PitchBook

Case Studies in Fund Performance

Contents

2007 vintage buyout funds

POOLED IRRS

IRR HURDLE RATES

Vintage year	Pooled IRR	Equal-weighted pooled IRR	Number of funds	Top decile	Top quartile	Median IRR	Bottom quartile	Bottom decile	Standard deviation	Number of funds
2007	9.34%	9.56%	79	20.62%	15.00%	9.73%	4.42%	-0.85%	9.82%	77

Source: PitchBook | **Geography:** Global
*As of March 31, 2017

As with many areas of finance, 2007 serves as a stark inflection point in the historical arc of PE, marking the high-water mark for both fundraising and dealmaking. The year was characterized by massive club deals, many of which—including the infamous TXU/Energy Future Holdings LBO—flamed out in spectacular fashion. Another defining characteristic of 2007 was the prevalence of massive funds, including 62 funds of $1 billion or more, six of which had $10 billion or more. Not only did these vehicles face elevated competition, but they also were making their initial deals in an environment of eye-watering valuations.

The exuberance of 2007—and the run-up in the preceding years—is frequently pointed to as a cautionary tale for PE, with many assuming the mega buyout funds raised during the period categorically underperformed. At the 10-year anniversary, this time in PE history is particularly pertinent, as purchase-price multiples have once again risen to record levels and Apollo has closed on a massive $24.7 billion buyout fund (surpassing the previous record set by Blackstone in 2007). It's easy to cherrypick anecdotes about where things went wrong in 2007, so we decided to dig into the data to find the true story and gain insight into what may be in store in the current environment.

The results we found were mixed, but the performance of 2007 mega buyout funds (i.e., larger than $1 billion) is not as dire as hearsay may suggest. For the 2007 vintage, the pooled TVPI multiple is 1.50x and the median is 1.45x, both of which beat 2007 vintages funds from smaller size buckets. Furthermore, the bottom-quartile rate for mega buyout funds (5.55%) compares favorably to other size groups, trailing only funds of $250 million–$500 million. These stats suggest that these mega buyout funds have preserved capital better than investors may realize.

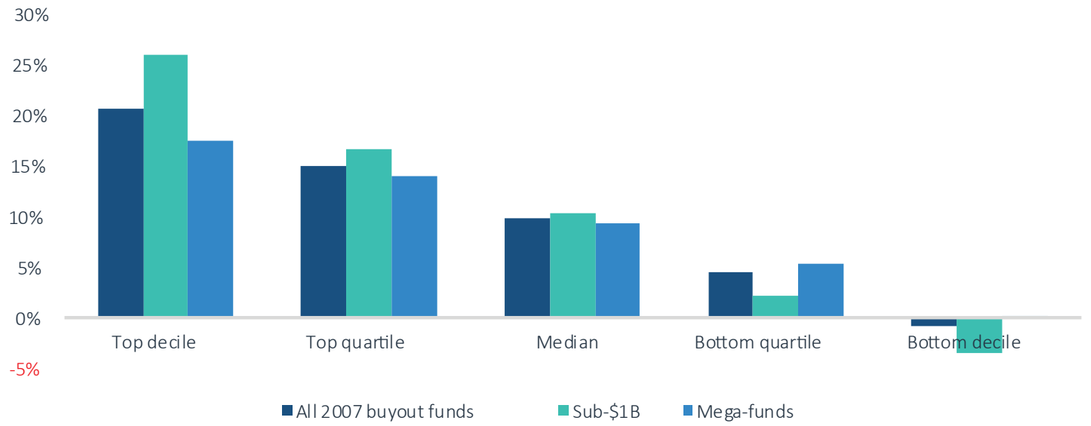
Where 2007 mega buyout funds come up short, however, is delivering outperformance—both against other buyout funds and public equities. While the 2007 mega buyout funds provided relatively good downside protection, they largely failed to deliver the outsized returns that investors expect of PE. The top-quartile hurdle rate for mega buyout funds is 14.35%, which lags funds in the two smallest size buckets by roughly 300bps.

As a whole, 2007 buyout funds have underperformed public equity markets, posting a PME of 0.96. As the PME calculation is capital-weighted, mega buyout funds predictably mirror the broader group, delivering a PME of 0.97 while smaller vehicles fared slightly worse at 0.94. Investors certainly expect PE to outperform, so the PMEs below 1.0 are disappointing; however, it is worth noting that this comparison against public equities includes a period with one of the longest bull markets on record (albeit with one of the steepest selloffs, too).

