lincoln Private Market Index Report", Lincoln International, Q1 2025

**Lincoln Private Market Index by company size, 1Q14-1Q25**
Index (10,000 = Q1 2014)




Source: "Lincoln Private Market Index Report", Lincoln International, Q1 2025

**You will never find references in our Alternative Investments reviews to "risk adjusted returns" on buyout, venture, real estate or most other alternative investments**. Private equity valuations are often stale, resulting in a very high autocorrelation[6] of returns (i.e., you can statistically guess the next return by knowing the prior one), particularly when compared to public markets. Hedge fund manager Cliff Asness wrote in 2023 on what he refers to as "volatility laundering": private equity investing can be lucrative but should not be based in any way on their highly smoothed returns[7]. Similarly, a 2022 paper found that the true economic volatility of private equity is close to 30% rather than a headline number of 10%; that smoothing results in an almost 0% probability of a 30% drawdown vs a true probability of 15%–16% over a three-year period; and that the expected maximum drawdown is 12% under smoothing versus a true drawdown value of 40%[8].

**Autocorrelation rates by index, quarterly data, 2001 to 2025, using a one period lag**

| | | | |
|---|---|---|---|
| Buyout | 0.64 | S&P 500 | -0.01 |
| Secondaries | 0.60 | Russell 2000 | -0.08 |
| Venture capital | 0.76 | Russell 3000 | -0.02 |
| Private debt | 0.39 | REITs | 0.06 |
| Real estate | 0.70 | Leveraged loans | 0.13 |

Source: Preqin, JPMAM, 2025

[5] The Lincoln Private Market Index measures the enterprise fair value of 6,000 portfolio companies for over 200 sponsors with EBITDA less than $200 mm, excluding early-stage venture and non-operating companies. Lincoln uses quarterly financial reports from the portfolio companies to perform auditor-vetted valuations (comparable public company analyses and discounted cash flow analyses)

[6] From a statistical perspective, autocorrelation is the correlation of a time series with a delayed version of itself

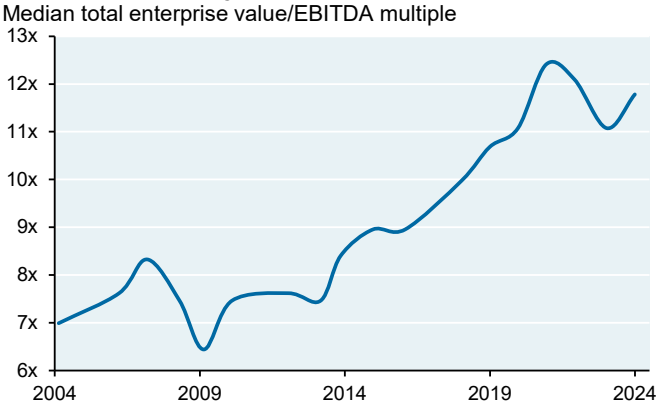
[7] "*Why does private equity get to play make-believe with prices*?", Cliff Asness, Institutional Investor, Jan 2023

[8] "*The value of smoothing*", Journal of Portfolio Management / Private Markets, Baz et al, 2022

## Dry powder, multiples and venture capital supply/demand ratios

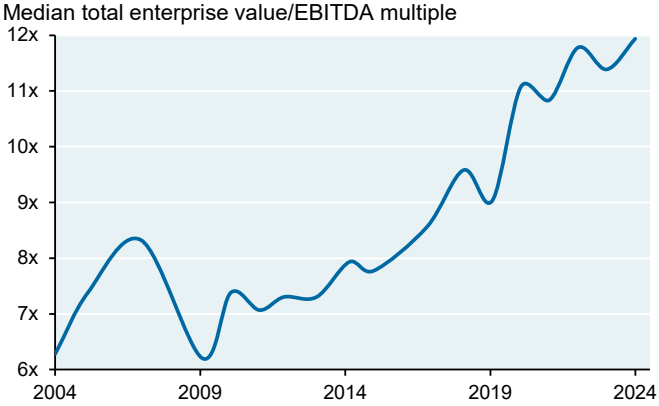
Buyout multiples are still high; I don't expect them to decline much given all the dry powder still to be invested, although this is measured below in dollar terms and not relative to the opportunity set (i.e., market cap of mid cap companies, for example). Venture capital dry powder is still high as well in dollar terms, which has contributed to a decline in the VC demand/supply ratio since our 2023 paper.

**North American buyout multiples**
Median total enterprise value/EBITDA multiple



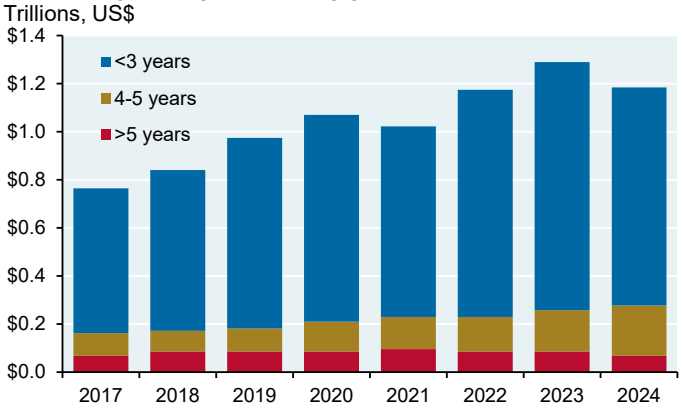

Source: "Global Private Equity Report 2025", Bain, September 30, 2024

**Western Europe buyout multiples**
Median total enterprise value/EBITDA multiple



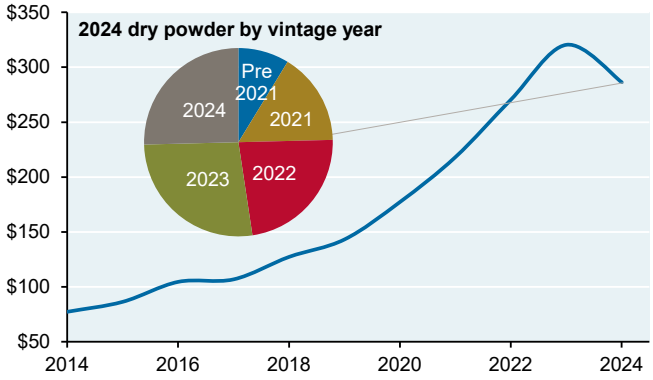

Source: "Global Private Equity Report 2025", Bain, September 30, 2024

**Global buyout dry powder by years since capital raised**
Trillions, US$



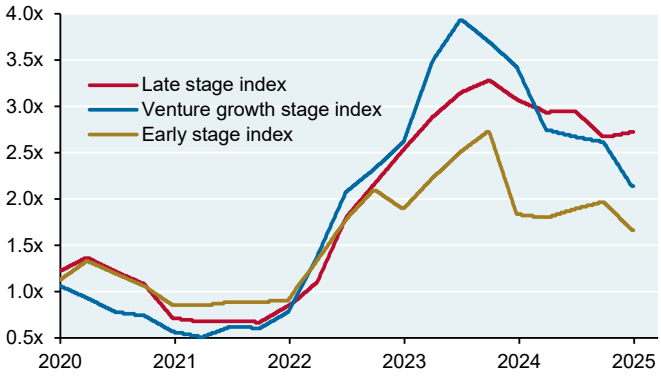

Source: "Global Private Equity Report 2025", Bain, 2024

**US venture capital dry powder**
US$, billions




Source: Pitchbook, September 2024

**US venture capital demand to supply ratio**
Ratio




Source: Pitchbook NVCA Venture Monitor, Q1 2025

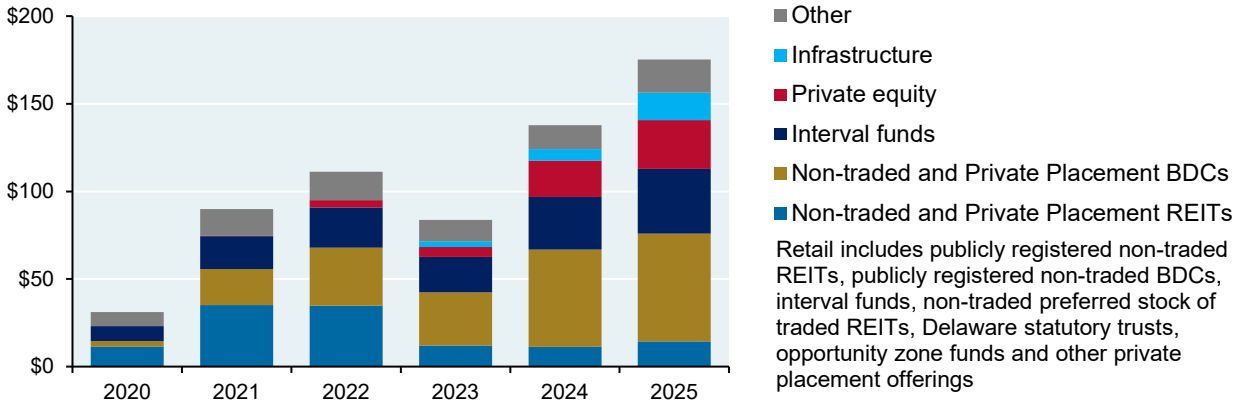
**The "democratization" of alternative assets, retail investors and litigation risks**

Trump Administration Executive Order 14330 stated that "every American preparing for retirement should have access to funds that include investments in alternative assets"[9]. The order directed the Secretary of Labor and the SEC to reexamine regulations to ensure that Americans have the right to participate in the growth and diversification opportunities provided by private assets.

*Background*: firms selling securities to the public must register with the SEC, provide extensive disclosures and comply with governance rules. Firms raising capital privately from eligible investors are exempt from most rules, subject only to anti-fraud provisions. The logic: sophisticated investors bargain on their own (although most sign standard contracts with little ability to alter them). The Fifth Circuit Court of Appeals and Supreme Court have reinforced this approach by (a) blocking SEC attempts to require better private fund disclosure of compensation, sales practices and conflicts of interest and (b) striking down SEC use of administrative law judges[10].

Even before Trump's Executive Order has any impact on 401(k) plan asset allocation choices, alternative asset fundraising through retail channels hit $137 bn in 2024 and was running at a $175 bn annual pace in 2025; alternatives now comprise ~20% of millennial portfolios; and 48% of US investors are interested in alternatives. Since Accredited Investor thresholds aren't indexed to inflation, the share of qualifying households rose from 1.8% in 1983 to 22% in 2022 and is on track to hit 30% by 2030.

**Retail fundraising for alternative investments by year**
US$, billions




Source: Robert A Stanger & Co, Alts Wire, JPMAM, 2025. Note: 2025 figures are annualized

A forthcoming paper examines possible litigation risks given differences in governance, exit rights, disclosure rules and fiduciary duties in private assets compared to public markets[11]. **The authors argue that if existing securities regulations don't constrain the industry and enforce market discipline, private litigation will.** The paper cites the following sources of potential dispute between fund general partners and retail investors:

> *Expenses*. In regulated retail products like mutual funds, there are strict rules on expense ratios, disclosure of inducements and performance reporting net of all fees. Alternative asset products sold to ordinary retail investors are registered/regulated under the 1940 Act and subject to the same protections and requirements. But alternative asset vehicles sold to more sophisticated retail investors (i.e., Accredited Investors) may not be required to show all fund-level and portfolio-level expenses, to present investors with a consolidated view of total charges or to define what constitutes appropriate market rates in related-party transactions. The sections of limited partnership agreements devoted to expenses have grown from a few lines to several pages, some filled with vague/ambiguous categories leaving wide latitude for interpretation

[9] "*Democratizing access to alternative assets for 401(k) investors*", Executive Order 14330, August 2025

[10] The SEC had used administrative law judges for decades until the Supreme Court's *Jarkesy* decision in 2024 effectively eliminated them, requiring Seventh Amendment jury trials instead

[11] "*Private Equity, Public Capital and Litigation Risk*", Ludovic Phalippou (Oxford) and William Magnuson (Texas A&M), November 2025 (forthcoming)

*Net asset values*. Many alternative asset funds have boilerplate provisions requiring that investors accept reported NAVs and refrain from challenging them. But NAVs often affect the way fees are computed and the way performance is reported, which may collide with other regulations

*Elimination of fiduciary duties*. Private equity documents may (a) limit the fiduciary duties that managers owe to investors, (b) modify standards of conduct for managers and (c) restrict investor rights to sue for violations while providing for indemnification of officers/managers

The authors also cite IRR as a source of litigation risk but I found this unconvincing. First, lack of investor knowledge of finance is not a basis for litigation. Second, as long as IRR is not described as being the same as a compound annual return, the authors' exaggerated hypotheticals are irrelevant. Third, IRR is essentially the same concept as yield to maturity as applied to high yield and distressed debt; it is the rate at which the present value of the cash flows less the upfront investment is equal to zero. Unless courts invalidate the concept of present value, I see no basis for litigation unless firms describe IRRs as being something they are not.

**The paper then cites the following bases for potential litigation**:

- Doctrines drawn from contracts, torts and consumer protection have relevance to the private equity model and could be used to challenge customary fee, NAV and fiduciary practices
- While institutional investors have incentives not to litigate when things go wrong[12], the same incentives do not apply to retail investors. The authors of the study cited below found only six lawsuits in the 40 years (!!) from 1984 to 2024 filed by institutional private equity investors against private equity firms
- Private litigation has a unique ability to make opaque practices visible through court filings, expansive discovery procedures, expert testimony and publication of judicial opinions.[13]
- It's unclear if private equity firms can impose arbitration and waiver of class action provisions on retail investors. When Carlyle attempted this in its 2021 IPO, it removed the clause after SEC consultations [Note: most private asset documents we see require disputes to be settled in court and not via arbitration]
- While SEC anti-fraud rule 10b-5 is typically been enforced against public companies, there's no reason it could not be enforced against private ones. Also: the rule is non-waivable, and contains "private rights of action" (investors can bring claims themselves without waiting for regulators to do so)
- Legal firewalls may protect private asset fund managers from class action suits. The Securities Litigation Uniform Standards Act pre-empts private state-law and mass action claims alleging manipulation, deception or misrepresentations in connection with purchase or sale of covered securities

***Counterarguments***. Lawyers that structure retail alternative asset documents object to several premises of the Magnuson/Phalippou piece. They emphasize that alternative asset products are usually sold via professional intermediaries with fiduciary duty to clients, and who negotiate selling agreements and build in protections for investors. They believe that challenges to fee structures face very high hurdles and are rarely successful in the presence of binding arms-length contracts between sophisticated parties. They also believe that legal remedies granting relief from waivers permitted by law are quite rare. They argue that litigation would be self-defeating since most funds indemnify managers; in other words, any litigation proceeds would be paid by the fund rather than the manager, so LPs would be collecting mostly from themselves. And as the paper acknowledges, individual actions are generally not profitable for plaintiff lawyers, so they must find claims to bring as class actions…which in turn will require identifying lead plaintiffs willing to sue, but which may run into Securities Litigation Uniform Standards Act (SLUSA) clauses which preempt state law class action suits.

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[12] "*Opting Out of Court? Reputation and Informal Norms in Private Equity*", Vanderbilt Law Review, 2025

[13] Case Study: an individual investor at the Gates Foundation suspected that Abraaj, the largest Middle East private equity group, was inflating valuations. The investor conducted his own forensic study which led to lawsuits and the Abraaj bankruptcy in 2018. One key point: none of the Abraaj institutional LPs acted despite having the same information and despite warnings they received regarding the firm's behavior

**What about risks to financial intermediaries from litigation based on securities sold to retail investors?** As shown below, the track record of retail litigants has usually been favorable: FINRA arbitration has resulted in 50%-70% claimant settlement/award rates. **However: such litigation applies to actions taken by the broker-dealer and not actions taken by the alternative asset manager**.

Examples might include issues related to liquidity. Many funds have provisions that allow suspension or limitation of redemptions under certain conditions, i.e. during market disruptions or a surge in redemption requests. If the fund acts within the explicit terms of the documents and disclosed these possibilities to investors, a lawsuit against the alternative asset manager is unlikely to be successful. But what if these risks were not explained and disclosed clearly in materials the intermediary used with its retail clients? That could be a basis for litigation. Another example: some alternative asset managers impose early repurchase deductions on investors who sell their interests within two years of initial purchase, while others have the ability to force investors to sell shares back to the company should the board determine it to be in the interests of the company. It would not be difficult to imagine cases where financial intermediaries did not sufficiently explain these risks adequately to their retail clients; **but again, this would primarily be an issue between retail investors and financial intermediaries rather than resulting in litigation against the underlying alternative asset managers**.

| **Arbitration results by type, 1992-2006 based on 6,803 FINRA arbitrations** | Claimant victory rate | Punitive award rate |
|---|---|---|
| Suitability, NYSE Rule 405, NASD Rule 2310 | 49% | 10% |
| Churning, excessive trading, excessive commissions | 57% | 11% |
| Unauthorized trades/transactions | 58% | 12% |
| Failure to execute/monitor | 50% | 5% |
| Misrepresentation, Rule 10b-5, fraud, deceptive sales practices, failure to disclose | 51% | 11% |
| Theft, conversion and self-dealing | 58% | 18% |
| **Total** | **49%** | **9%** |

Source: Choi (NYU) and Eisenberg (Cornell), 2010

| **FINRA arbitration, 2012-2016** | Frequency |
|---|---|
| Settlement | 69% |
| Award with punitive damages | 7% |
| Award without punitive damages | 11% |
| Withdrawn | 9% |
| Closed by other means | 4% |

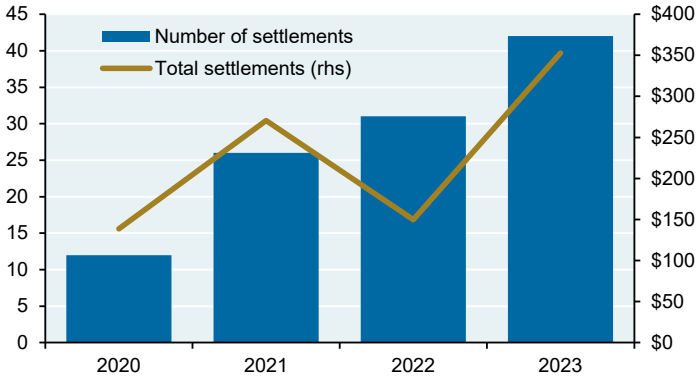
Source: FINRA

**I also wonder about speed of investment.** This is not a litigation risk per se, but the influx of retail money in vehicles that require rapid deployment may collide with private markets that have more than $4.2 trillion of dry powder in drawdown vehicles waiting to be invested. While drawdown funds have up to five years to invest, retail vehicles such as evergreen funds need to deploy capital quickly to prevent cash drags on performance.

### Wrapping up

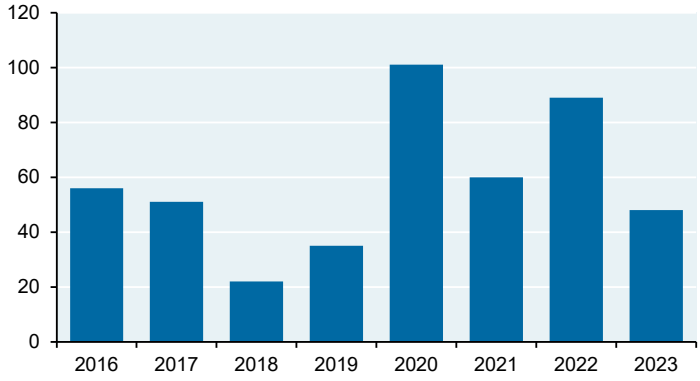
If something goes wrong with democratization of alternative assets, there are examples of prior litigation waves. Examples include the ongoing cycle of 401k litigation linked to excessive fees[14] and performance issues, the wave of litigation that followed the 2008 collapse of the Auction Rate Security Market[15], litigation related to structured notes and litigation following the SPAC boom-and-bust[16]. Democratization of alternatives may be accretive to retail portfolios in the long run but if a sharp recession and liquidity crunch coincide, documentation firewalls designed to legally shield alternative asset fund managers will likely be tested.

**401k excessive fee litigation settlements**



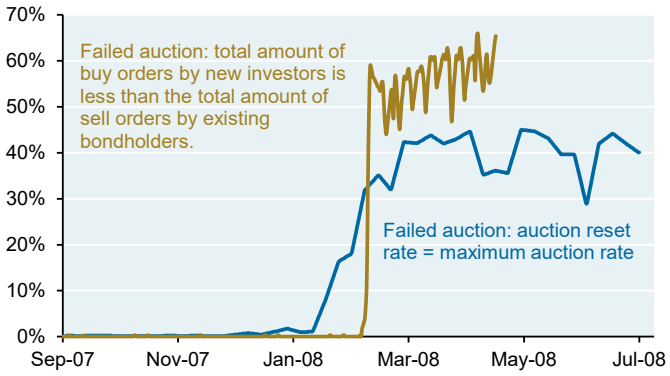

Source: Encore Fiduciary, 2024

**401k excessive fee and performance lawsuits by year**



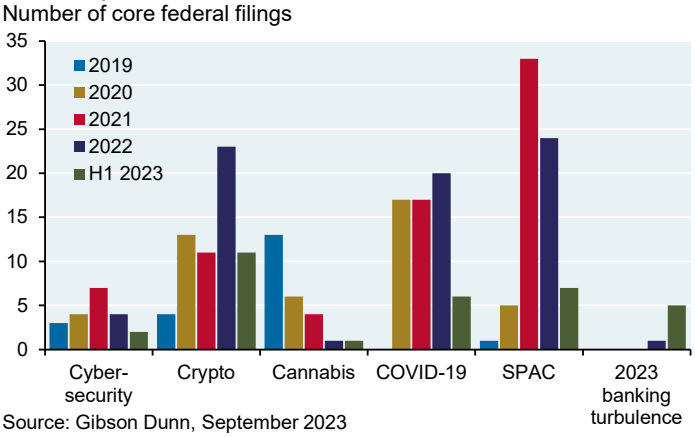

Source: Encore Fiduciary, 2024

**Percentage of failed auction rate security auctions in 2008**




Source: Journal of Financial Economics, Federal Reserve Board, 2010

**Summary of trend cases**




Source: Gibson Dunn, September 2023

[14] Alternatives and 401k plan fees may be an area ripe for litigation against plan sponsors. Prior 401k litigation claims include instances of plan sponsors not ensuring the cheapest share classes for a given investment, a concentration of higher-fee funds that underperform passive alternatives and other fiduciary breaches

[15] The majority of auction rate security lawsuits were ultimately resolved by agreed settlements which involved the repurchase of securities by banks and by payment of fines. In 2008 alone, the SEC received over 1,000 complaints. By 2009, large financial institutions settled with the agency, making roughly $50 billion available to pay auction rate security investors who claimed that these firms mislead them about how these securities worked and what risks they bore (SEC Division of Enforcement)

[16] Roughly two-thirds of all SPAC class action suits filed in 2021 and 2022 named directors and officers of the SPAC entity as defendants in the lawsuit (Woodruff Sawyer)

## Hedge fund returns and the art/science of performance measurement

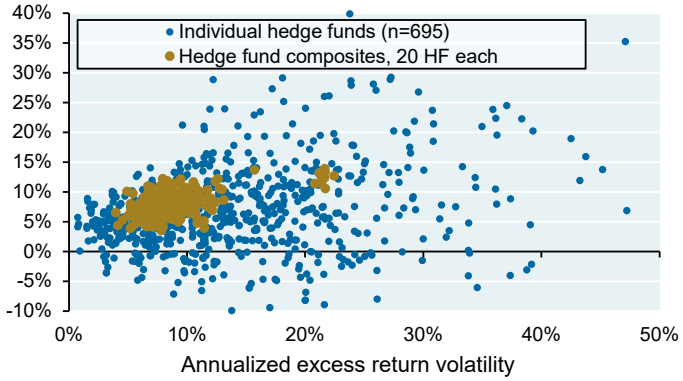
One of the most subjective things in finance is the evaluation of hedge fund performance. A few years ago there was press coverage of a large state defined benefit plan terminating its hedge fund platform due to perceived underperformance. When we looked at the details, the constraints the plan put on its hedge fund managers resulted in volatility that was much closer to cash/bonds than equities. As a result, they should have used a performance benchmark that reflected that (and I'm not sure that they did).

In any case, I wanted to get a sense for how hedge funds performed over the last five years from the perspective of an investor building a diversified portfolio (as opposed to a plan exclusively investing in hedge fund of fund or multi-strategy portfolios)[17].

**Step #1**: obtain performance for US-based hedge funds (relative value, equity hedge, event driven and macro) that report on a monthly basis to HFR and which have five years of performance[18]. The blue dots in the first chart show each hedge fund's five-year annualized excess return over T-bills vs the volatility of its excess return.

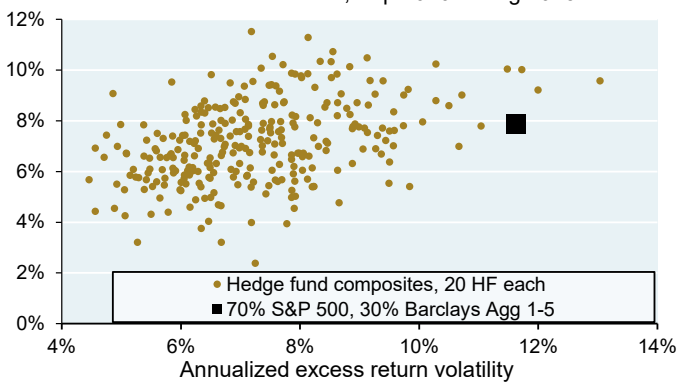
**Step #2**: create randomized portfolios of 20 hedge funds. We force diversification by requiring each randomized portfolio to have 6 long-short funds, 4 event driven funds, 4 macro funds and 6 relative value funds. The gold dots in the first chart show the excess return and volatility of these randomly constructed portfolios. You can see how diversification benefits collapse the gold cluster relative to the blue one; the average correlation of the hedge funds in the analysis was 0.25 over the five year horizon.

**Individual hedge funds and 20-fund composites [HFR]**
Annualized excess return vs T-bills, Sep 2020 to Aug 2025




Source: JPMAM, HFR, August 2025

**20-fund composites vs 70/30 benchmark [HFR]**
Annualized excess return vs T-bills, Sep 2020 to Aug 2025




Source: JPMAM, HFR, August 2025

**How did these randomized hedge fund portfolios perform?** If you were only focused on absolute return, you'd be disappointed: as shown on the right, only a third of the portfolios outperformed a 70-30 combination of the S&P 500 and the Barclays US Agg 1-5 [the black square], which is a commonly used hedge fund benchmark. But the volatility of this 70-30 portfolio was almost 12%, which was higher than practically all randomized hedge fund composites; as a result, I'm not sure how good of a benchmark 70-30 is.

[17] This information is most relevant for diversified institutional investors that are not subject to taxation. After-tax analysis of hedge fund performance is complicated given the need to distinguish between different kinds of gains and income, and the need to incorporate tax loss carryforwards and carrybacks on a fund-specific basis

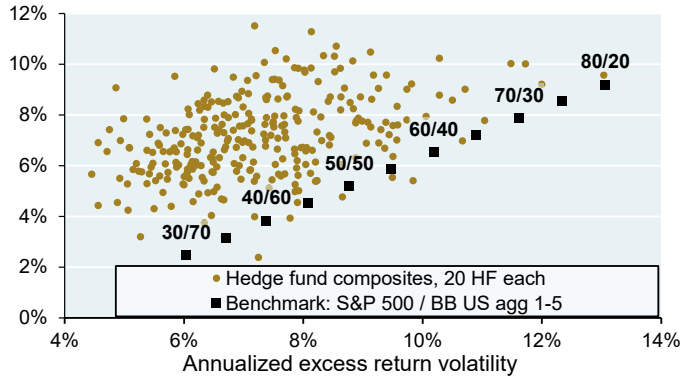
[18] The hedge fund inclusion waterfall: start with database of all funds; eliminate funds that are not US domiciled; eliminate funds due to structure (not limited partnerships or limited liability companies); eliminate funds that are not one of our four core strategy types; and eliminate funds that were launched after our start date; and eliminate funds that report quarterly or annually since we cannot compute comparable monthly volatility

**Step 3: Using a calibrated risk-adjusted benchmark.** Instead of pre-selecting a benchmark mix for each portfolio, let's do the opposite: wait until the returns and volatilities are known and measure each fund against a stock-bond mix with the same volatility. The black squares show different weighted combinations of the S&P 500 and Barclays US Aggregate 1-5 Index. Over the last five years, the vast majority (98%) of randomized hedge fund portfolios outperformed interpolated risk-adjusted benchmarks. When we repeat the analysis using 10-fund randomized portfolios, the outperformance rate is still 91%.

**The critical aspect of this analysis: you must (a) care about risk adjusted returns more than absolute returns, and (b) be willing to use an ex-post benchmark rather than an ex-ante benchmark to evaluate performance**.

**20-fund composites vs benchmarks [HFR]**

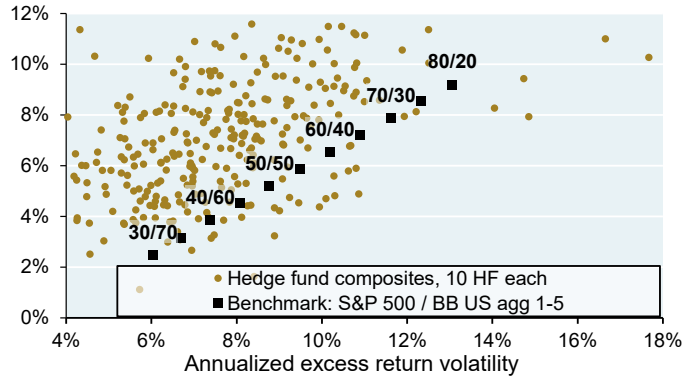
Annualized excess return vs T-bills, Sep 2020 to Aug 2025




Source: JPMAM, HFR, August 2025

**10-fund composites vs benchmarks [HFR]**

Annualized excess return vs T-bills, Sep 2020 to Aug 2025

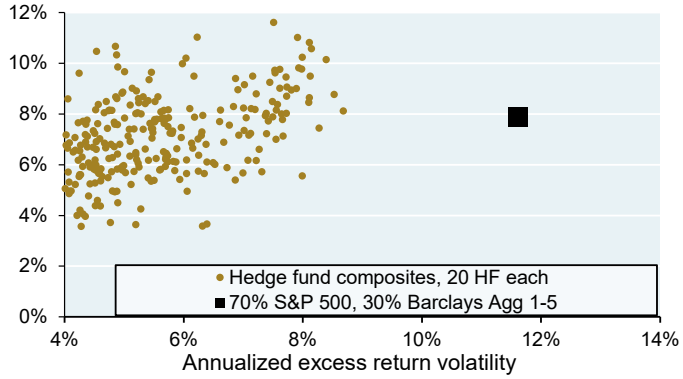



Source: JPMAM, HFR, August 2025

These results did not appear to be a function of HFR data; when we repeated the exercise using the Pivotal Path hedge fund universe, we obtained similar results: using a fixed 70/30 benchmark, only 30% of funds outperform. But when shifting to a risk-adjusted lens, practically all hedge fund composites outperformed since correlation benefits are so high in terms of their impact on volatility.

**20-fund composites vs 70/30 benchmark [PivPath]**

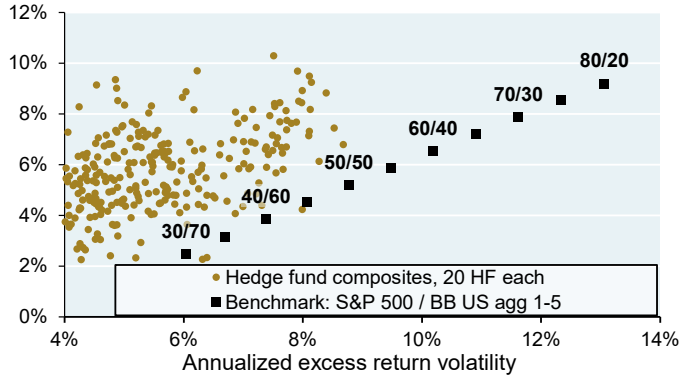
Annualized excess return vs T-bills, Sep 2020 to Aug 2025




Source: JPMAM, Pivotal path, August 2025

**20-fund composites vs benchmarks [PivPath]**

Annualized excess return vs T-bills, Sep 2020 to Aug 2025



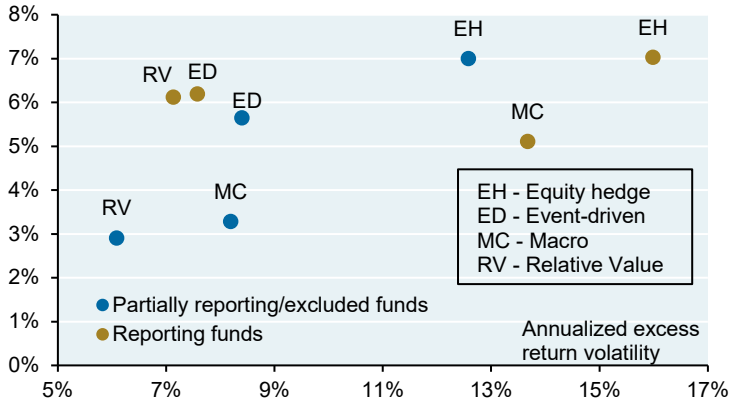

Source: JPMAM, Pivotal path, August 2025

**Data issues and selective reporting: the issue of survivorship bias in hedge fund databases.** One of the great things about the MSCI/Burgiss database of buyout and venture returns: the data is sourced from LPs and their custodians whether GPs approve of this or not. As a result, we have a complete picture of performance without having to care whether buyout or venture GPs report performance to data aggregators like Cambridge, Venture Economics, Preqin, Pitchbook etc. Unfortunately**, the same LP-sourced data ecosystem does not exist for hedge funds**, which is a problem since some hedge funds either don't report to any of the established databases, or stop reporting for some reason, possibly the result of a decline in performance.

**Measuring hedge fund survivorship bias.** Some well-known studies estimated hedge fund survivorship bias to be 1.32% - 2.80% when measured over ten and fifteen year periods[19]. Our analysis period is only five years, so presumably the degree of survivorship bias would be lower. If we use the high end of the estimated survivorship bias range (2.80% SB), the HFR 20-fund outperformance rate falls from 98% to 69%, while using the lower end of the range (1.32% SB) results in an HFR outperformance rate of 91%. The survivorship bias studies we found were based on performance data through 2010, which is a bit stale. Some of my hedge fund colleagues believe that updated studies would find less of a performance drag, but I found no evidence to substantiate this.

**Another survivorship bias exercise:** what does performance look like for partially reporting funds? The chart below shows average performance for Pivotal Path funds by strategy that we didn't include due to insufficient reporting (gold dots) compared to fully reporting funds we did include (blue dots). Were there signs that hedge funds struggled even before they stopped reporting? We only found material differences in the risk-return tradeoff for relative value funds. For the other types, there was either no performance gap or the performance gap was accompanied by commensurately lower volatility.

**Performance based on hedge fund data quality**
Annualized excess returns over T-bills




Source: Pivotal Path, JPMAM, 2025

[19] See Ibbotson and Chen, 1995-2006; Xu, Liu and Loviscek, 1994-2009; Kaiser and Haberfelner, 2002-2010

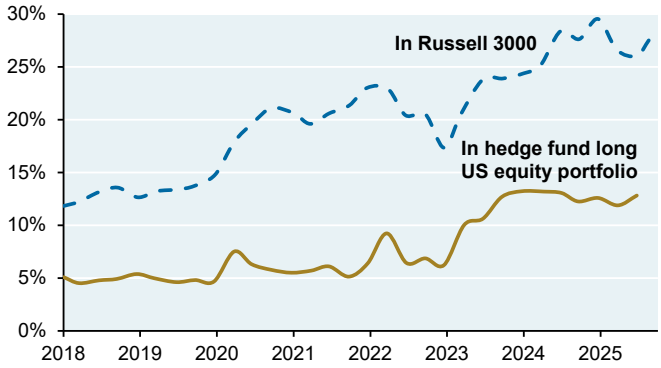
**Observations on hedge fund portfolios from prime brokers and independent analysts**

The large prime brokers publish aggregated information sourced from the hedge funds they transact with. As a result, every prime broker has a different view of what hedge funds are doing in portfolios. The charts below represent the vantage point of one of the larger prime brokers (Goldman):

- Hedge funds remain underweight Mag 7 stocks relative to the Russell 3000 Index by roughly the same amount as in December 2023, although both weights have gone up for obvious reasons
- The average fund holds 70% of its long portfolio in its top 10 positions, close to the highest concentration on record. Similarly, hedge fund crowding in a small number of positions is also at elevated levels

Another warning sign is shown in the fourth chart: fundamental (long-short) hedge funds have shifted portfolios to stocks in the highest quintile of beta, which are generally AI-related stocks.

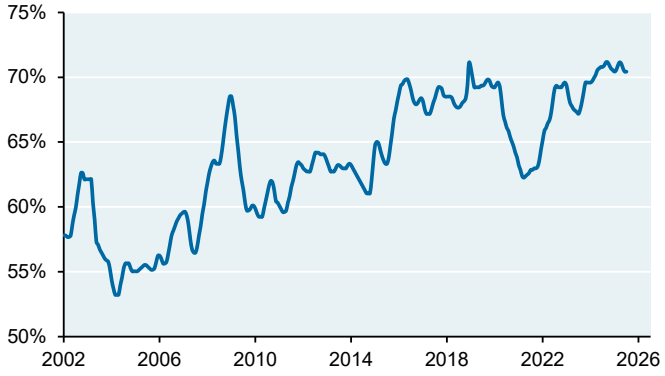
**Weight of Magnificent 7 stocks (AAPL, AMZN, GOOGL, META, MSFT, NVDA, TSLA),** Percent of portfolio




Source: GS Global Investment Research, Q2 2025

**Hedge fund portfolio density**

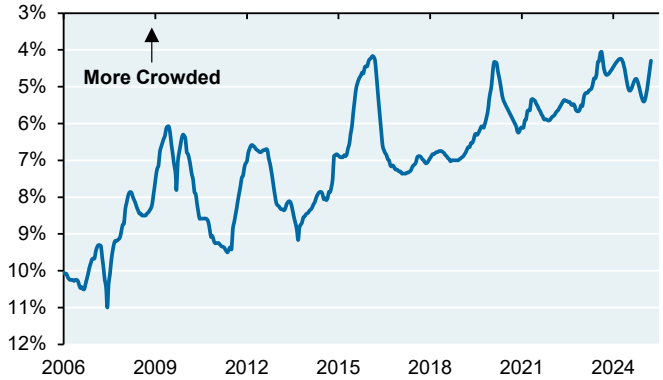
Weight of top 10 positions in median hedge fund long portfolio




Source: GS Global Investment Research, Q2 2025

**Hedge fund crowding index**

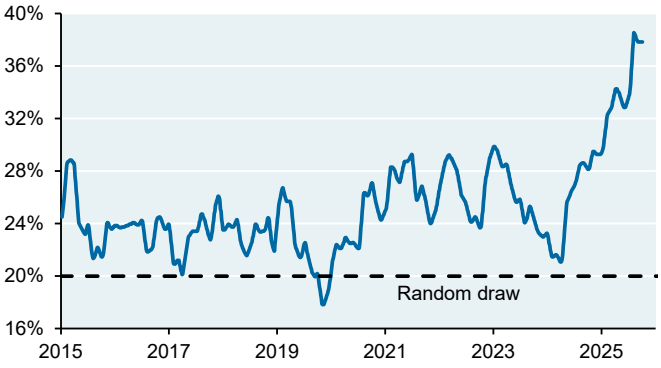
Percent, effective N as % of distinct equity holdings




Source: GS Global Investment Research, Q2 2025

**Share of hedge fund stock holdings in top quintile of beta**

Percent

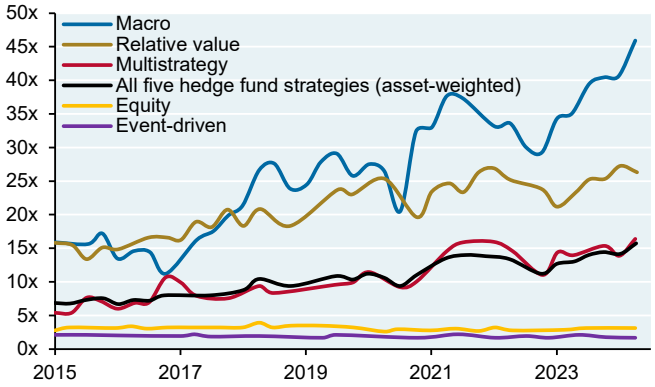



Source: Empirical Research, November 5, 2025

### What about hedge fund leverage?

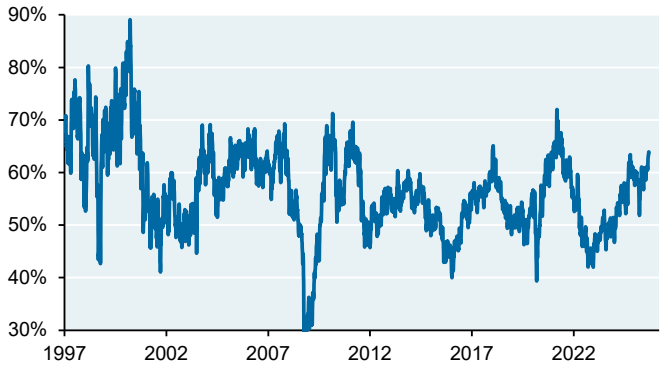
Standard approaches to measuring hedge fund leverage include the ratio of long and short positions divided by net asset value, and net leverage divided by net asset value. As seen in the next two charts, these approaches show hedge fund leverage at the high end of the range over the last decade. A third approach looks at the NYSE margin account net debit balance divided by S&P 500 market cap; but this is very inexact since hedge funds access leverage in different ways, including futures or via prime finance/repos.

**Hedge fund leverage: gross notional exposure to NAV**
Ratio




Source: "Global financial stability report", IMF, April 2025

**Equity long short net leverage as % of NAV**
Percent, 5 day average



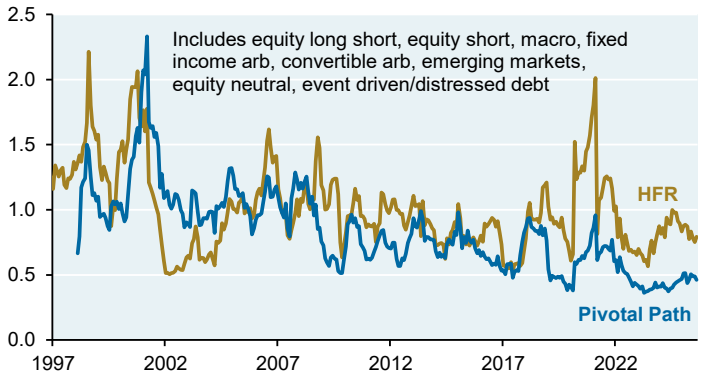

Source: JP Morgan Positioning Intelligence, Bloomberg, September 29, 2025

However, not all hedge fund gross exposures are the same with respect to risk. Nikolaos Panigirtzoglou and his team who write the JP Morgan Flows & Liquidity Report have adopted an interesting approach to **estimate the implicit leverage and risk of hedge fund positions**: they divide the return volatility for each major hedge fund style by the volatility of primary asset classes that each style invests in (i.e., a completely unleveraged portfolio would have an imputed leverage of 1.0). Using this approach, hedge fund leverage is comparable to prior periods and not unusually high[20].