To be sure, the performance of 2007 mega buyout funds trails the historical average for funds of similar sizes from other vintages; however, operating with the knowledge of what transpired in the financial crisis, most investors in 2007 vintage funds would likely be happy to see their returns solidly in the black—and even above most long-term estimates of equity market performance (i.e., 8%).

2007 mega-buyout funds' performance not as dire as supposed

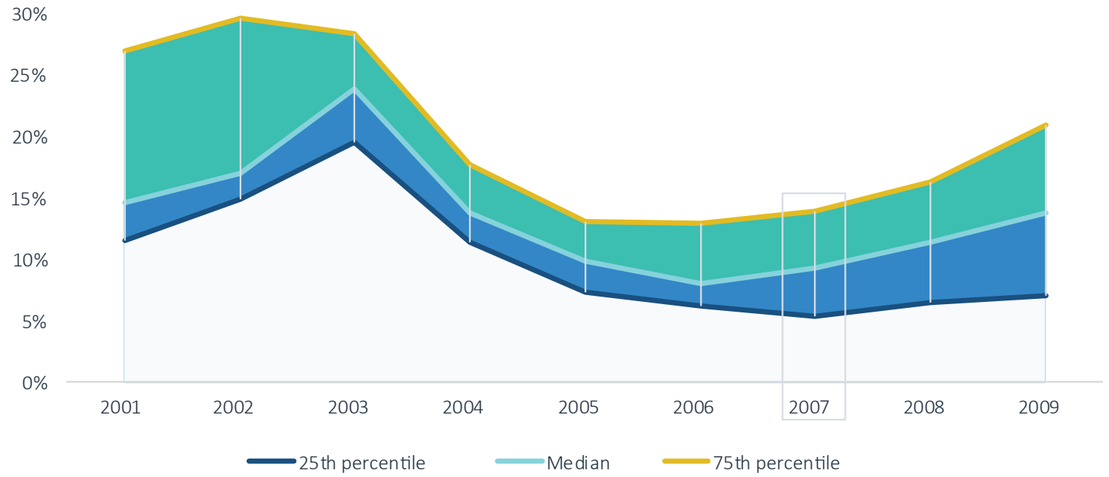
2007 vintage buyout fund IRR quartiles and deciles