**NYSE margin account net debit balance**
Margin debit balance net of credit balance, % of S&P 500 market cap


Source: FINRA, NYSE, JPM Flows & Liquidity, September 2025

**Imputed hedge fund leverage**
Leverage multiple




Source: HFR, Pivotal Path, JPM Flows & Liquidity, August 2025

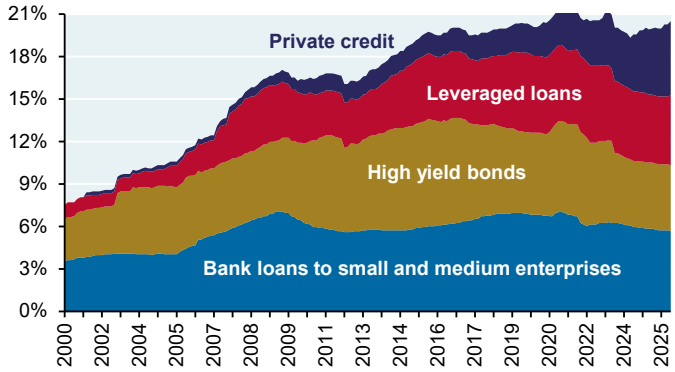
In Appendix III, we review two academic papers on hedge funds. One focuses on how social media platforms respond to hedge fund disclosures of short positions, while the other focuses on how some hedge fund managers react to underperformance by increasing portfolio risk.

[20] JP Morgan Flows & Liquidity Report, Nikolaos Panigirtzoglou, July 25, 2025

**Private credit: a decade of strong returns and only limited distress, but the next recession is going to separate the good and bad underwriters, resulting in greater performance dispersion**

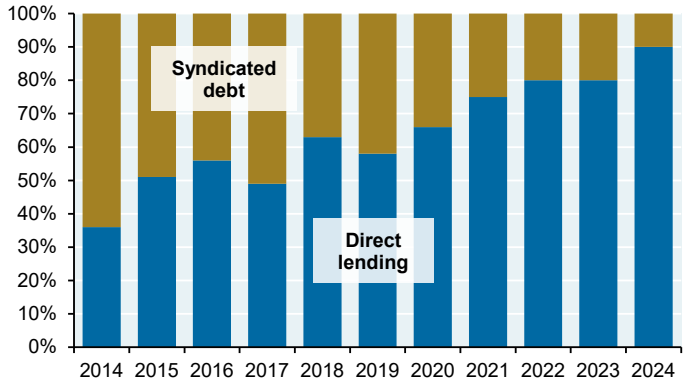
Private credit markets have exploded, rising from $250 billion in 2007 to $2.5 trillion globally when including direct lending, mezzanine lending, special situations, distressed debt, BDCs and loans to venture, infrastructure and real estate.[21] **To be clear, there has not been an explosion in US risky credit overall; as shown in the first chart, private credit has taken share from other risky credit types**; and as per the second chart, direct lending now accounts for 90% of middle market buyout financing, having squeezed out syndicated bank loans. One reason for this shift: as discussed in research paper #5 and as illustrated below, the average US bank has a large risk-based capital incentive to lend to BDCs rather than to the middle market companies that BDCs lend to (46% RoE for US bank loans to a BDC compared to 18% RoE for bank loans to middle market companies).

**US risky credit market shares**
Amount outstanding as a percent of US GDP




Source: Bridgewater, October 23, 2025

**US middle-market leveraged buyout loan issuance**
Percent



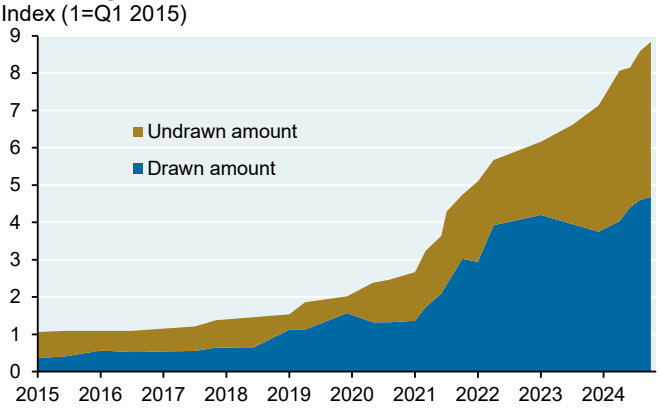

Source: "Global Private Equity Report 2025", Bain, 2024

**The RoE on bank lending to small companies**

| | Bank loan to middle market company | Bank loan to BDC |
|---|---|---|
| SOFR overnight rate | 5.30% | 5.30% |
| Spread | 6.25% | 2.00% |
| **Assumed default rate** | **4.00%** | **0.25%** |
| **Assumed recovery rate** | **60%** | **95%** |
| Expected loss | 1.60% | 0.01% |
| Spread on debt funding | 0.55% | 0.55% |
| Tax rate | 25% | 25% |
| **Operating expenses** | **2.00%** | **0.10%** |
| **Risk weight** | **100%** | **20%** |
| Capital (% of assets) | 12.00% | 2.40% |
| **Return on equity** | **18%** | **46%** |

Source: Chernenko et al, JPMAM, 2024

**Revolving-credit liabilties of BDCs**
Index (1=Q1 2015)



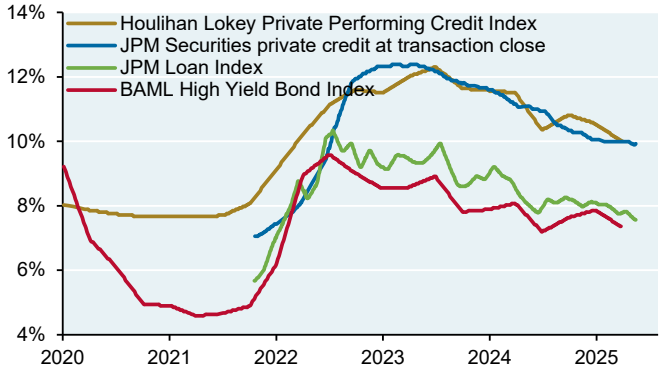

Source: "Global financial stability report", IMF, April 2025

**It's also worth noting that in the BDC market, undrawn revolving amounts are just as large as the drawn amounts.** This raises questions around the circumstances under which undrawn amounts might be tapped, and what the creditworthiness of borrowers would be when/if it happens. According to a May 2025 analysis from the Federal Reserve, US banks are sufficiently liquid and capitalized enough to absorb this drawdown risk from BDCs and other private debt funds. From a systemic risk perspective, some research finds comfort in the fact that the average BDC stressed capital ratio is 30% compared to 10% for the average US bank (research paper #5).

[21] Source for $2.5 trillion global private credit figure: Preqin. The size of private credit markets can vary based on the source used. Private credit exists in stand-alone commingled funds, in publicly traded and non-traded BDCs and in CLOs. In its April 2024 Financial Stability Report, the IMF cited $1.2 trillion in closed-end private credit funds, $300 billion in BDCs and $100 bn in middle market CLOs in the US. In May 2025, the Fed reported AUM for US BDCs and other private credit funds rising from $250-$300 bn in 2010 to $1.4 trillion in 2024

**The rationale behind private credit is straightforward**: earn a spread over broadly syndicated leveraged loans in exchange for a more concentrated portfolio. In the case of CLOs, private credit portfolios are riskier as well, at least as defined by credit ratings: while 30% of BSLs are rated B- or below, the same figure for loans to small and medium sized enterprises is 85%+. While Moody's estimates similar recovery values for leveraged loans and private credit in event of default, this may not hold true in many cases. For example: the IMF estimated in 2025 that ~40% of companies borrowing from direct lenders had negative free operating cash flow (net of capex)[22].

**Private credit, broadly syndicated loan & high yield bond yields,** Yield to maturity




Source: Houlihan Lokey, JPM Global Markets Strategy, JPMAM, Oct 2025

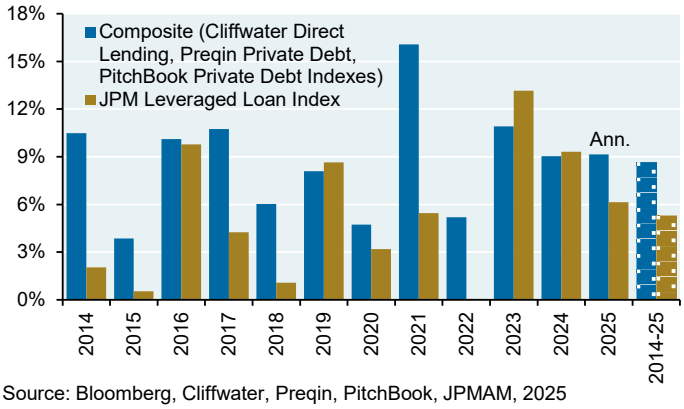
**Collateralized loan obligation collateral quality comparison**

| Collateral quality measure | Broadly syndicated loans | Small and medium-sized enterprises / private credit |
|---|---|---|
| B- or below (S&P) exposure | 30% | 87% |
| CCC (S&P) exposure | 6% | 13% |
| Caa (Moody's) exposure | 5% | 12% |
| Overcollateralization cushion for lowest tranche | 4% | 5% |
| Weighted average rating factor (higher = riskier) | 2804 | 3734 |
| Weighted average rating factor cushion vs covenants | 327 | 109 |
| Diversity cushion vs covenants | 22 | 4 |
| Moody's weighted average recovery rate estimate | 47% | 44% |

Source: Moody's, S&P Global Ratings, JPMAM, August 2024

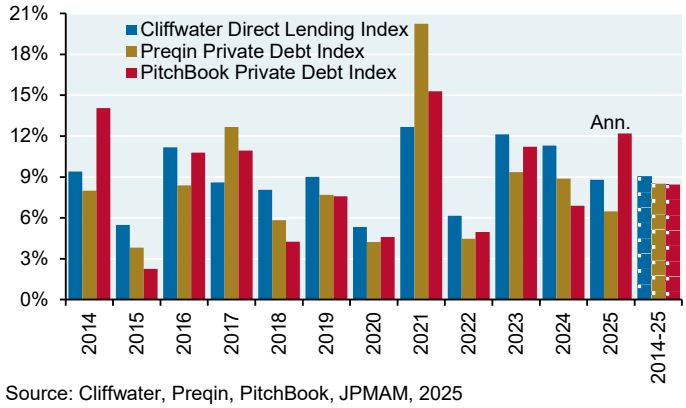
**In terms of private credit performance, so far so good**: a composite of three private credit indexes generated excess returns of 3.5% per year vs a leveraged loan index since 2014. Private credit indexes typically include direct lending, mezzanine and distressed subcategories. Our latest intel suggests that private credit spreads vs loans have narrowed from 200-250 bps in early 2023 to 150-175 bps in September 2025 due to an influx of new capital. As shown on the right, there weren't major differences between the private credit indexes[23]. As a general principle, outside of recessionary periods, it pays to be long riskier forms of credit.

**Performance of private credit vs leveraged loan indexes**
Annual total return, percent




Source: Bloomberg, Cliffwater, Preqin, PitchBook, JPMAM, 2025

**Performance of private credit indexes**
Annual total return, percent




Source: Cliffwater, Preqin, PitchBook, JPMAM, 2025

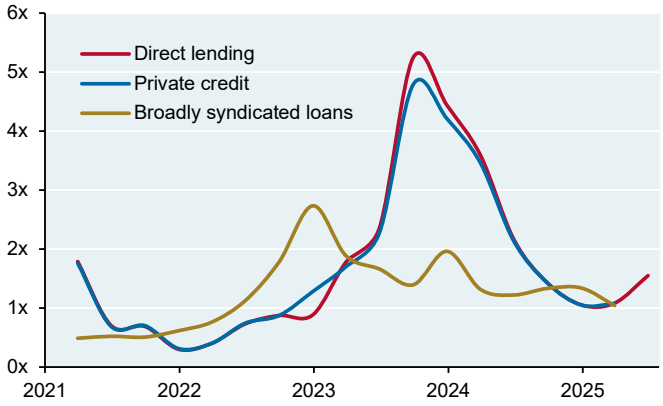
**To be clear, this outperformance is often not entirely apples-to-apples.** According to research paper #6, ~20% of private credit fund holdings on a value weighted basis have equity-like exposure. After adjusting for this, the authors of this study found that private credit outperformance would be closer to zero.

[22] IMF Financial Stability Report, April 2025, Figure 1.24

[23] Cliffwater also has a performance index for managers whose portfolios are comprised 95%+ of senior debt; the average return for the 2014-2024 period is almost identical to the performance of its Direct Lending Index

**There are currently few signs of private credit distress; the aggregate picture looks decent as it should during an economic expansion.** As shown below, the ratio of private credit downgrades to upgrades had declined since our last piece before rising again in Q3 2025, and private credit default rates remain low. Even when including selective defaults (i.e., restructurings that would otherwise have resulted in default), the trend has modestly improved since two years ago. Note how non-performing exposure for broadly syndicated loans and middle market loans are both still less than 1% according to S&P. There may be implied support from financial sponsors supporting less profitable companies; while sponsor-backed loans represent only 10% of loans to middle market companies, they represent ~80% when measured in dollars. While there's justifiable concern about PIK allowances, the PIK share of gross BDC investment income barely rose from 2023 to Q2 2025 (see tables).

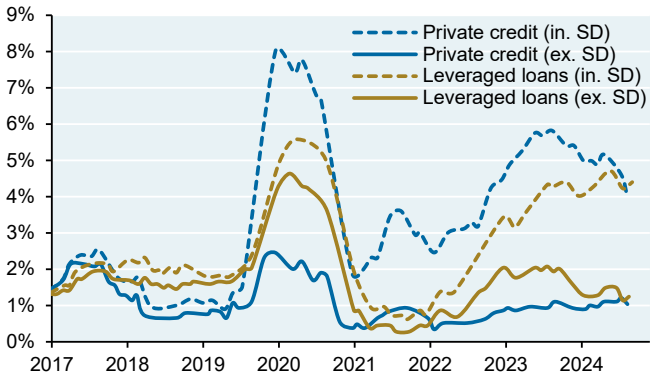
**Ratio of downgrades-to-upgrades**




Source: S&P Global Ratings, IMF, JPMAM, Q2 2025

**Default rates with and without selective defaults (SD)**

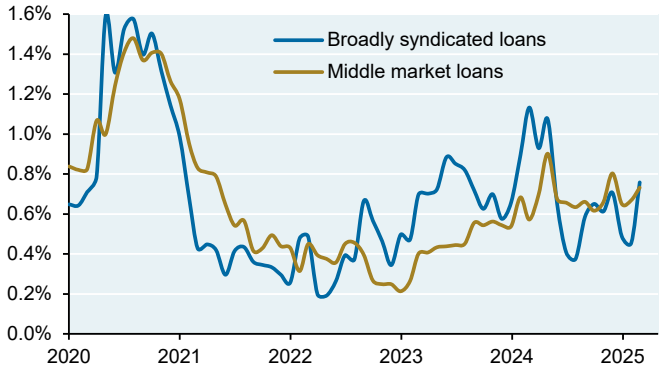
Percent




Source: S&P Global Ratings, JPMAM, Q2 2025

**Nonperforming exposure**

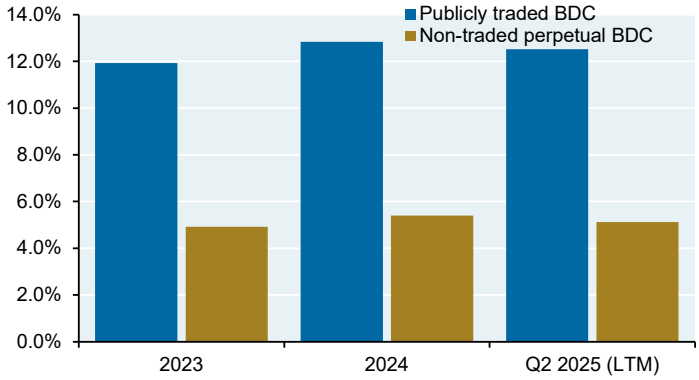
Nonperforming loans as a share of total loans




Source: S&P Global Ratings, JPMAM, April 2025

**PIK interest share of gross investment income**

Asset weighted for 8 large BDCs




Source: S&P Global Ratings, JPMAM, Q4 2025

**PIK interest share of gross investment income**

| Publicly traded BDC | 2023 | 2024 | Q2 2025 (LTM) |
|---|---|---|---|
| Ares Capital Corp | 13.9% | 15.5% | 16.3% |
| Blackstone Secured Lending Fund | 4.5% | 6.3% | 6.0% |
| Blue Owl Capital Corp | 13.3% | 15.4% | 12.9% |
| Blue Owl Technology Finance Corp | 22.0% | 20.4% | 17.6% |
| Golub Capital BDC | 8.9% | 9.8% | 9.9% |
| Main Street Capital Corp | 2.5% | 4.7% | 4.4% |
| Prospect Capital Corp | 15.5% | 15.6% | 12.5% |
| Sixth Street Specialty Lending | 4.2% | 6.1% | 5.1% |
| **Asset weighted average** | **11.9%** | **12.8%** | **12.5%** |

Source: S&P Global Ratings, JPMAM, Q4 2025

**PIK interest share of gross investment income**

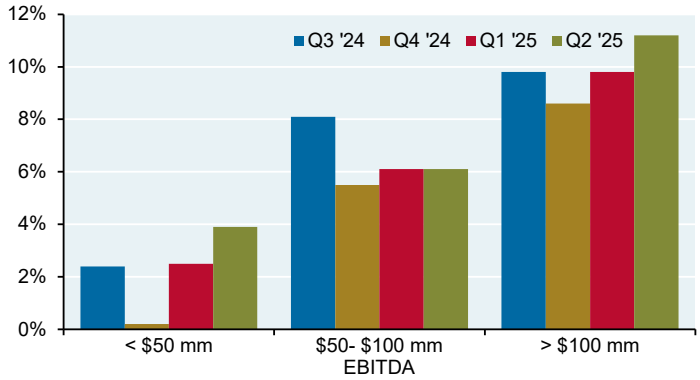
| Non-traded perpetual BDC | 2023 | 2024 | Q2 2025 (LTM) |
|---|---|---|---|
| Apollo Debt Solutions BDC | 1.3% | 1.6% | 1.5% |
| Ares Strategic Income Fund | 2.2% | 4.7% | 5.4% |
| Blackstone Private Credit Fund | 4.1% | 5.5% | 5.4% |
| Blue Owl Capital Corp II | 12.4% | 13.6% | 13.5% |
| Blue Owl Credit Income Corp | 9.3% | 7.4% | 6.2% |
| Golub Capital Private Credit Fund | 1.5% | 3.9% | 4.5% |
| HPS Corporate Lending Fund | 3.6% | 5.1% | 5.0% |
| Sixth Street Lending Partners | 5.9% | 5.2% | 6.1% |
| **Asset weighted average** | **4.9%** | **5.4%** | **5.1%** |

Source: S&P Global Ratings, JPMAM, Q4 2025

## Private cash flow and credit/covenant defaults by size and industry

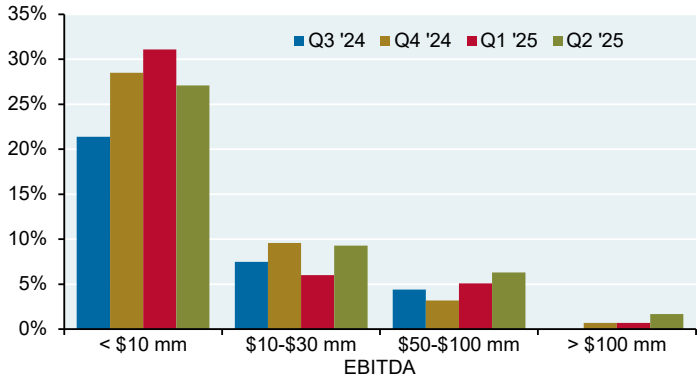
The larger private credit borrowers have generally seen the highest cash flow growth over the last year, as shown in the first chart; cash flow growth for smaller companies remains challenged. As a result, it's not surprising that covenant default rates are highest for these smaller companies, as shown on the right. The actual default rates have been highest for the middle segment of borrower by size, as shown in the third chart. The last chart shows default rates by industry; nothing remarkable to see here, other than periodic stresses in manufacturing and consumer retail.

**Private company last 12 months EBITDA growth by company size,** Percent, YoY



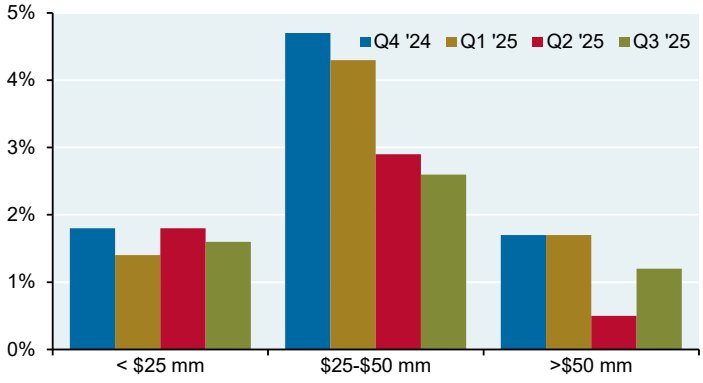

Source: Lincoln International, Q2 2025

**Private company covenant default rates by company size**
Percent



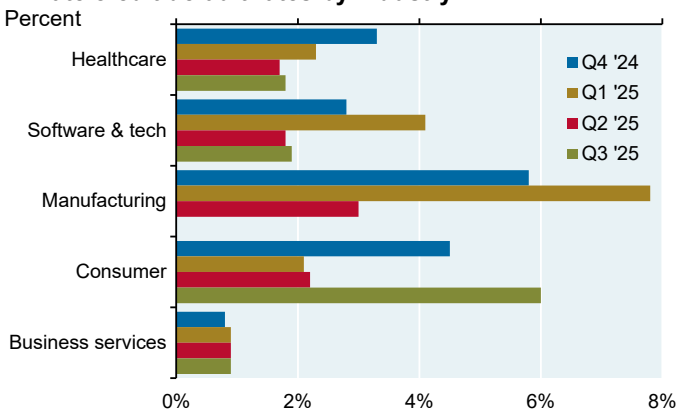

Source: Lincoln International, Q2 2025

**Private credit default rates by EBITDA**
Percent




Source: Proskauer, Q3 2025

**Private credit default rates by industry**
Percent



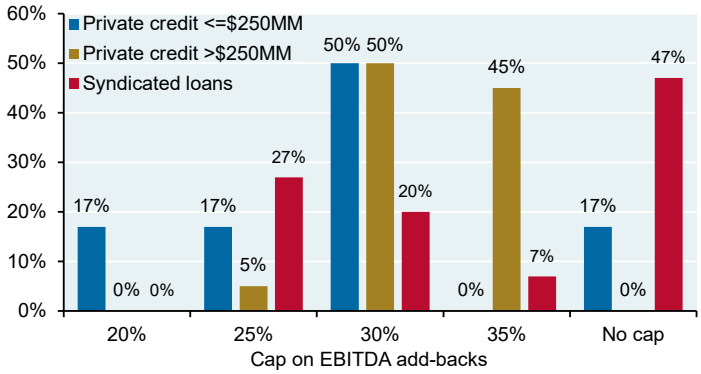

Source: Proskauer, Q3 2025

### Underwriting standards in private credit

The implicit premise in private credit: lenders will be more conservative than in the loan market given riskier borrowers and a more concentrated portfolio. In our 2023 Alternatives paper, we showed two charts which we repeat below: more restrictive private credit terms with respect to allowances for "EBITDA addbacks" which artificially lower debt/EBITDA ratios, and more restrictive private credit terms and conditions on key loan features. Moody's has not updated the figures for either chart, **so we cannot opine on whether these attributes of private credit lenders are still adhered to**. Our sense is that negotiating power has been shifting steadily away from lenders to smaller borrowers as more capital piles into private credit.

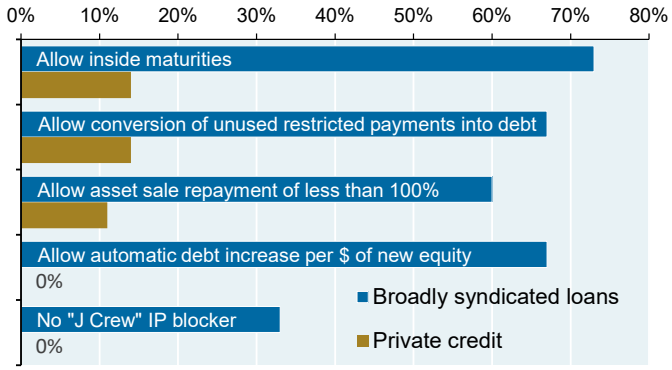
Given much lower ratings of most CLO middle market obligors vs leveraged loan borrowers, tighter underwriting standards and a larger collateral cushion seem like a necessity, particularly given historical transition matrices on default migration rates for B- and CCC companies over time. If the underwriting standards are in fact tighter in private credit, the rating agencies don't appear to have enough visibility to confirm this in CLOs: 88% of middle market CLO loans are "credit estimates" from the agencies rather than actual credit ratings, and the average credit estimate is B-.

**Private credit more restrictive than BSLs on EBITDA make-believe,** % of loans by EBITDA restriction cap



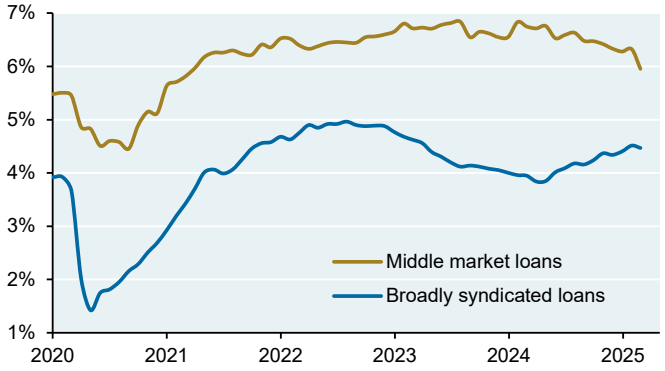

Source: Moody's Investor Services, October 2023

**BSL market less protective than private credit on key covenant features,** Percent of deals allowing each feature



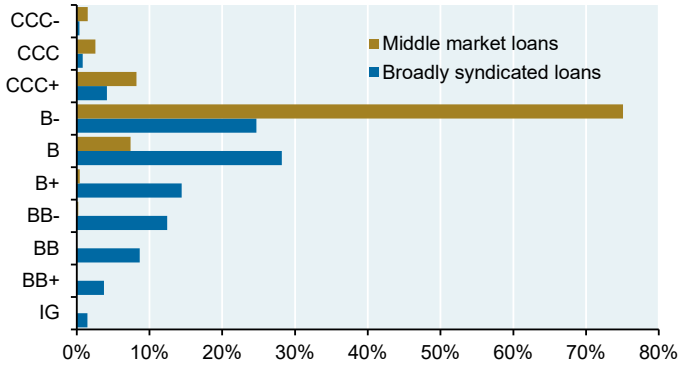

Source: Moody's Investor Services, October 2023

**Median junior overcollateralization cushion**
Percent




Source: S&P Global Ratings, JPMAM, March 2025

**Rating distribution of CLO obligors**
Share of loans



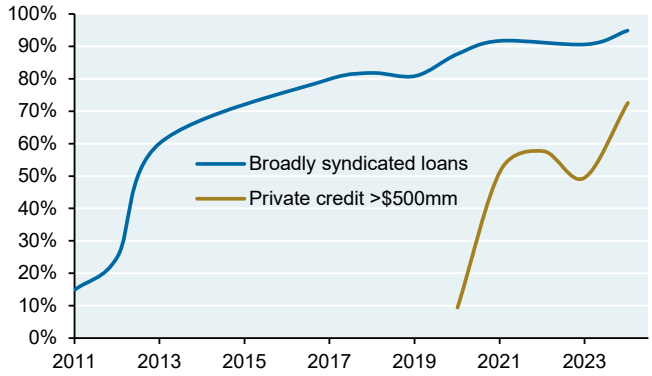

Source: S&P Global Ratings, JPMAM, Q2 2025

**That said, there has been underwriting deterioration in private credit**. Given the influx of capital commitments, it's hard to believe there wouldn't be. Signs of declining underwriting standards shown below: cov-lite shares have been rising in private credit, catching up with broadly syndicated loans; maintenance covenants have become rarer for larger deals; and median BDC leverage has been steadily rising.

The last chart from a 2025 S&P Global private credit review is interesting in this regard. The blue bars show the extent of "maintenance coverage headroom" in middle market loan deals. Headroom refers to the degree to which middle market companies can borrow more since their debt/EBITDA ratios are still below specified covenant levels. For larger middle market loans, ~50% of borrowers still have at least 40% headroom to take on more debt. My interpretation:

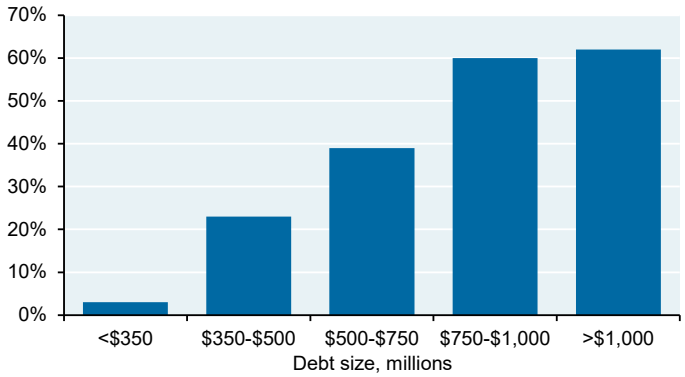
- Standard debt/EBITDA covenant cushions were ~25% a few years ago and have risen to ~40% (i.e., the degree to which debt/EBITDA could rise before restrictive covenants kick in)
- While half of the middle market companies have plenty of room to borrow, many of these borrowers have debt/EBITDA covenant ratios of 8x-12x, so the fact that they still have room to borrow is the byproduct of rather toothless covenants (the average debt/EBITDA ratio for first lien LBOs over the last decade is ~4.5, and ~6.0x including second and third liens)

**Covenant-lite share of new-issue loans**
Percent



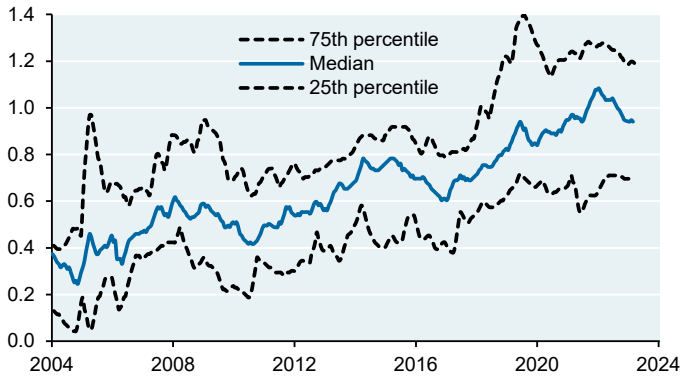

Source: Satori Insights, Kirkland & Ellis, BIS, Covenant Review, 2025

**Private credit deals without maintenance covenants by deal size,** Percent of issuers



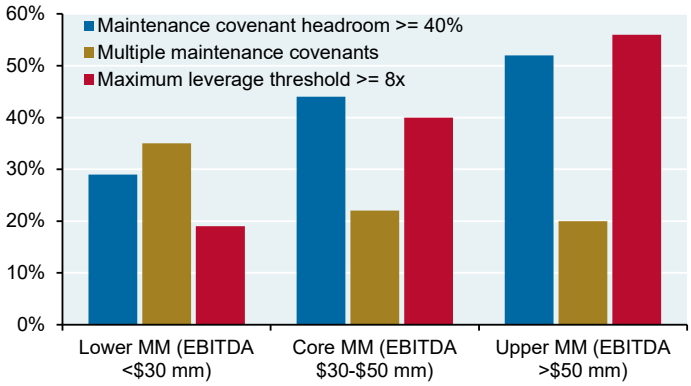

Source: S&P Global Ratings, JPMAM, 2024

**Median BDC leverage**
Debt to equity ratio




Source: "Global financial stability report", IMF, 2024

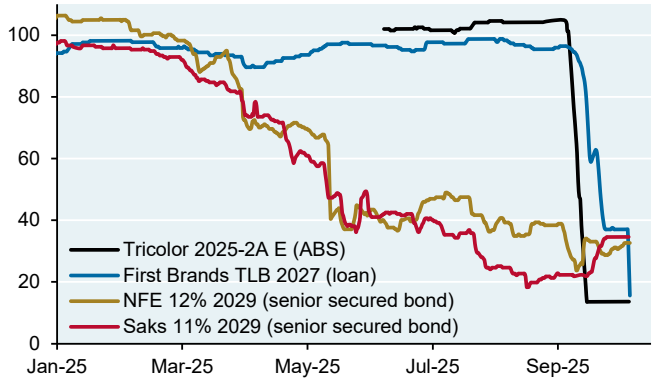
**Middle market borrowers maintenance covenants**
Percent




Source: S&P Global Ratings, JPMAM, Q2 2025

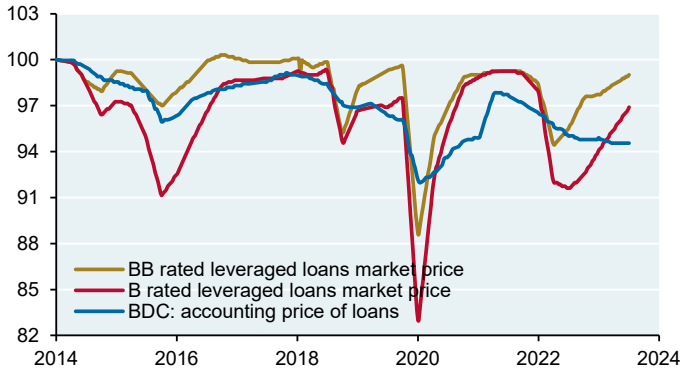
The next chart shows price declines on select middle market securities this year; Tricolor and First Brands marks fell off a cliff, both reportedly involving collateral fraud. Howard Marks argues that First Brands risks should have been spotted well in advance by lending banks[24]. My sense is that many middle market loans are marked at par for as long as humanly possible. Consistent with this view, the second chart shows BDC pricing staleness during recessions and other periods of market stress. In private credit, investors may not see a problem on a specific position until it's too big to ignore. The grid shows an example of price differences on Medallia holdings in BDCs.

**Price declines on select middle market securities**
Cents on the dollar




Source: Bloomberg, October 12, 2025

**Accounting fair value of BDC first-lien loans**
Index (100 = 2014)



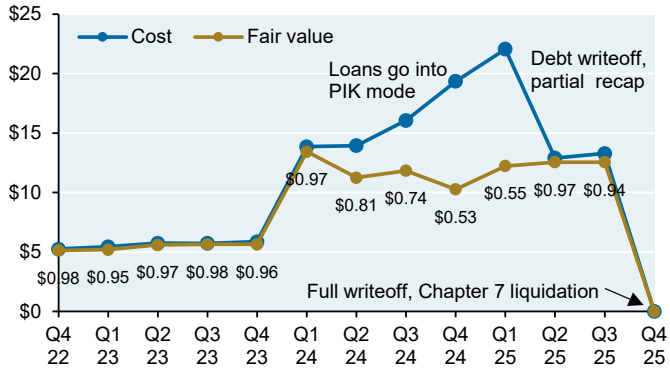

Source: "$2 trillion private credit market warrants closer watch", IMF, April 2024

**Fair value assigned to Medallia's private credit loan**
Cents on the dollar

| | Q2 24 | Q3 24 | Q4 24 | Q1 25 | Q2 25 | Q3 25 |
|---|---|---|---|---|---|---|
| Blackstone | 98 | 95 | 94 | 89 | 87 | 82 |
| Apollo | 100 | 100 | 87 | 87 | 87 | 77 |
| FS KKR | 100 | 100 | 98 | 95 | 91 | 91 |
| Monroe | 100 | 99 | 99 | 98 | 89 | 84 |
| Onex | 100 | 99 | 96 | 96 | 92 | 91 |
| HPS | 98 | 99 | 94 | 91 | 89 | - |
| Antares | - | - | 98 | 98 | 97 | - |

Source: Bloomberg, Q3 2025

**BlackRock TCP BDC loans to Renovo**
$ mm, with fair value marks in cents per dollar




Source: TCPC 10-Qs and 10-Ks, Bloomberg, JPMAM, November 2025

The last chart shows the sudden and complete writeoff of BDC loans to Renovo, a direct-to-consumer platform for home remodeling. This is not about stale marks or fraud; the position was marked down to 53 cents in 2024 before a recapitalization in which the BDC wrote off part of the debt in exchange for preferred stock, and then marked the remaining debt close to par. Instead, this episode highlights what can happen to small asset-light companies that BDCs lend to; in this case, the salvage value from a Chapter 7 liquidation is expected to be zero.

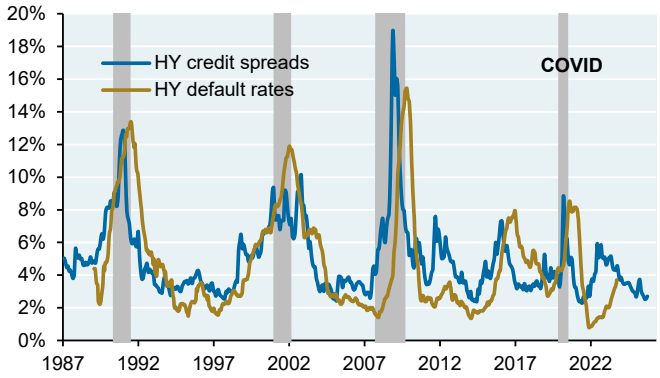
[24] In his latest note, **Howards Marks notes red flags that should have been clear to banks lending to First Brands**: (a) First Brands customers were not required to remit factored receivables to banks but to First Brands itself, allowing the company to fraudulently borrow against them again; (b) opaque financing structures resulted in debt ~2x higher than disclosed borrowings; (c) the company reported $5 bn in sales but the CEO had almost no media references or online profile and a significant litigation history including allegations of misconduct; (d) the company profit margins were above the industry average and had created a web of corporate entities
Howard Marks, "*Cockroaches in the Coal Mine*", November 6, 2025

**Wrapping up: dispersion will eventually come for private credit, just like other alternative asset classes**

The performance of private credit managers has been tightly bunched since 2014, as one would expect in the absence of a lasting recession [see first chart; while there was a recession during COVID, high yield default rates peaked at much lower levels than during three prior recessions, and both the peak level and duration of the credit spread increase was muted due to fiscal and monetary policy]. As a result, it has been difficult for investors to really tell which managers have underwritten better than others since the private credit boom began.

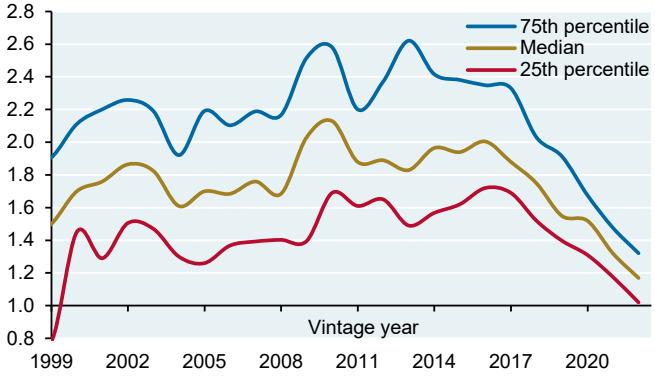
**The next recession is likely to create more manager dispersion in private credit, similar to what is seen in other alternative investments**. Below we show 75th vs 25th percentile performance for buyout and venture; first vs fourth quartile performance for hedge funds; and a chart I prepared a decade ago on dispersion of activist hedge fund event returns. In private credit, I suspect it will come down to the documents: the chart on underwriting discipline repeated below is likely to be a key determinant of manager success.

**COVID was not a typical recession**
Percent



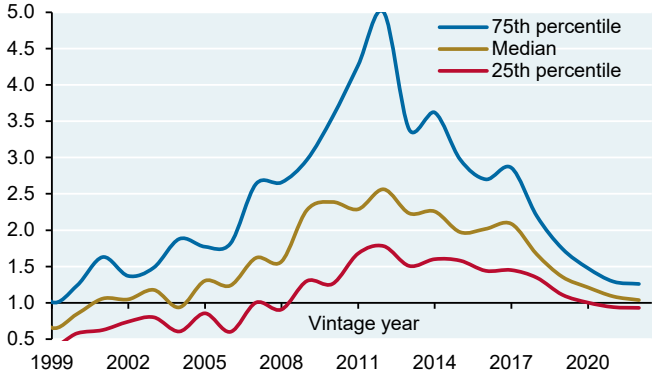

Source: BofaML, Moody's, Barclays, Bloomberg, JPMAM, November 2025

**US buyout performance**
Multiple on invested capital (MOIC)



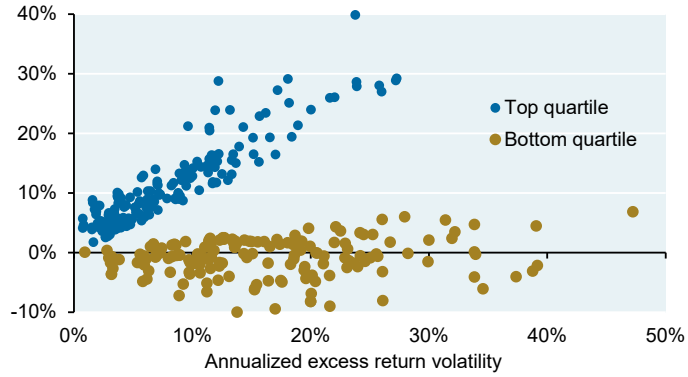

Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**US venture capital performance**
Multiple on invested capital (MOIC)



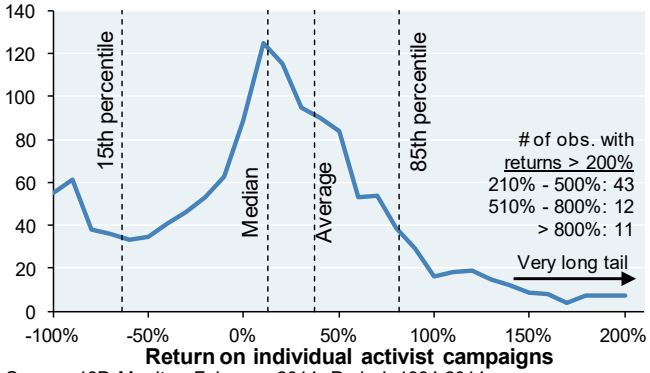

Source: Steve Kaplan (U Chicago), MSCI/Burgiss, JPMAM, Q2 2025

**Top and bottom quartile hedge fund performance**
Annualized excess return vs T-bills, Sep 2020 to Aug 2025



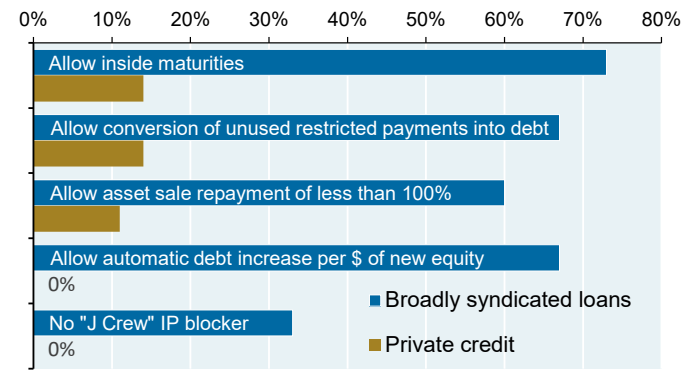

Source: JPMAM, HFR, August 2025

Distribution of **absolute** returns from activist events




Source: 13D Monitor. February 2014. Period: 1994-2014.