Source: PitchBook | **Geography:** Global
*As of March 31, 2017

But they still haven't delivered as expected

Mega-buyout IRR quartiles by vintage



Source: PitchBook | **Geography:** Global
*As of March 31, 2017

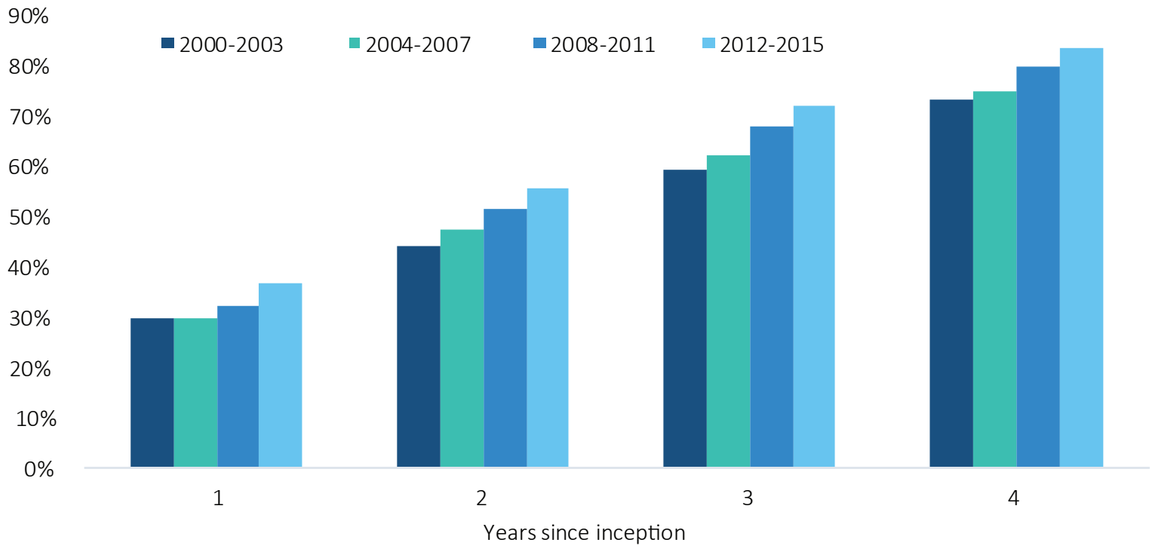
Going with the flows

As the amount of capital tied up in private capital funds has swelled to unprecedented levels, valuations have been pushed up at all stages of the investment cycle. Purchase-price multiples for acquisitions have risen to pre-crisis levels; startup valuations haven't been this high since the dotcom bubble; even LP stakes in buyout funds are selling at nearly full NAVs on the secondary market. GPs have adapted and honed their strategies to meet the new realities of the market—reconsidering everything from deal sourcing and structuring, to operational plans and exit strategies. Many of the variations in approach are qualitative in nature, but other changes are detectable in the data. Fund cashflows are one example where historical trends have deviated in recent years.

Seek and deploy

The rate at which a fund calls down capital has ripple effects for the vehicle's long-term performance. In VC, round sizes have risen in tandem with valuations, meaning that VCs now must write larger check to get into the same deals they have in the past. To meet this new reality, successful VCs have aggressively upped the target size of their funds; however, even with larger pools of capital, they are still investing faster they have in the past (although still much slower than PE funds, as VCs are keen to keep capital available to participate in follow-on financings). The average VC fund raised in the early 2000s called down less than 60% of capital commitments by its third year, but that has steadily increased to roughly 70% for more recent vintages. Drawdown rates for PE funds are trending in the other direction, with managers taking longer to invest funds than they have in the past. Part of this can be attributed to mean reversion, as 2004-2007 vintage funds invested at a record-breaking pace in the runup to the financial crisis. For more recent funds, capital deployment has been steadily decelerating; PE funds historically have called down more than 80% of commitments by the end of their fourth year, but that has slipped to just 77% for 2012-2015 vintage funds.

VC called down % over time by vintage bucket



Source: PitchBook | **Geography:** Global
*As of June 30, 2017

Anecdotally, managers say that high prices recently have hampered their ability to make deals even while LPs continue to commit large sums to new funds; however, the data show that the pace of investment has largely kept up with the robust fundraising market. As such, we believe that the slower drawdowns of more recent PE funds can primarily be attributed to two factors.

Waiting for the call

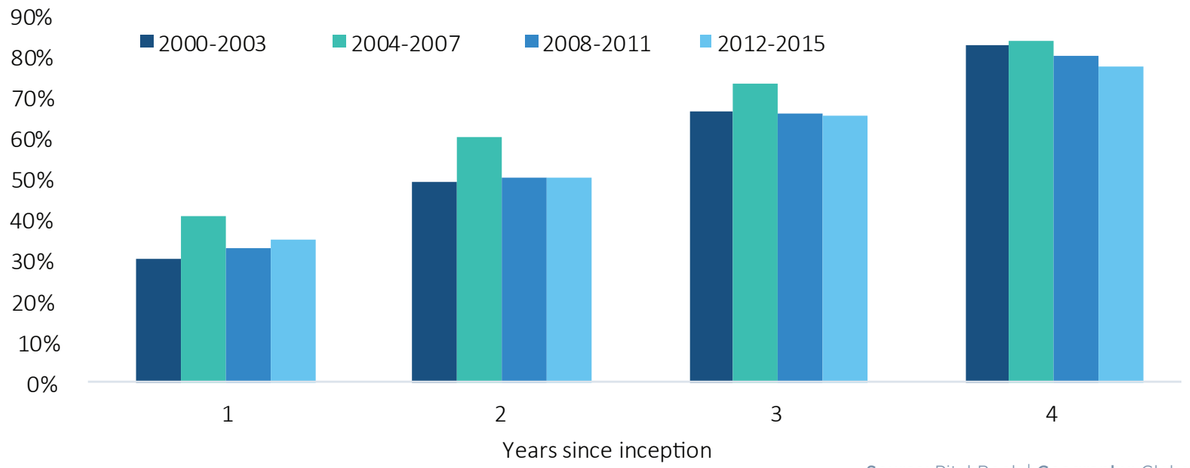
First is that GPs are finding new sources of capital to tap. The biggest single factor is the prevalence of co-investment capital, which has allowed GPs to stretch their fund commitments farther. And while overall debt levels have been at elevated levels for several years, the use of subscription credit lines—already standard practice for many firms—is becoming more commonplace; even Apollo, which has never had one before, is setting up a capital-call facility for its newest vehicle. Prudent use of credit lines should not be a concern, but many in the industry believe that they are now being used as a strategic tool, rather than a means of managing fund administration. To that end, lenders in the space say that it is now common to see facilities with repayment periods of two years or more. Given their increasing prevalence and evolving structure, we think that subscription credit lines may be retarding the pace of capital calls, which may serve to artificially boost IRRs but will not impact cash multiples.