**BSL market less protective than private credit on key covenant features,** Percent of deals allowing each feature




Source: Moody's Investor Services, October 2023

**It's better to ask questions of private credit managers during an expansion than during a recession when it's too late.** Here are some questions to ask:

- What is the extent of your reliance on "recurring revenue" loans to growth stage companies in portfolios given their frequently distressed credit stats? For these type of loans, S&P cites[25] median leverage of 16x, median interest coverage of 0.42 and negative free cash flow for the average company (all of which are pretty bad), but also states that such loans only represent ~5% of the overall private credit market
- To what extent do you provide "last out" loans that are subordinated in borrower bankruptcy?
- What is the maximum potential draw on your line of credit obligations to borrowing companies as a percent of total loans outstanding?
- The WSJ reports a surge in private credit lenders requiring unanimous consent before any lien subordination, a clause which now appears in 84% of new credit deals[26]. Have you been doing this all along?
- At what level do you start charging incentive fees? In other words, do you charge incentive fees starting at 5%-6% and make loans at ~10% and apply leverage on top of that (i.e., taking non-investment grade risk and earning incentive fees starting at investment grade returns)?
- Do you charge fees on PIK interest when accrued or only when that interest is paid? If that interest is never paid, do you return the fees earned on it?
- Since 80%+ of private credit managers also manage private equity, how would you manage potential conflicts in a recession that result in substantial corporate distress?

[25] S&P Private Credit and Middle Market CLO Quarterly, Q2 2025

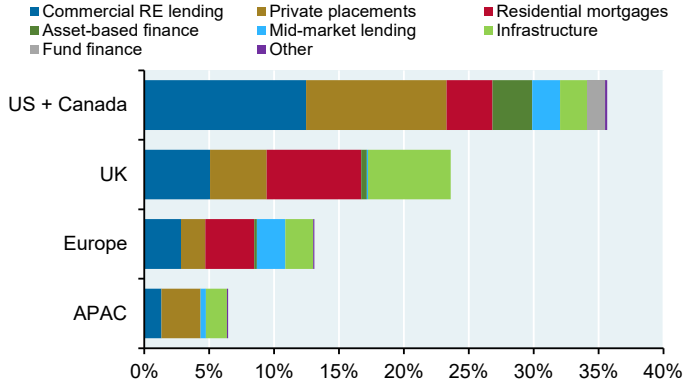
[26] "*A Private-Credit Winter Is Coming*", WSJ, October 27, 2025

**Close-up: private credit and insurers, unrealized values and pricing services**

The US insurance industry has larger exposures to private credit than the UK, Europe or Asia, but only when including all private credit categories. In terms of mid-market lending, US insurer exposure is similar to Europe as a share of investments.

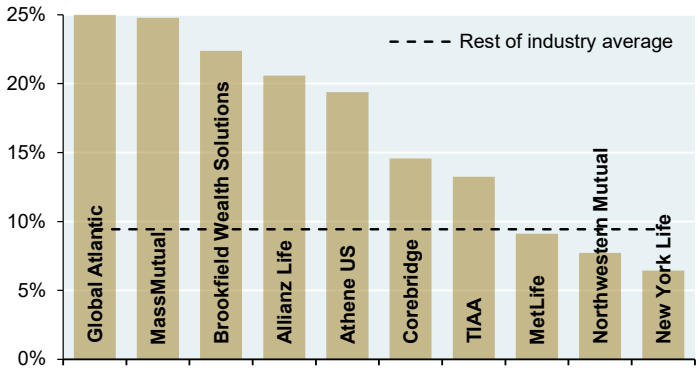
As shown in the second and third charts, the use of private letter ratings for private credit vary by insurer, and the majority are provided by "specialized" rating agencies, particularly for less liquid Level 3 assets. At the end of 2023, a Bloomberg article found that the rating agency Egan-Jones employed just 20 analysts and was still able to rate more than 3,000 private credit deals in 2024[27].

**Private credit allocations by sector and country**
Percent of largest global insurers' total investments



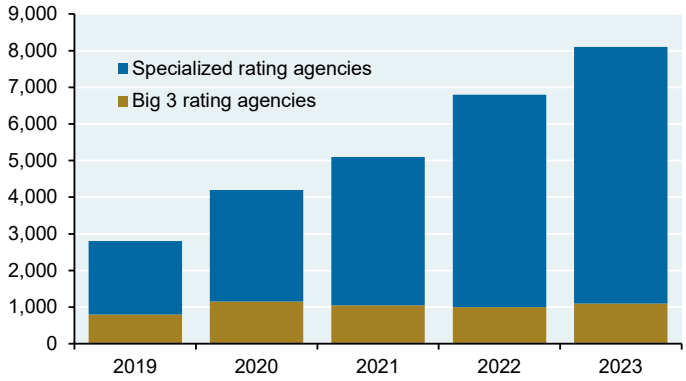

Source: Moody's, June 2024

**Top ten insurer holders of private letter rated bonds**
% of total bond holdings



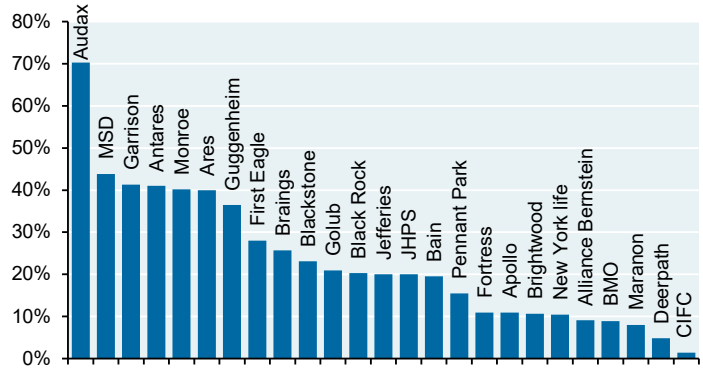

Source: Moody's, June 2025

**Privately rated securities held by US insurers**
Number




Source: "Global financial stability report", IMF, October 2025

**Private credit CLO collateral market by pricing services, by CLO manager**




Source: Moody's Comparison of BSL and Private Credit CLOs, August 2024

**Some academic research finds that large portions of the value in private credit portfolios is still unrealized, just as we found with buyout and venture funds.** Research paper #7 found that private credit returns are largely driven by unrealized, manager-assessed values rather than by returns realized through repayment or refinancing. One example: the oldest direct lending fund vintages from 2015 still have median unrealized residual values of ~30% of the fund. This figure was even higher for mezzanine debt which had a median unrealized residual value of ~60% of the fund. The reason this is important for investors to understand: many private credit CLO positions aren't marked by pricing services but by the managers themselves, as shown above.

[27] "*A New Ratings Game: 3,000 Deals, 20 Analysts, Lots of Questions*", Bloomberg Law, June 1, 2025

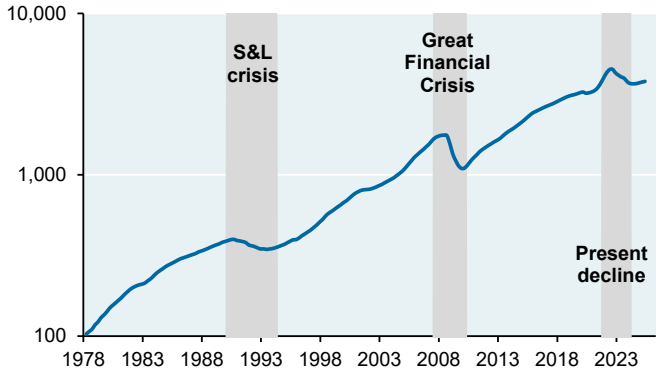
## Commercial real estate: the plentiful bad news is mostly in the price

In the 20th anniversary the Eye on the Market compilation we released last summer, there was one theme that kept appearing: after a correction, markets tend to recover way before fundamentals do:

- During the Great Depression, the Dow Jones Index bottomed when only half of the eventual bank failures had taken place
- During the 2008 financial crisis, S&P 500 bank stocks bottomed at a time when only 8% of the eventual bank failures had taken place
- During the 2011 European balance of payments crisis, a European equity index bottomed well before the peak in European unemployment and well before the end of capital outflows out of peripheral Europe
- During the 1990 Savings & Loan crisis, high yield spreads peaked at a time when only 55% of all eventual corporate defaults had taken place
- During the Financial Crisis in 2008, high yield spreads peaked when only 30% of eventual corporate defaults had taken place; AAA CMBS spreads peaked when CMBS delinquency rates were still only 0.5% (they would eventually rise to 8.5%); and leveraged loan prices bottomed at time when trailing 12-month defaults were 4.5% (they would eventually rise to 8%)

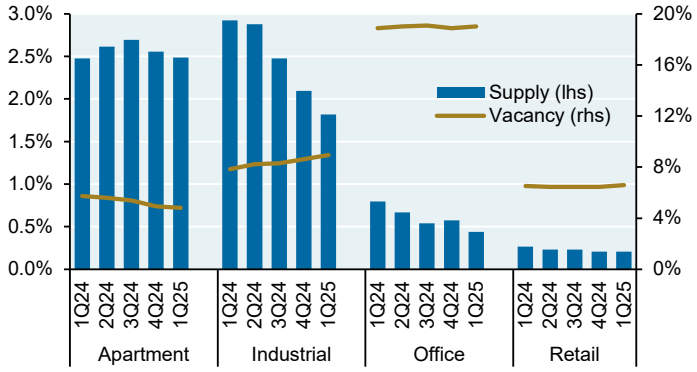
So…even though many real estate vacancy rates are still rising, the third major real estate price correction since 1978 suggests that a lot of bad news is priced in. We're already seeing small monthly gains in commercial real estate returns and a recovery in transaction volumes. There's a lot of inventory that's still overpriced, but it's time to look for opportunity.

**Open-end Diversified Core Equity (ODCE) real estate index**
Index (log scale)



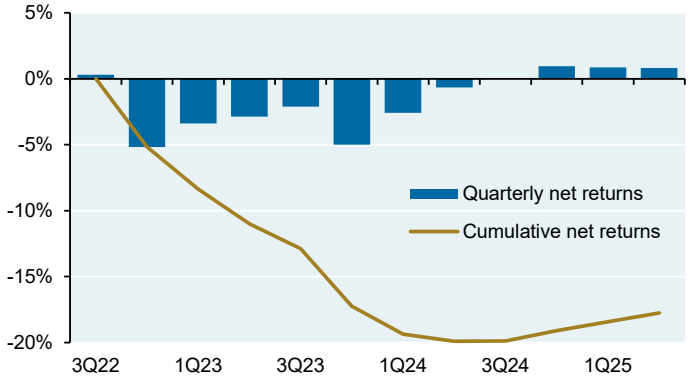

Source: National Council of RE Investment Fiduciaries, JPMAM, Q2 2025

**Real estate supply and vacancy by sector**
Supply delivered over 4 quarters / inventory
Vacancy rate



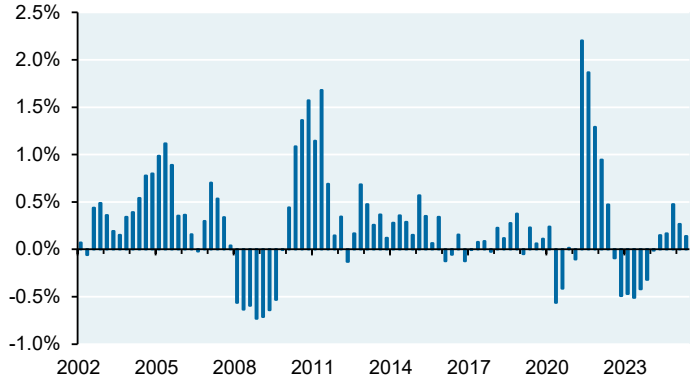

Source: CBRE-EA, Q1 2025

**ODCE net returns**
Percent




Source: National Council of RE Investment Fiduciaries, JPMAM, Q2 2025

**US commercial real estate transaction volumes**
YoY growth

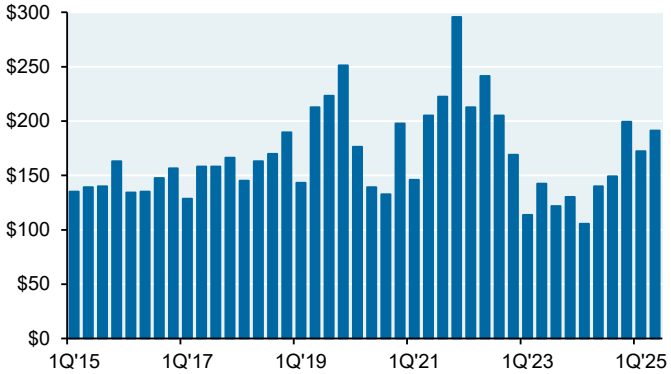



Source: Cohen & Steers, July 31, 2025

## Real estate capital markets activity: signs of life, mostly

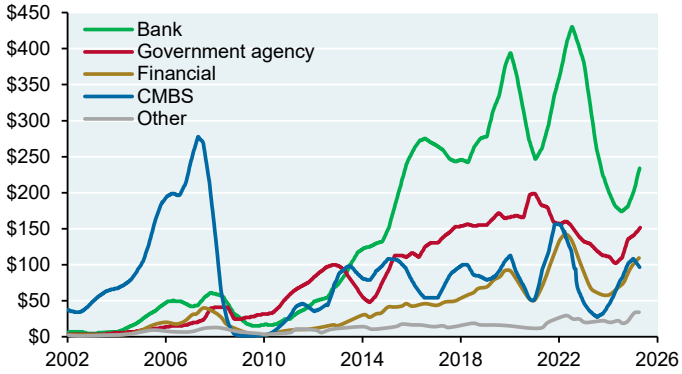
Commercial real estate debt origination volumes are picking up across multiple lending types (first two charts); and there's even signs of life in Manhattan office lending (third chart) although not much anywhere else. The distressed share of CRE volumes is gradually rising (slowly), a sign of market-clearing. The challenge: from 10% (retail) to 50% (multifamily) of loans maturing by 2027 look to be insolvent, with another large portion challenged with debt service coverage below 1.25x.

**Commercial real estate debt origination quarterly volume**
US$, billions



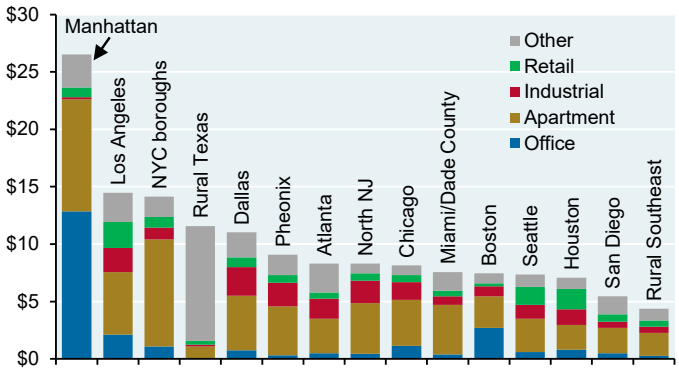

Source: RCA, July 25, 2025

**Total commercial real estate debt origination value**
Rolling 12 month total, US$ billions




Source: RCA, July 25, 2025

**Top 15 markets real estate loan volume by property type**
US$, billions

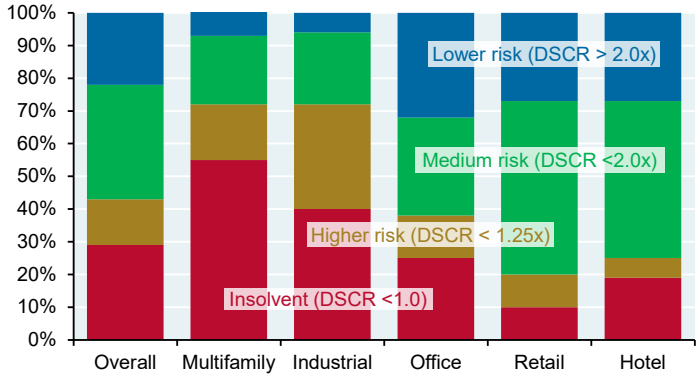



Source: RCA, July 25, 2025

**Distressed share of total CRE volume**
Percent


Source: RCA, July 25, 2025

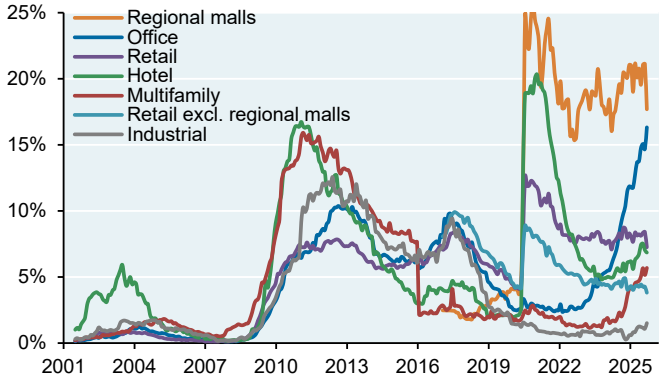
**Debt service coverage ratio (DSCR) of CRE debt**
Share of outstanding securitized CRE debt maturing before 2027




Source: Trepp, July 25, 2025

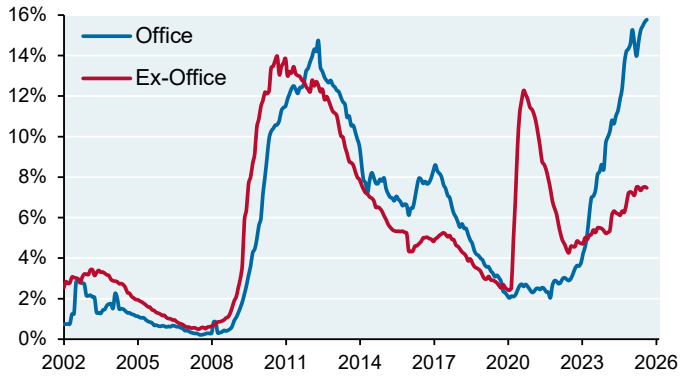
**To be clear, many fundamentals are still weak**. Office delinquencies are soaring, leading to rising special servicing rates; multifamily delinquencies are rising and now exceed 10% in some Texas and Florida cities; and industrial vacancy rates have doubled since 2022. For hotels, revpar growth was just 0.4% in 2024 and CBRE projects 2025 revpar growth of -0.1%. Factors negatively affecting hotels: slower inbound traveler growth, less business travel, government layoffs and a 5% increase in short term rentals that compete with hotels. Hotel margins are expected to be under pressure in 2025 given labor challenges, rising operating costs and unfavorable demand conditions compared to 2024 (election year, hurricane recovery).

**CMBS delinquencies by property type**
Percent



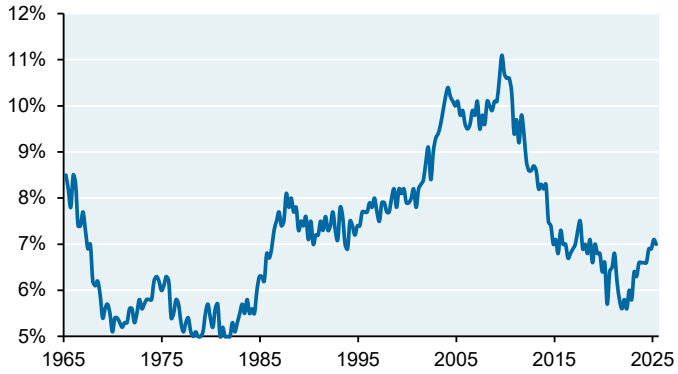

Source: Moody's, JPMAM, September 2025

**Special servicing rates for office and non-office CMBS loans,** Percent



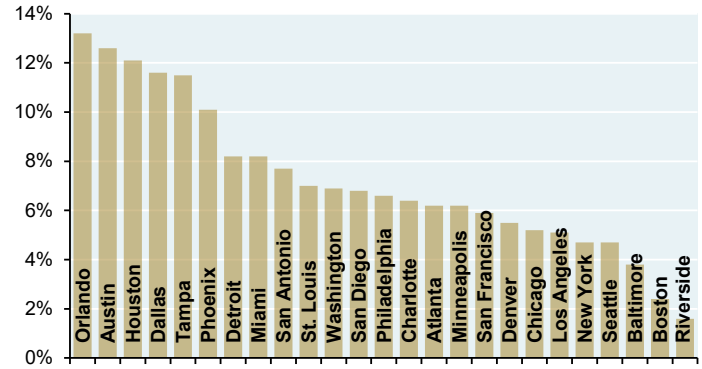

Source: JP Morgan CMBS Research, September 2025

**US residential vacancy rate**
Percent



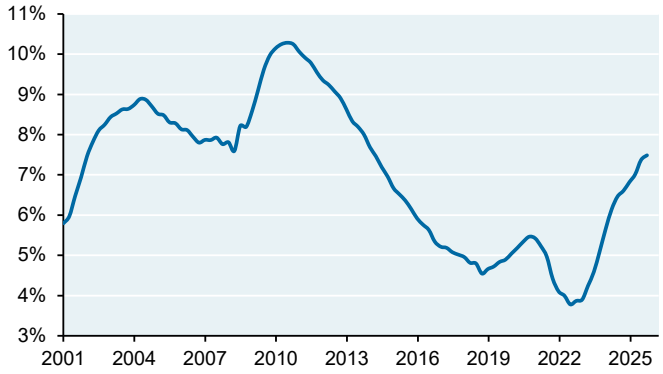

Source: Census Bureau, Bloomberg, JPMAM, Q2 2025

**Residential vacancy rates for the 25 largest metropolitan statistical areas,** Percent



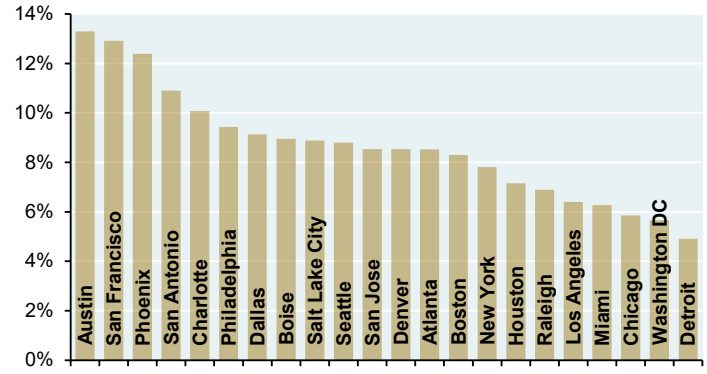

Source: Census Bureau, JPMAM, Q2 2025

**US industrial vacancy rate**
Percent




Source: CoStar, JPMAM, Q3 2025

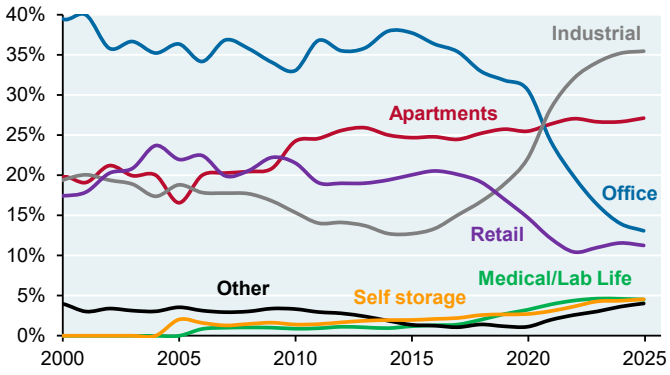
**Industrial vacancy rates for select US cities**
Percent




Source: CoStar, JPMAM, Q3 2025

**The most dramatic shift on record: the reduction in institutional investor office exposure in favor of industrial**. For those making the shift in 2015, rewards have been substantial: since that time, NCREIF returns on industrial have been 250% vs just 20% for office. That said, the long office nightmare is slowing in intensity: net absorption is close to zero rather than negative; the total sq ft of properties under construction is declining sharply, which will eventually drive new deliveries closer to zero; and sublease availability is declining rather than growing. Similar data, from JLL: future deliveries are expected to fall to ~1 mm sq ft per year from 2027-2030 with 70% of future supply preleased. Vacancy rates may overstate office distress for new buildings: as shown in the last two charts, demand is highly concentrated in buildings completed since 2015, and vacancy is highly concentrated in a subset of zombie buildings.