Another factor likely at play is PE firms keeping more capital on hand to support add-on deals executed by their platform companies. Similar to how VCs keep dry powder available to fund follow-on financings, PE managers now must consider how to fund potential add-on acquisitions down the road. Indeed, roughly two-thirds of US buyouts are add-ons, and these transactions are increasingly being executed later in the investment lifecycle.

Paper gain tigers?

While LPs must grapple with how to allocate uncalled capital, changes to the pace of capital deployment are most important to the extent that they impact the time-weighted return of capital. To that end, the IRR performance of recent VC funds looks strong on a historical basis; however, our previous analyses have pointed out that the vast majority of gains in these funds are yet to be realized. The median IRR for 2013 vintage VC fund is 15.3%, while the median DPI is just 0.09x. But concerns about sluggish distributions and VCs' inability to return capital may be overblown.

PE called down % over time by vintage bucket



Source: PitchBook | **Geography:** Global
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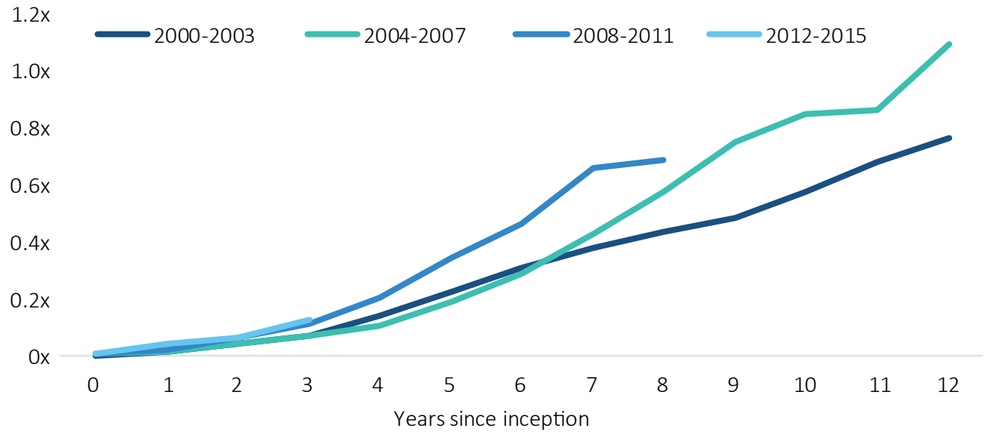
For VC funds, distribution rates for the 2000–2003 and 2004–2007 vintage buckets largely mirror one another through the first seven years of a fund's life, after which the 2004–2007 group begins to outperform. Considering the age of these funds, this uptick in performance began to occur in the late 2000s, in the post-crisis period characterized by an improving macro backdrop, and has carried over into 2008–2011 vintage funds. At the seven-year mark, the average 2008–2011 vintage fund has produced a DPI of 0.65x, compared to just 0.38x and 0.42x for the 2000–2003 and 2004–2007 vintage buckets, respectively. So, while substantial unrealized value continues to linger in many recent VC funds, these vehicles at their initial stages have proven relatively adept at returning capital compared to earlier eras.

Over the last two decades, the opposite trend has taken hold in the PE space. Not only are funds taking longer to return capital, but the absolute level of returns also seems to be on the downswing. The average PE fund raised in the early 2000s generated a DPI of 1.0x before its seventh year, but those halcyon days all but disappeared in the run-up to the financial crisis. Indeed, 2004–2007 vintage PE funds took until their ninth year to make investors whole, and that timeline has only continued to extend for more recent vintages as PE firms have placed greater emphasis on operational improvements, which take time to bear fruit. This reality will not come as a surprise to industry professionals, and many GPs have already taken the proactive step of incorporating longer fund lives and investment periods in more recent LPAs to ensure they're prepared and setting LP expectations accordingly. While LPs generally have seemed amenable to reasonable timeline extensions, an outstanding question is whether they'll be accommodating if cash-on-cash returns fall short over the full life of the funds.

VC DPI over time by vintage bucket



Source: PitchBook | **Geography:** Global
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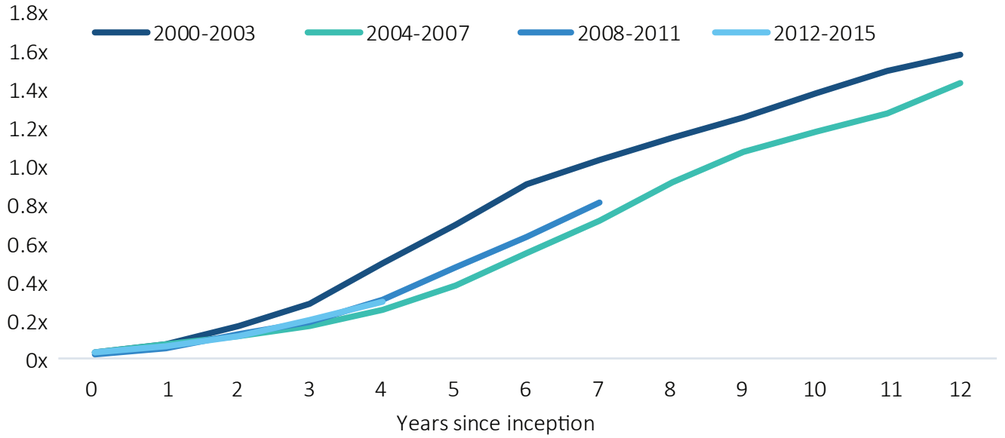
PE DPI over time by vintage bucket



Source: PitchBook | **Geography:** Global
*As of June 30, 2017

Performance persistence

Key takeaways

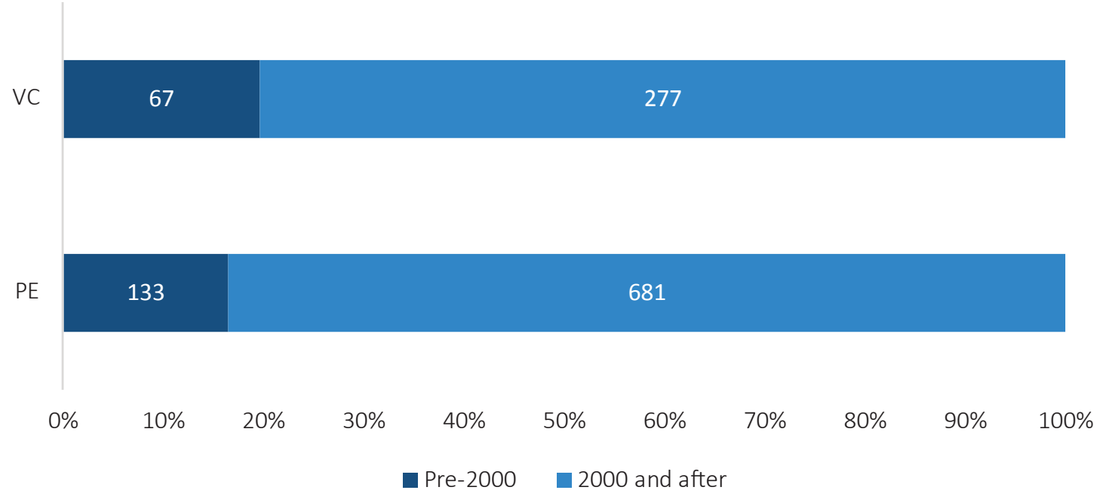
- Performance persistence is observable in both PE and VC funds, with the highest level of persistence occurring at the ends of the return distribution. Funds that deliver top-quartile performance are followed by a top-quartile successor fund 35% and 41% of the time for PE and VC, respectively.
- In addition to observing broad-based performance persistence, we found that the level of persistence rises as a firm raises additional funds for a particular strategy.
- While we observed a considerable amount of persistence in the quartile performance from one fund to the next—particularly on the ends of the distribution—regressions of net IRRs among subsequent funds in a Fund Family did not show a strong correlation in returns.