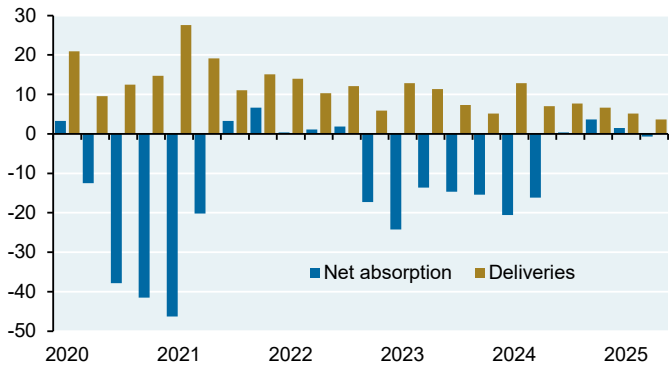
**MSCI commercial real estate property type allocations (US All Core Open-Ended Property Fund Index)**




Source: MSCI, JPMAM, Q3 2025

**US office net absorption and deliveries**

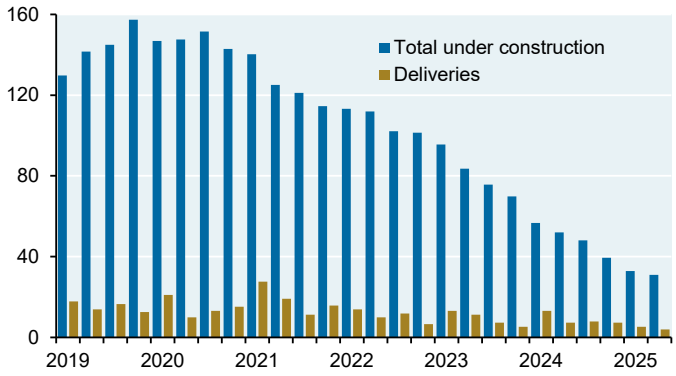
Millions of square feet




Source: "US office market report", Colliers, JPMAM, Q2 2025

**US office construction pipeline**

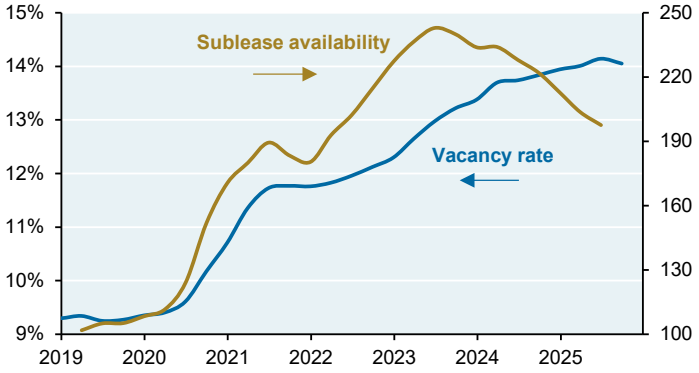
Millions of square feet




Source: "US office market report", Colliers, JPMAM, Q2 2025

**US office vacancy rate vs sublease availability**

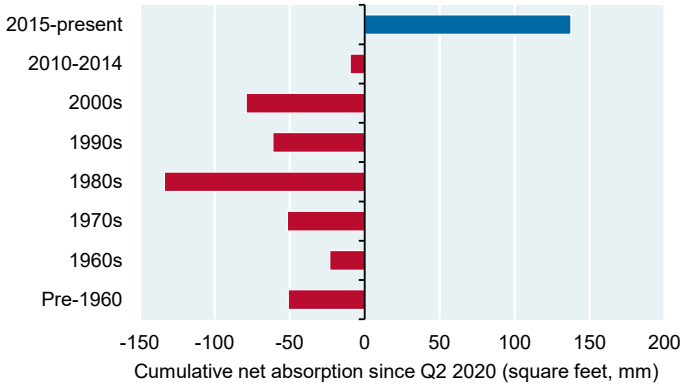
Percent Millions of square feet




Source: CoStar, "US office market report", Colliers, JPMAM, Q3 2025

**Net absorption by building vintage**

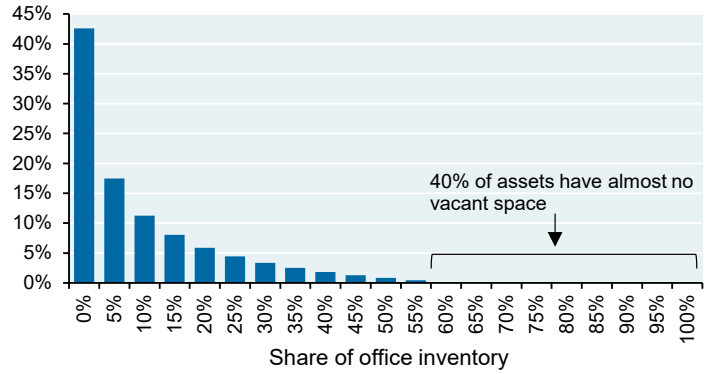
Year built




Source: JLL Research, Q2 2024

**Office vacancy concentration**

Share of vacant space

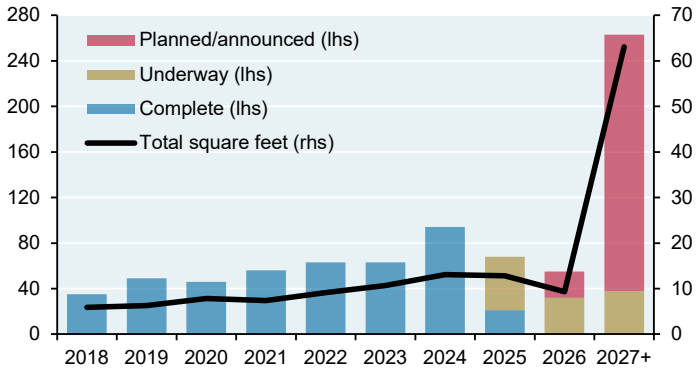



Source: JLL, JPMAM, Q3 2025

**What about office-to-residential conversions as a means of materially reducing office supply?** Let's use an example. Assume a conversion of a prewar Class B office building whose rents are $3.50 psf per month. Assuming conversion costs of $320 psf plus $40 psf for green efficiency, a decline in post-conversion rentable space of 15%, new residential rents at the 90th percentile ($96 psf annually for an 875 sq foot 1 BR apartment), the buyer would still need to negotiate a sales price of $175 psf to generate 15%-18% returns. This price represents a ~60% decline in price psf from pre-pandemic levels.

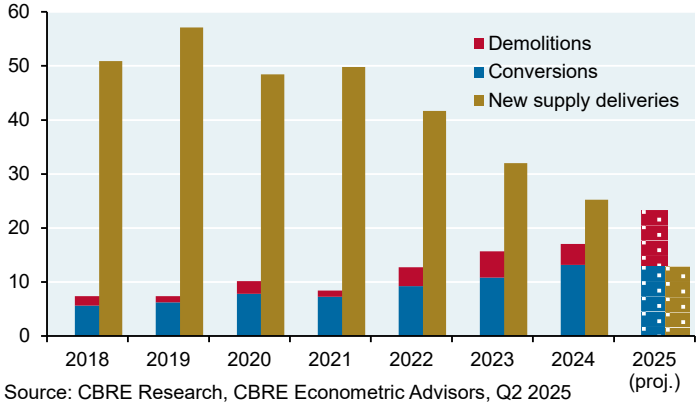
An August 2025 article in Reuters agreed[28]: while there are 100-150 million sq ft of office space slated for conversion around the US, these projects face challenges: zoning restrictions, structural floor plate mismatches, retrofit costs for HVAC and plumbing systems and uncertain financial viability since substantial tax incentives are harder to obtain when converting into luxury units. According to JLL, actual reductions in office supply have been ~35 mm sq ft per year, most of which is apartment conversions and non-office redevelopment; that compares to 430 mm sq ft of vacant space added since 2019. The chart on the right from CBRE shows that for the first time since 2018, demolitions plus conversions will exceed new supply.

**Office conversions by status & estimated completion year**




Source: CBRE Research, May 2025

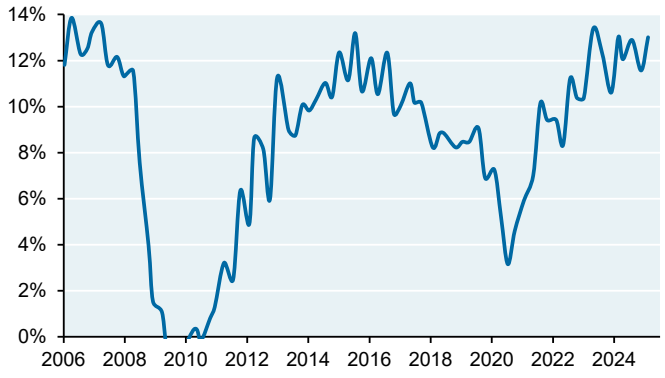
**Office conversions & demolitions vs new supply deliveries**




Source: CBRE Research, CBRE Econometric Advisors, Q2 2025

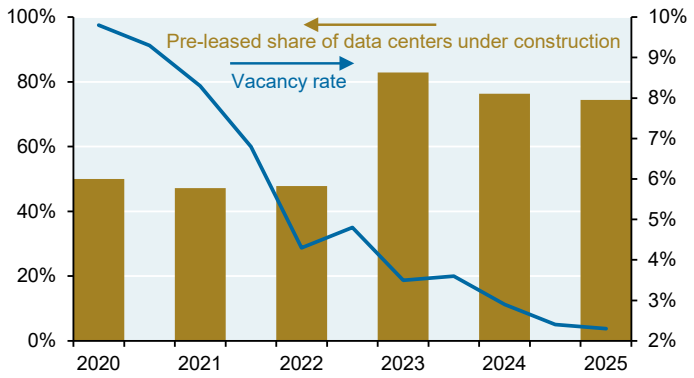
Some positive news from retail: a recovery in re-leasing spreads, which measures the difference between the rent on an expiring lease and the rent on a new lease for the same space. And on data centers, vacancy rates remain below 3% as pre-leasing rates hover around 75%. Data centers have grown from 2% of fundraising to 31% in 2025, with AI workloads estimated at half of total data center sq ft.

**Strip center REIT blended re-leasing spreads**




Source: Green Street, 2025

**US data center vacancy rates and pre-leasing**

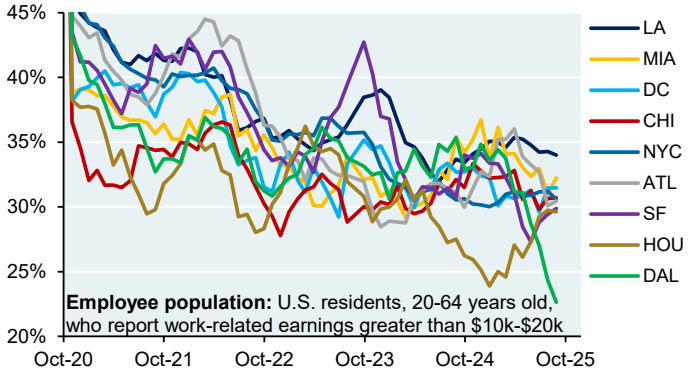



Source: CBRE, JLL Research, JPMAM, 2025

[28] "*US Commercial Real Estate Crisis Deepens as Office Vacancy Rates Hit Record Highs*", Reuters, Aug 25, 2025

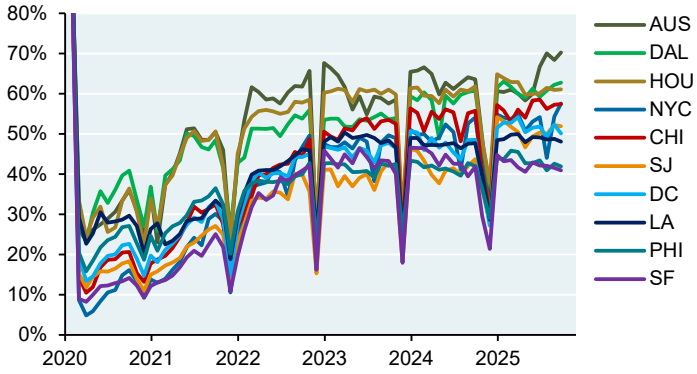
**Beneath the deteriorating office fundamentals lies the following dynamics:** for the most part, work from home employment still hovers at 30%-35% compared to less than 5% before the COVID pandemic. We triangulate three sources to arrive at this figure: Nicholas Bloom's Work-From-Home survey (Dallas is the major exception), Kastle Key Fob swipe data and the post-COVID recovery in mass transit ridership. Regarding the latter analysis, the median mass transit recovery vs 2019 is now 71%, up only 4% from two years ago.

**Work from home: large metropolitan cities**
Percent of full paid days worked from home




Source: Bloom, Barrero and Davis, September 2025

**Commercial property utilization rates based on security card (key fob) swipes vs Feb 2020 levels**, Percent




Source: Kastle, Bloomberg, JPMAM, October 2025

**Post-Covid recovery in mass transit ridership (Q2 2019 = 100%), median recovery = 71%**

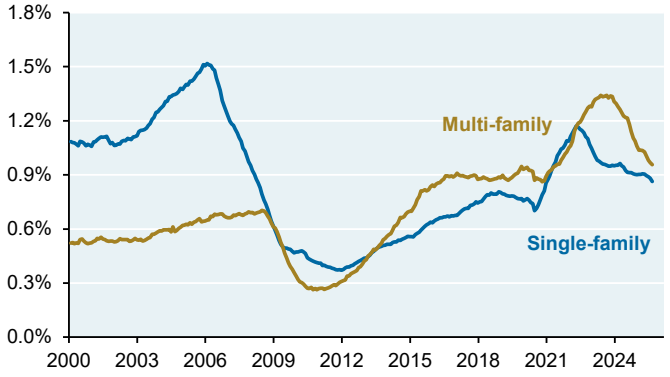
| # | City | Recovery from Q2 2019 to Q1 2025 | Transit Authorities |
|---|---|---|---|
| 1 | Miami | 105% | Miami-Dade Transit Agency |
| 2 | Salt Lake City | 97% | Utah Transit Authority |
| 3 | Houston | 84% | Metro Tr Auth of Harris Co |
| 4 | Austin | 84% | Capital Metropolitan Trp Auth |
| 5 | New York | 80% | MTA Bus Company, MTA Long Island Rail Road, MTA Metro-North Railroad, MTA New York City Transit, MTA Staten Island Railway, New York City DOT |
| 6 | Washington | 80% | District Dept of Transp, Washington Metro Area TA |
| 7 | Los Angeles | 80% | Access Services, Los Angeles County MTA, Southern California RRA |
| 8 | San Antonio | 80% | VIA Metropolitan Transit |
| 9 | Philadelphia | 75% | Southeastern Penn TA |
| 10 | Seattle | 71% | King County Dept of Trp, Sound Transit, Washington State Ferries |
| 11 | Dallas | 71% | Dallas Area Rapid Transit, Trinity Railway Express |
| 12 | Charlotte | 71% | Charlotte Area Transit |
| 13 | Boston | 65% | Massachusetts Bay Tr Auth |
| 14 | Phoenix | 65% | City of Phoenix PTD, Valley Metro, Valley Metro Rail, Inc. |
| 15 | San Jose | 62% | Santa Clara Valley Trp Auth |
| 16 | San Francisco | 60% | Golden Gate Bridge, Hwy & TD, San Francisco Bay Area RTD, San Francisco Muni Rwy |
| 17 | Detroit | 60% | City of Detroit Dept of Trp, Detroit Transp Corp/DPM |
| 18 | Chicago | 60% | Chicago Transit Authority, Metra |
| 19 | Denver | 56% | Regional Trp District |
| 20 | Atlanta | 52% | Atlanta-Region Transit Link Authorit, Metro Atlanta Rapid Tr |
| 21 | Raleigh | 46% | GoRaleigh |
| 22 | Boise | 22% | Valley Regional Transit |

Source: APTA, individual transit reports, JPMAM, Q1 2025

**Some final comments on multifamily, hotels and BREIT**. One reason for rising multifamily vacancy rates is the surge in supply that took place over the last 2-3 years. The chart on the left shows single family and multifamily housing supply under construction as a % of the existing housing stock; the multifamily pipeline was the largest on record in the 21st century. As shown on the right, new multifamily supply is expected to decline once all of this new supply is absorbed. On hotels[29], there's a big difference in ADR and RevPARs for the luxury segment and the rest of the market, consistent with a rising stock market and a sluggish economy.

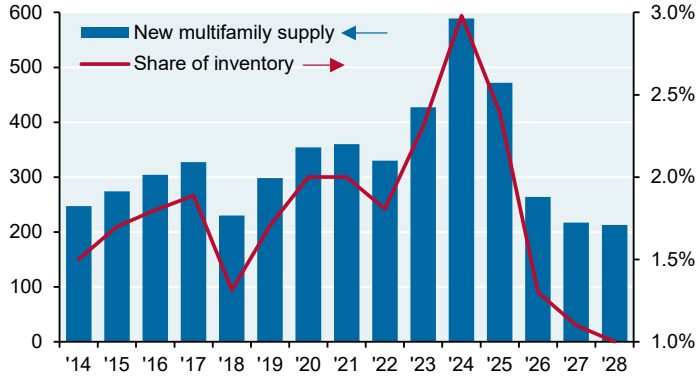
**BREIT update**. In the 2023 paper we highlighted how redemption requests had risen to 8% of NAV with a collapse in withdrawal fulfillments to 5%. We noted at the time that BREIT's office exposure was just 3% of NAV and are not surprised to see BREIT redemption requests falling back to 1%-2% of NAV.

**Housing supply under construction**
Percent of owner occupied housing stock



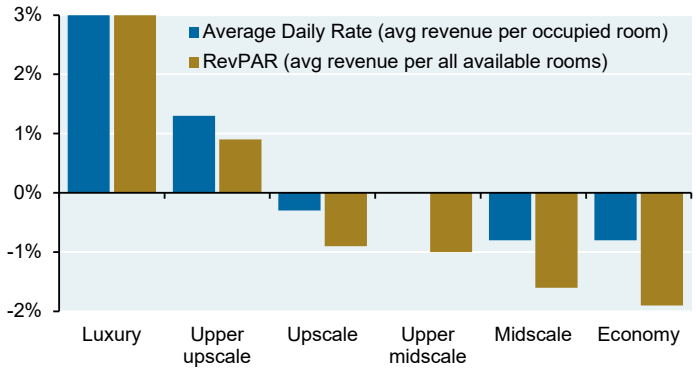

Source: Bloomberg, US Census, JPMAM, August 2025

**Historical and projected US multifamily supply**
Units, thousands Percent



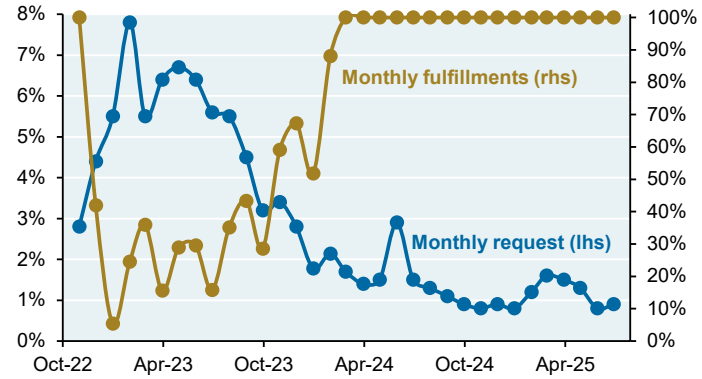

Source: RealPage Market Analytics, Q4 2024

**Hotel performance by class, YTD through Q2 2025**
Percent




Source: Costar, Q2 2025

**BREIT investor redemptions and fulfillments**
Percent of NAV Percent of total request



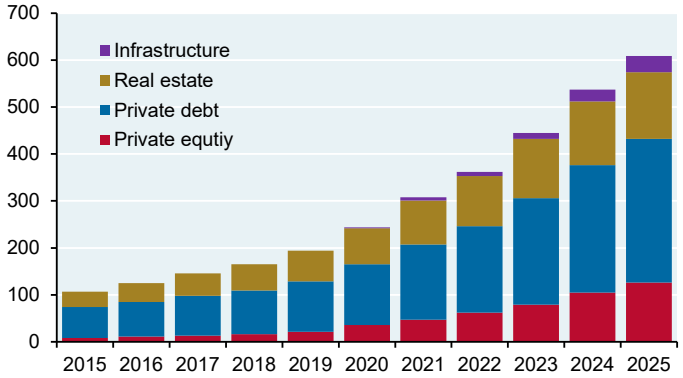

Source: BREIT, JPMAM, June 2025

[29] Why do hotels leave the TV screen on for new guest arrivals, which forces them to search around for the remote to turn it off? This is an aggravating way to start a hotel stay

## Appendix I: characteristics and performance of Evergreen funds

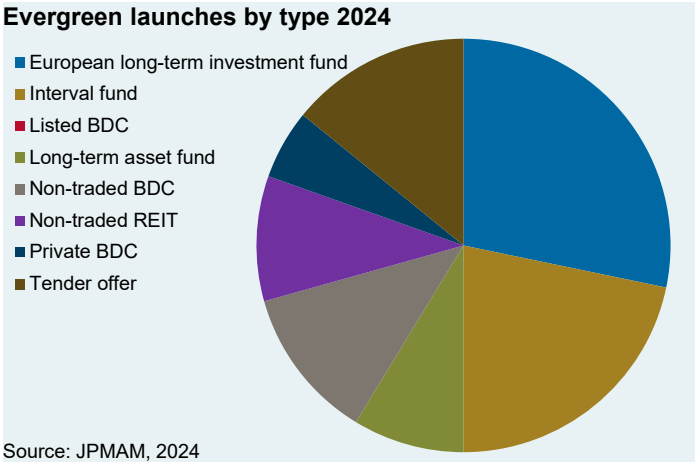
Evergreen funds are hybrid structures with no end date that continuously accept new capital, unlike traditional closed end funds with an expected time horizon. This approach offers investors quicker access to a diversified portfolio and some liquidity although this may be limited by redemption caps and gates. We pulled a sampling of the three largest evergreen funds and the three largest closed end drawdown funds for each of three categories (private credit, private equity and real estate). For private credit and private real estate, fund vehicle leverage is typically higher than drawdown funds while deal-specific leverage is a bit lower. Due to their open-ended nature, evergreen managers tend to hold 20%-25% in cash plus credit facilities. They're also generally more diversified in terms of # of investments.

**Number of evergreen funds by asset class**
Number of funds



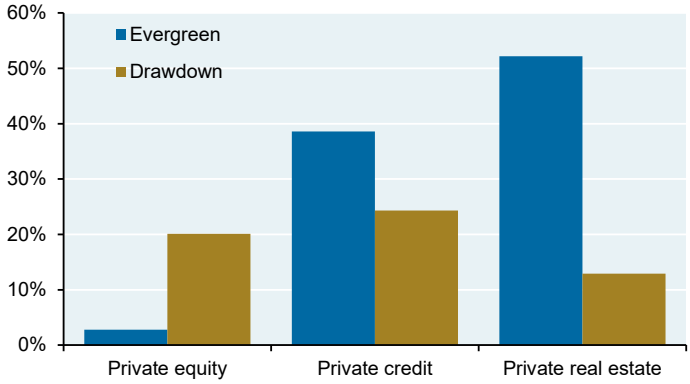

Source: JPMAM, September 2025

**Evergreen launches by type 2024**



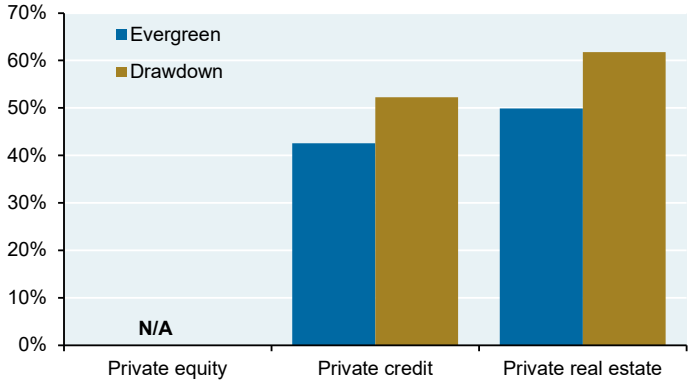

Source: JPMAM, 2024

**Evergreen vs drawdown fund vehicle leverage proxy**
Leverage proxy: (total vehicle assets - NAV) / total vehicle assets



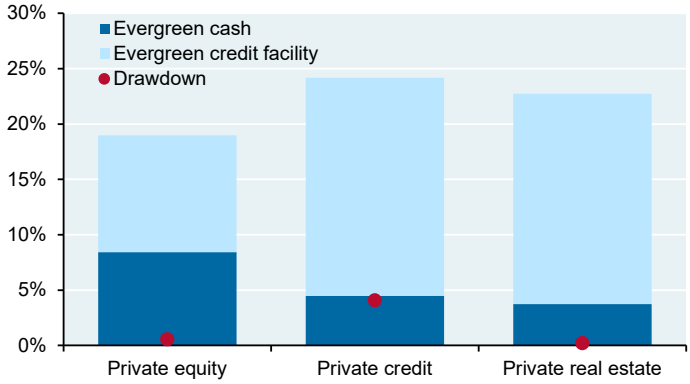

Source: JPMAM, June 2025. Universe: largest three funds in each category

**Evergreen vs drawdown fund deal leverage**
Leverage ratio (LTV)



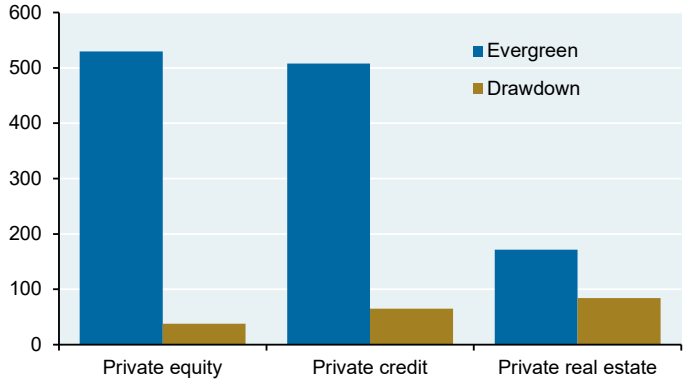

Source: JPMAM, June 2025. Universe: largest three funds in each category

**Evergreen vs drawdown fund cash levels**
Cash as % of fund




Source: JPMAM, June 2025. Universe: largest three funds in each category

**Evergreen vs drawdown fund number of investments**
Number of investments



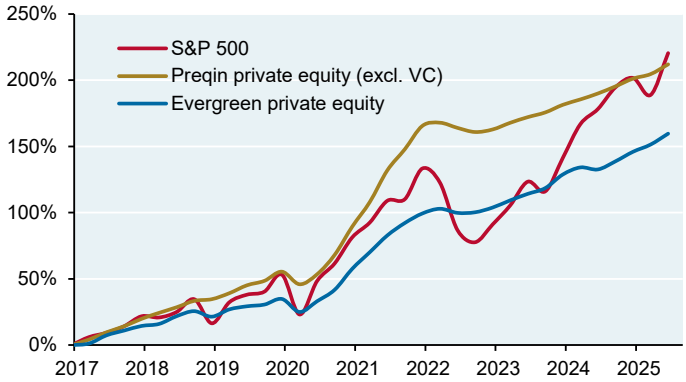

Source: JPMAM, June 2025. Universe: largest three funds in each category

*Performance*. The evergreen structure is only a few years old, which means it has not yet been subject to the stresses of a true recession with sharply rising corporate default rates and soaring credit spreads (see chart on page 30). Our Private Bank CIO-Alternatives team constructed composites for 150 US registered evergreen private equity, private debt and real estate funds, all of which are a subset of the 600+ evergreen fund universe. The composites are shown below in blue; while we also show the performance of a closed-end counterpart, for many evergreen fund investors this is less relevant given its lock-up and closed end features. The more apt comparisons: do evergreen funds offer higher returns than publicly traded markets in exchange for less liquidity?

For private equity, evergreen funds have trailed the S&P 500 but as discussed earlier, it's not clear this is the right benchmark given the contribution of Mag 7 stocks. For private debt and real estate, we do see some incremental return benefit. There may also be portfolio benefits to evergreen funds; while closed end fund risk-adjusted returns are meaningless given high autocorrelation of returns (0.6 - 0.7 as discussed on page 9), evergreen NAVs are a better measure of interim value given flows in and out of the funds. They also exhibit lower autocorrelation of monthly returns (private debt 0.1, private equity 0.2, real estate 0.4) than closed end funds.

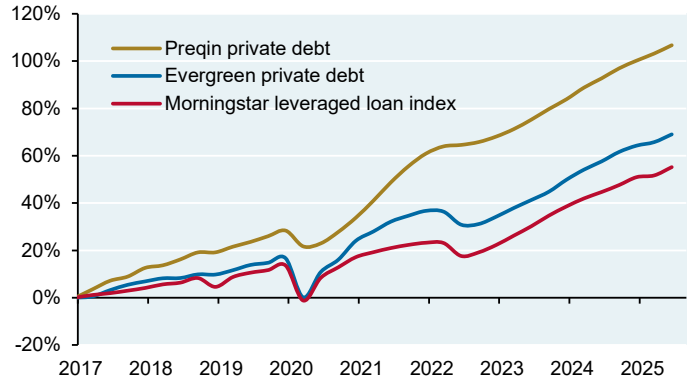
The open-ended nature of evergreen funds may affect how managers mark positions across the entire industry. Drawdown fund managers earn fees on committed capital, so marks don't really affect much other than interim NAVs used for fundraising purposes. **But with the rise of open-ended evergreen funds, marks will matter a lot more since they affect entry and exit valuations by investors. This will be particularly important to monitor for managers with both evergreen and traditional drawdown vehicles.** The time frame below might not be long enough to evaluate evergreen performance; evergreen funds may book upfront gains when buying LP interests below NAV but the economic reality of those gains isn't known until that LP interest is either sold to a third party, or when the underlying companies are monetized by the GP that controls them.

**Evergreen private equity performance**
Cumulative return since 2017



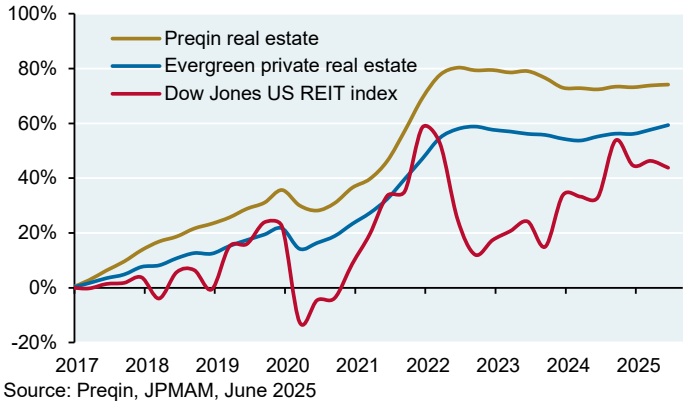

Source: Preqin, JPMAM, June 2025

**Evergreen private debt performance**
Cumulative return since 2017




Source: Preqin, JPMAM, June 2025

**Evergreen private real estate performance**
Cumulative return since 2017

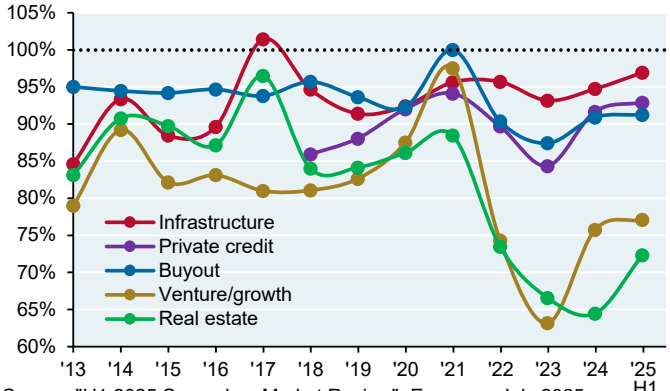



Source: Preqin, JPMAM, June 2025

## Appendix II: LP- vs GP-led secondary funds and performance vs buyout

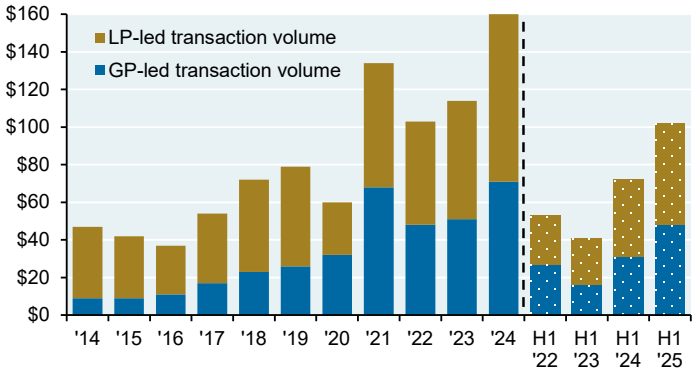
In LP-led secondary transactions, an LP sells all or a portion of their position to new investors which are often secondary funds created for this purpose. As shown on the left, such transactions tend to take place at discounts of 5%-15% for buyout, private credit and infrastructure, and at much wider discounts for venture and real estate. In GP-led transactions, a GP typically sells one or more assets towards the end of a fund's life to a new fund they also manage, and which is funded by a combination of new LPs and investors from the legacy fund who roll over their stake. In recent years, GP-led transaction discounts have usually been smaller than LP-led transactions. Over the last ten years, GP-led transactions have grown into a larger share of the secondary fund market.

**LP-led secondary transaction prices**
As a % of reference date NAV




Source: "H1 2025 Secondary Market Review", Evercore, July 2025

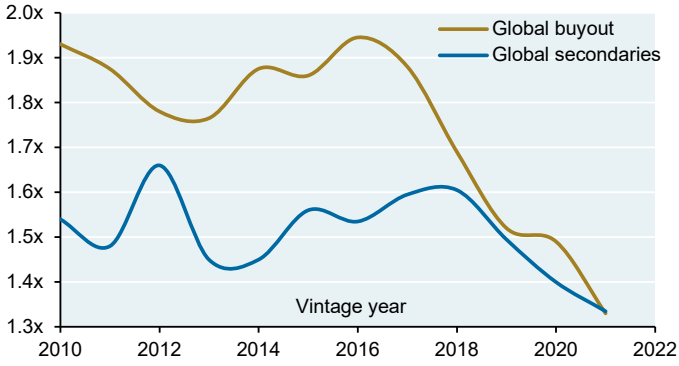
**Secondary market transaction volume**
US$, billions




Source: "H1 2025 Secondary Market Review", Evercore, July 2025

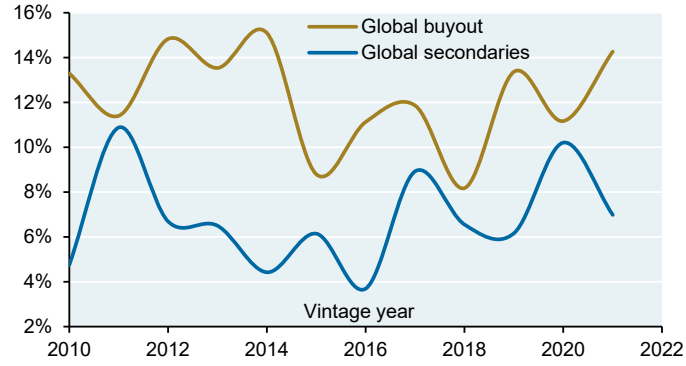
According to MSCI/Burgiss, the median global secondary fund has underperformed its buyout counterpart in each vintage year since 2010. I don't think this would come as a surprise to secondary fund investors; **the value proposition for secondary funds is usually the ability to gain quicker exposure to an existing, shorter duration buyout portfolio which entails less uncertainty than a new buyout fund**. As shown on the right, the dispersion between top and bottom quartile buyout funds is much higher than for secondary funds; for many investors, that's worth paying for in the form of modestly lower returns. And of course, "performance" depends upon which metric is used. TVPI is not time weighted; if we used IRRs instead, median buyout funds averaged 15.4% for vintage years 2010 to 2021 compared to the median secondary fund of 13.5%.

**Buyout vs secondaries median TVPI by vintage year**
Total value to paid-in capital




Source: MSCI/Burgiss, JPMAM, Q2 2025

**Buyout vs secondaries IRR dispersion by vintage year**
Top quartile fund IRR minus bottom quartile




Source: MSCI/Burgiss, JPMAM, Q2 2025

## Appendix III: Alternative Investment Research Roundup

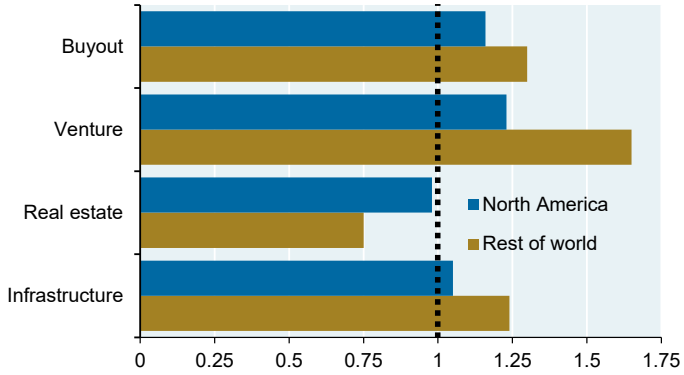
Every two years we read through academic papers on alternative investments. In this section, we review some of the ones we found interesting which are additive to topics already discussed.

***Private equity research***

Research roundup #1: returns across asset classes and the art of benchmarking[30]

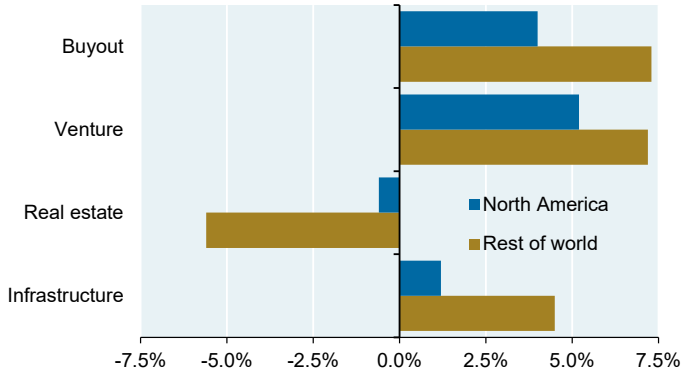
The authors studied 7,816 private funds for 1988–2019 vintages using cash flows and NAVs current through 2023. Their findings: buyout funds, venture capital and infrastructure funds have performed well relative to public markets on both a PME and direct alpha basis. In contrast, real estate funds have underperformed relative to their public market benchmarks, in particular those outside of North America. The paper also looked at buyout and venture returns using different benchmarks, as shown in the bottom chart.

**PMEs across alternative assets North America vs RoW, 1988-2019 vintages,** Public market equivalent ratio



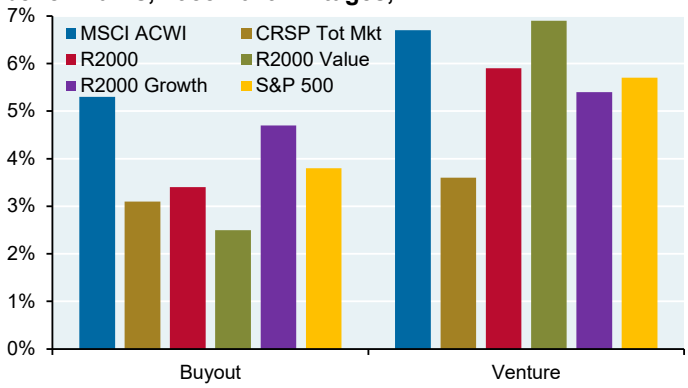

Source: Brown et al, Institute for Private Capital, JPMAM, March 2025

**Direct alpha across alternative assets North America vs RoW, 1988-2019 vintages,** Percent




Source: Brown et al, Institute for Private Capital, JPMAM, March 2025

**Direct alpha of North American PE relative to various benchmarks, 1988-2019 vintages,** Percent




Source: Brown et al, Institute for Private Capital, JPMAM, March 2025

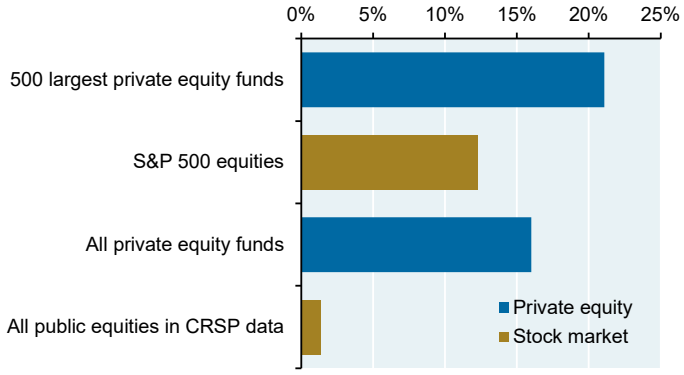
[30] "*Risk-adjusted performance of private funds: what do we know?*", Brown et al, Institute for Private Capital, March 27, 2025

Research roundup #2: private equity performance vs public equities, 2004-2023[31]

The author looked at performance data based on SEC Form PF regulatory filings rather than from voluntarily reported performance data or sources like MSCI/Burgiss. The study found that private equity returns tended to exceed public equity returns when comparing average annual IRRs on both an overall and industry-by-industry basis. The author also found that private equity benefits from asset scale: the PE funds in the largest quintile by size earned the highest returns, as shown in the third chart.