Is the past prologue?

The phrase "past performance does not guarantee future results" has become so ubiquitous in investment memoranda that few investors are likely to notice it in the footnotes. And while most investors have that maxim embedded somewhere in their mental investment framework, when it comes to investing in active managers, past performance is virtually always one of the first things considered. But should it be? One of the timeless questions for private capital funds is whether performance persistence exists. The answer has major implications for capital allocators.

Academics have come to mixed conclusions. The most prominent paper, Has Persistence Persisted in Private Equity?, found persistence for pre-2000 PE and VC funds, but the story changed when they examined more recent funds. After 2000, the researchers "find little evidence of persistence for buyout funds, except at the lower end of the performance distribution" but that "performance in venture capital funds remains as persistent as pre-2000." Using PitchBook's fund performance data, we investigated these conclusions and explored other areas that could provide insight into how a general partner's (GP's) performance changes over time.

Funds pairings (#) by vintage year of first fund



Source: PitchBook | **Geography:** Global
*As of September 30, 2017

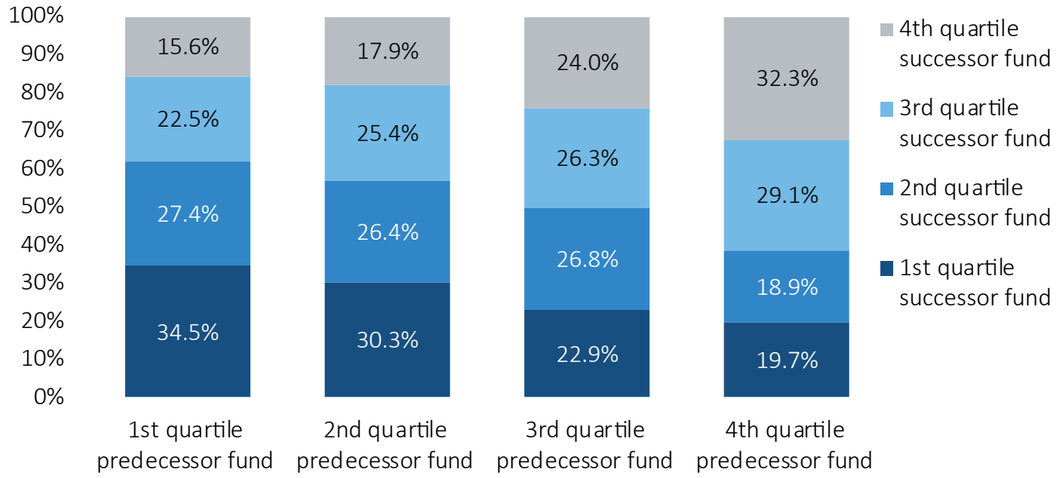
All in the family

For this analysis, we have bucketed funds into "Fund Families" to account for the different investment strategies managed by a single GP. For example, if a manager has both buyout funds and private debt funds, performance persistence is measured separately for the two strategies. The same goes for differences in geography and various sub-strategies of PE (e.g. energy, secondaries, growth). A total of 1,158 fund relationships (814 PE and 344 VC) are included in this analysis.

If performance from one fund to the next were random, 25% of top-quartile funds would produce a top-quartile successor. In fact, that figure comes out to 35% for PE, suggesting a high degree of persistence in top performers. We find that the inverse is true as well, with 32% of bottom-quartile funds being followed by another bottom-quartile fund. Furthermore, 62% of top-quartile funds led to a subsequent fund with above-median returns.