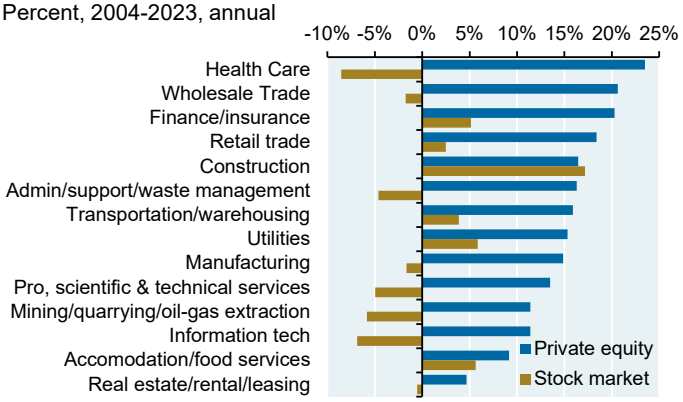
We were puzzled by the very low IRRs in the second chart when computed for the stock market by industry since they're measured over a time of generally good performance for US equities. After reviewing the methodology in more detail, we found that the author equal-weighted the CRSP universe of stocks to create stock market benchmarks. In other words, the author assumed that an investor would (as an alternative to private equity) equal-weight companies as small as $25-$50 mm in current market cap terms, and then hold them for ten years without any rebalancing or index substitution which are common to traditional index benchmarks like the S&P 500 or Russell 1000. The author also "winsorizes" the data by limiting the impact of the best 2% and worst 2% of all returns; over the long run, a lot of stock market winners come from the top 2% cohort, particularly in winner-take-all sectors. Bottom line: I don't think the author's stock market returns by industry are indicative of the average investor public market equity experience over this period. That's why the PME comparisons shown earlier in this paper rely on larger capitalization, market-cap weighted and balanced indexes.

**Private equity vs stock market avg annual IRR, 2004-2023**
Percent



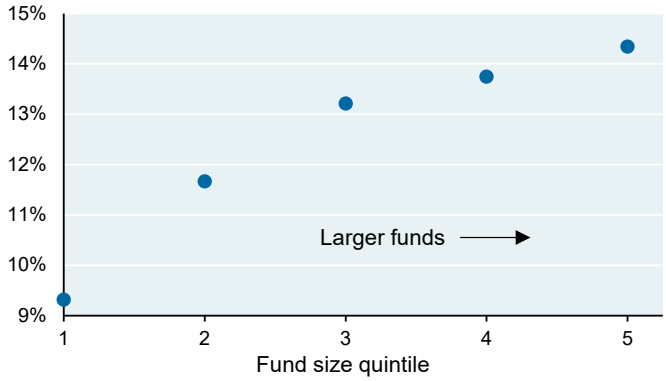

Source: "The Performance of Private Equity", Gupta, April 25, 2025

**Private equity vs stock market avg annual IRR by industry**
Percent, 2004-2023, annual




Source: "The Performance of Private Equity", Gupta, April 25, 2025

**Limited partners IRR vs fund size quintile**
Average annual IRR, percent



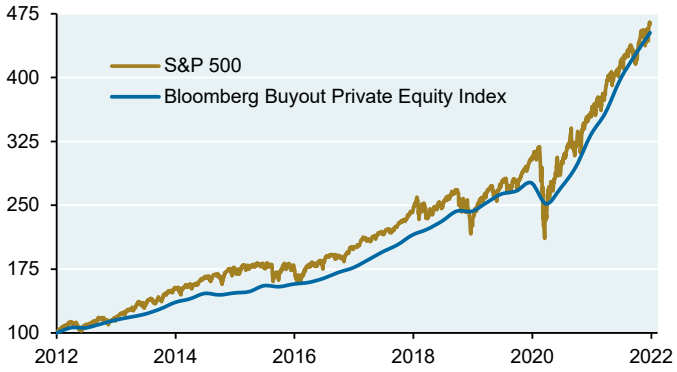

Source: "The Performance of Private Equity", Gupta, April 25, 2025

[31] *"The Performance of Private Equity: Evidence from Confidential Filings"*, Gupta (Federal Reserve), April 2025

Research roundup #3: on leverage and multiple expansion[32]

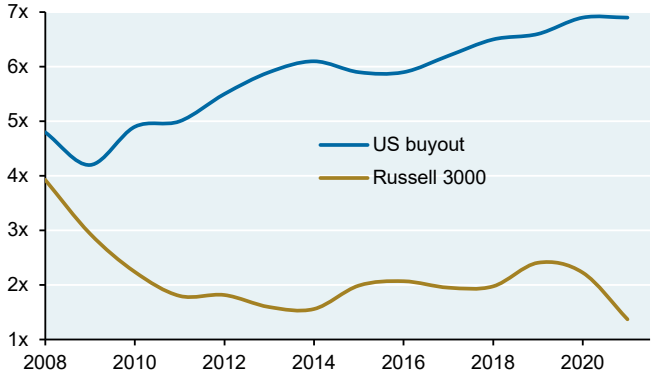
The authors found that private equity roughly matched public equity returns from 2012 to 2022; the first chart compares the Bloomberg Buyout Private Equity Index to the S&P 500. The paper concludes that investors should expect greater outperformance given much higher net debt / EBITDA ratios vs public equity counterparts.

**S&P 500 vs US buyout total returns**
Index (100 = December 31, 2011)




Source: Bloomberg, JPMAM, 2025

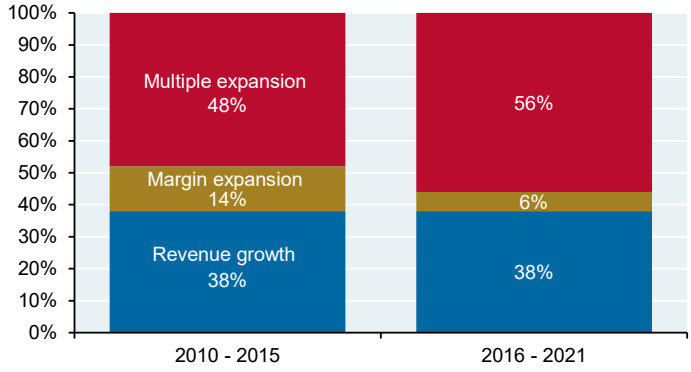
**US buyout vs comparable public equity debt ratios**
Net debt / EBITDA




Source: Lietz & Chvanov, Harvard Business School, Bloomberg, 2025

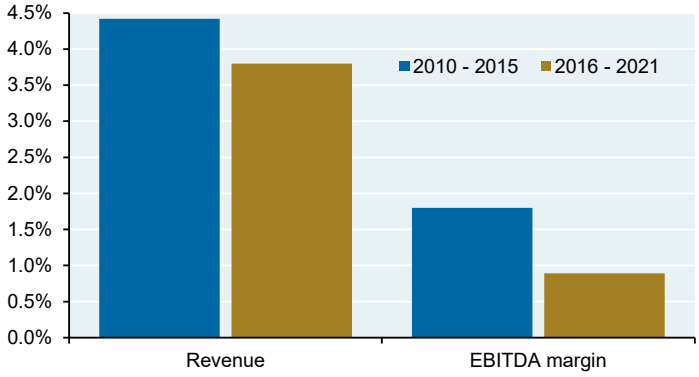
**Are PE firms really adding value?** The authors found that from 2016 to 2021, over half of buyout returns are attributable to multiple expansion rather than margin expansion or revenue growth. Furthermore, they found evidence of declining median revenue and margin improvements when comparing 2010-2015 vs 2016-2021.

**Global buyout value creation by year of exit**
Share of value creation




Source: Lietz & Chvanov, Harvard Business School, January 2024

**Global buyout median value creation by year of exit**
Median CAGR




Source: Lietz & Chvanov, Harvard Business School, January 2024

[32] *"Does the case for private equity still hold"*, Harvard Business School, Lietz, January 2024

Research roundup #4: what is the optimal leverage for a private equity firm?[33]

The authors from the Fed found that higher debt levels in buyouts is largely value-maximizing and not excessive, since private equity ownership lowers expected distress costs, since buyout companies have lower revenue volatility and since buyout companies have lower asset volatility.

Since private firms lack market prices, each PE-backed company was matched to public peers based on profitability, leverage, total assets and volatility of return on assets in the same country-industry-year. Their model for optimal leverage resulted in median and mean levels of 53% and 48%, which are remarkably close to actual post buyout leverage of 50% (both mean and median). Re-estimating the model with pre-buyout data generates much lower optimal leverage ratios of 29% median and 22% mean, which again is remarkably close to actual pre-buyout levels of 28% median and 25% mean.

Some of the Fed's findings justifying higher buyout leverage:

- Asset volatility drops markedly after a buyout takes place, from ~31% to ~18%. Lower volatility reduces expected distress costs, permitting higher value-maximizing debt
- Sales volatility declines after buyout vs. matched public controls. Firms diversify both their product basket as well as geographic product market after a buyout
- Distress gets equity support: when in distress, private equity backed firms typically receive larger equity injections than public controls, which is consistent with "deep pockets" reducing default risk
- The cost of under-leveraging is material: If a private equity backed firm kept leverage near pre-buyout levels, the median loss in firm value is ~4%

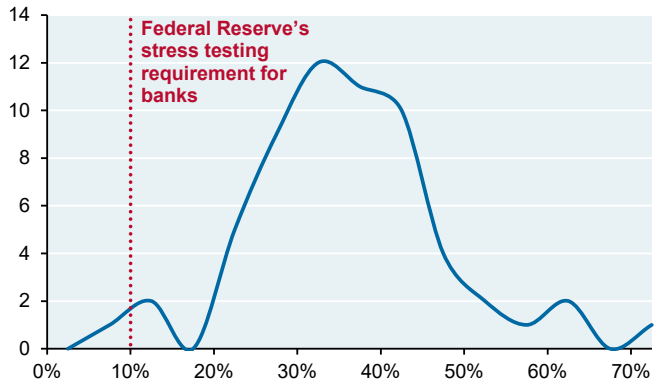
[33] "*Does Private Equity Over Lever Portfolio Companies?",* Sharjil Haque, Board of Governors of the Federal Reserve System, 2023

***Private credit research***

Research roundup #5: well-capitalized BDCs and the economics of bank lending[34]

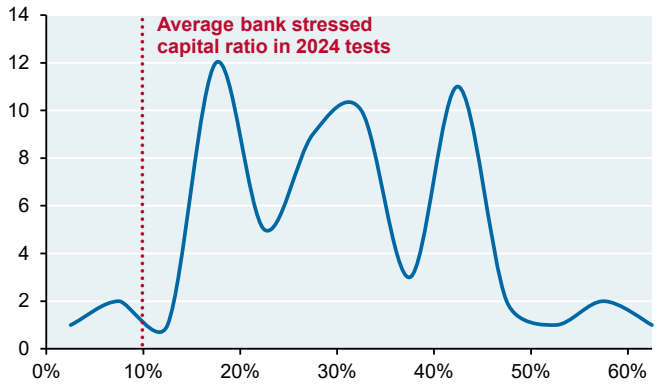
The authors found that BDCs are very well capitalized according to bank capital frameworks. These types of private credit funds have median risk-based capital ratios of about 36%, which is 26% more than Federal Reserve stress testing frameworks require. The average stressed BDC capital ratio is 30.4%, and just one BDC had a stressed capital ratio below 4.5%. In contrast, in the 2024 stress tests the average bank had a stressed capital ratio of 9.9%, well below the average stressed minimums of BDCs.

**Distribution of BDC risk weighted capital ratios**




Source: Chernenko et al, JPMAM, 2024

**Distribution of BDC stressed capital ratios**




Source: Chernenko et al, JPMAM, 2024

The authors found that banks find lending to private credit funds more attractive than lending to middle-market companies. The primary reason: over-collateralized loans to private credit funds get favorable capital treatment, enabling banks to exploit their low-cost sources of funding. While the spread on a BDC loan is lower than on a loan to a middle market company, the bank benefits from lower expected defaults, higher expected recoveries, lower operating expenses and lower risk weights which increase the ultimate ROE.

**The RoE on bank lending to small companies**

| | Bank loan to middle market company | Bank loan to BDC |
|---|---|---|
| SOFR overnight rate | 5.30% | 5.30% |
| Spread | 6.25% | 2.00% |
| **Assumed default rate** | **4.00%** | **0.25%** |
| **Assumed recovery rate** | **60%** | **95%** |
| Expected loss | 1.60% | 0.01% |
| Spread on debt funding | 0.55% | 0.55% |
| Tax rate | 25% | 25% |
| **Operating expenses** | **2.00%** | **0.10%** |
| **Risk weight** | **100%** | **20%** |
| Capital (% of assets) | 12.00% | 2.40% |
| **Return on equity** | **18%** | **46%** |

Source: Chernenko et al, JPMAM, 2024

[34] "*Bank capital and the growth of private credit*", Chernenko et al, March 2025

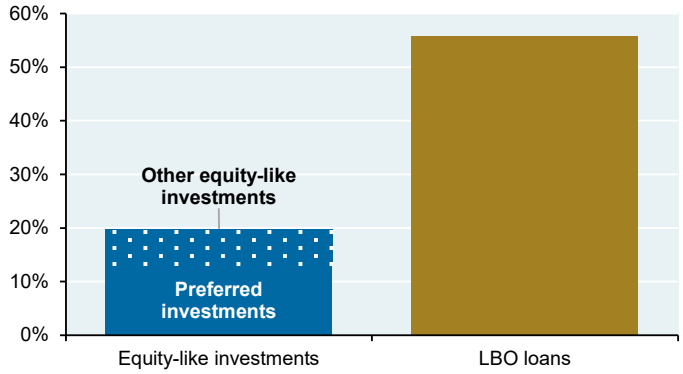
Research roundup #6: why private credit should be benchmarked against a mix of debt and equity[35]

Private debt funds charge substantial fees, usually a 1.5% annual management fee and 15% carried interest. Since other nonbank lenders have much lower fees, private debt funds must lend at higher rates than other nonbank lenders, and consequently do business with lower quality borrowers who do not have other sources of capital. To boost returns, private debt funds supplement the loans in their portfolios with equity or equity linked instruments such as warrants. Consequently, to measure risk adjusted returns investors receive, it is important to take the net-of-fee distributions and discount them using an approach that adjusts for both equity and debt related risks.

The authors used the MSCI/Burgiss private credit universe and filter for US$ denominated funds that launched between 1992 and 2015, excluding funds with less than five years of cash flows post-inception. For these 532 funds, they use MSCI/Burgiss for the fund returns and Pitchbook for the share of equity and preferred investments in the portfolios. Mixed investments that are a combination of debt and equity are counted as equity for purposes of the analysis, which might overstate the true equity risk component. The authors found that roughly 15% of private credit investments have some equity-like feature to them (20% of a value weighted basis), and that ~10% comes from preferred investments. They then computed excess returns on private credit by discounting returns by both corporate bond and stock factors to account for this equity exposure.

**The authors found that the risk-adjusted abnormal return on $1 of capital invested in private credit funds is indistinguishable from zero.** They estimate an insignificant abnormal return using Korteweg and Nagel (2016)'s generalized public market equivalent (GPME) method, which estimates an insignificant abnormal return of $0.031 per $1 invested. When using only debt as a risk factor, the estimated risk-adjusted profit becomes a positive, statistically significant $0.14 per $1 of capital invested. This estimate translates to a 2.3% alpha on private credit funds if only adjusting for corporate debt risk factors.

**Private credit fund holdings**
Percent, dollar weighted




Source: Erel et al, JPMAM, March 2024

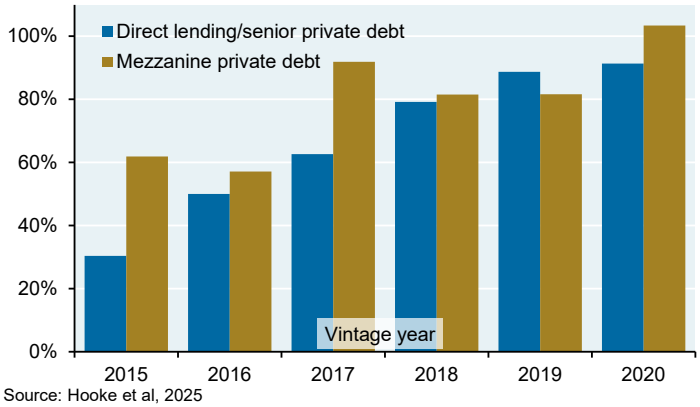
[35] "*Risk-adjusting the returns to private debt funds*", Erel et al, November 20, 2024

Research roundup #7: benchmarking private credit and residual value risk[36]

The authors found that private credit performance relies heavily on unrealized value. Across nearly all vintage years analyzed (2015-2020), a significant share of total value to paid-in capital (TVPI) is composed of residual value (RVPI) rather than realized cash returns (DPI). For example, even the oldest direct lending/senior private debt funds from the 2015 vintage have a median value of 30% unrealized returns, while for mezzanine private debt funds the figure is even higher at 60%.

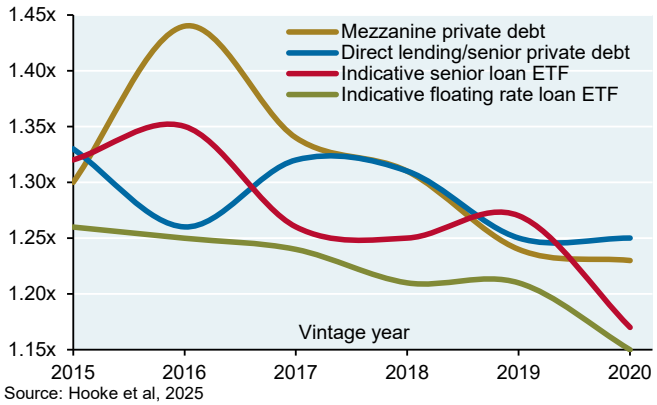
The authors concluded that private credit did not significantly outperform public benchmarks, since when compared to public market ETF benchmarks, private credit barely outperformed or underperformed. It's a judgment call; my interpretation of the chart on the right is a bit more positive than theirs.

**Median unrealized residual value as a share of fund**
Percent




Source: Hooke et al, 2025

**Performance of the median private debt fund relative to public benchmarks,** Total value to paid in capital




Source: Hooke et al, 2025

[36] *"Residual risk: benchmarking the boom in private credit"*, Hooke et al (Johns Hopkins), 2025

***Hedge fund research***

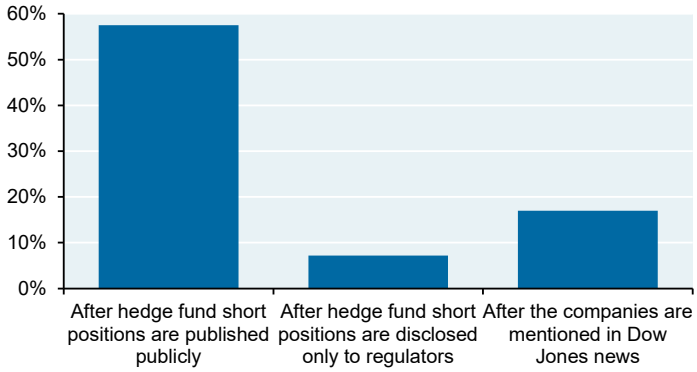
Research roundup #8: social media users, hedge funds and the returns on heavily shorted stocks[37]

The authors analyzed whether retail investors on social media platforms target hedge fund short positions. They found that disclosure of hedge fund short positions triggers activity on the Reddit community WallStreetBets (WSB) site, which leads to price increases for heavily shorted stocks.

Short sellers must report their short positions to FINRA on the 15th and final business days of each month (settlement dates). FINRA then compiles the short-interest data and discloses it to the public eight business days later (publication dates). The authors found that Reddit posts about highly shorted stocks increase when short sales are publicly disclosed, rather than when companies actually report earnings or when these earnings are discussed in the financial press. This implies that Reddit users are targeting hedge fund short positions rather than reacting to fundamental news. Increased WSB activity is typically followed by rising prices on the shorted stocks, but only if the stock's short interest is in the top one percentile. For these stocks, a one-standard-deviation increase in the number of posts is followed by 2.25% higher next-day returns. According to survey data, around 20% of institutional investors now make changes to their portfolios based on information posted in online forums.

**Social media activity about highly shorted stocks**

% change in WallStreetBets Reddit posts about highly shorted stocks




Source: "Did the Game Stop for Hedge Funds?", Chen et al, November 2024

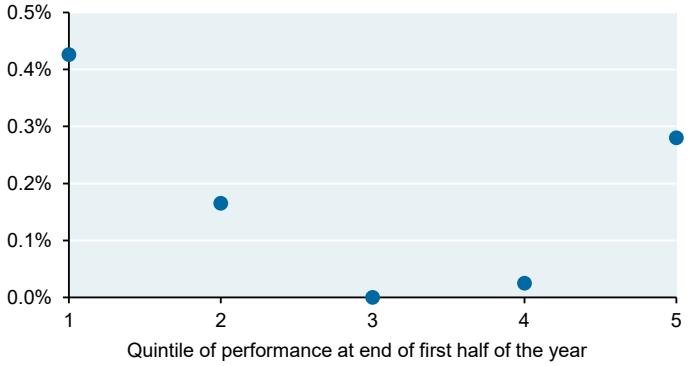
[37] *"Did the Game Stop for Hedge Funds?"*, Chen et al (University of Illinois at Chicago), November 2024

Research roundup #9: underperforming hedge funds go for broke[38]

The authors found that bottom quintile hedge fund managers amplify volatility by adding leverage and modifying asset class allocations in an attempt to improve performance. The analysis results: funds that are below their peak NAV halfway through a given year typically add 0.1% more to portfolio volatility in the second half of the year relative to a fund whose NAV is equal to its peak. Funds that are in the bottom quintile of performance after the first half of the year add 0.4% more to their volatility relative to the median fund. Also, funds with lax redemption policies and concentrated ownership tend to increase portfolio volatility more aggressively in hopes of reversing underperformance.

The authors also found that top quintile funds also add volatility (0.2%) because they are less concerned with dipping below their peak NAV and losing investors, so the potential to earn more in performance fees outweighs the risks. This is results in the "U" shaped curve below where lowest and highest quintile funds add to their volatility relative to average-performers.

**Hedge fund volatility increase by quintile of performance**
Std dev added to portfolio from 1H to 2H of year relative to median




Source: "The who and how of hedge fund risk shifting", Treasury, Oct 2024

[38] *"The Who and How of Hedge Fund Risk Shifting"*, Department of the Treasury, Andrews et al, October 2024

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