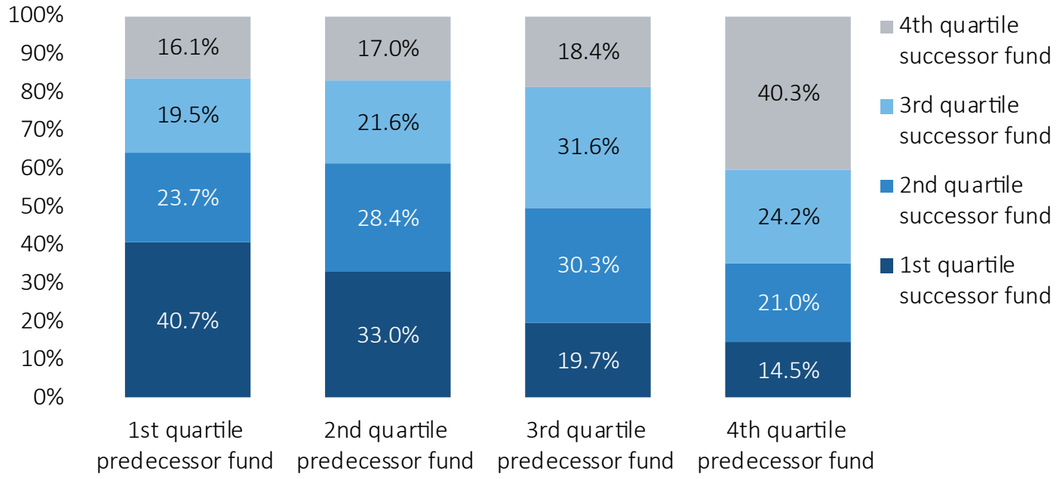
The story is similar for VC, with top-quartile funds spawning a successor fund in the top quartile 41% of the time. Persistence is similarly pervasive in the bottom end of the return distribution, with 40% of bottom-quartile funds being followed by another bottom-quartile vehicle.

PE fund IRR quartile persistence



Source: PitchBook | **Geography:** Global
*As of September 30, 2017

VC fund IRR quartile persistence



Source: PitchBook | **Geography:** Global
*As of September 30, 2017

In addition to observing broad-based performance persistence, we found that the level of persistence rises as a firm raises additional funds. We attribute this finding to the built-in survivorship bias inherent in this data; if a GP can raise at least three funds for a given strategy, it's a strong sign that limited partners have observed traits (including strong prior performance) that led them to believe the GP can continue to generate strong returns into the future. We believe this feedback loop is likely to be particularly strong in VC, where performance is more dependent on accessing strong performance outliers, because a dealmaker's reputation leads directly to high-quality, in-bound investment opportunities. Interestingly, we find that persistent underperformance also exists, suggesting that LPs are providing subpar GPs more leeway than may be warranted.

While we observed a considerable amount of persistence in the quartile performance from one fund to the next—particularly on the ends of the distribution—regressions of net IRRs between subsequent funds in a Fund Family did not show a strong correlation in returns. We expected to find some correlation in this regard, but this finding is not entirely surprising considering that PE fund performance metrics vary greatly depending on the vintage. A 2006 buyout fund with IRR of 11.3% would be in the top quartile, for instance, while that same level of performance for a 2001 fund would put it on the cusp of the bottom quartile.

Set it and forget it?

Even though persistence is not absolute, this data seems to suggest that LPs would be well-served to scrutinize past performance in their consideration of future fund commitments; however, there are several caveats to consider.

First, a certain number of managers will inevitably encounter challenges from one fund to the next. So, even when recommitting to a manager, LPs must conduct thorough due diligence to ensure that the GP has taken the necessary measures to insulate themselves from performance pitfalls, including complacency, style drift and strategy obsolescence. This includes assessing the GP's culture and ability to retain talent.

Second, a propensity to reallocate to existing managers may come at the detriment of considering new and upcoming GPs. First-time funds have exhibited strong historical performance relative to follow-on funds, and top-performing first-time funds are likely to be the persistent performers of the future. If investors overlook nascent managers, they may not have the ability to find capacity in the manager's subsequent fundraises.

References

Harris, R. S., Jenkinson, T., Kaplan, S. N. and Stucke, R. (2014). Has persistence persisted in private equity? Evidence from buyout and venture capital funds (Darden Business School No. 2304808). Charlottesville, VA: Darden Business School.

Chasing the bull

Key takeaways

- PE managers have struggled to keep pace with the bull market in public equities. For each vintage from 2006 to 2015, the median PE fund has failed to produce a KS-PME higher than 1.00x, indicating underperformance relative to the S&P 500.

- The level of outperformance for top PE funds is in decline. While the top-decile PME level crested 2.00x for multiple vintages in late 1990s and early 2000s, it has averaged 1.34x for 2006 to 2015 vintages and hasn't been above 1.50x since 2005.

- Even top-quartile VC funds rarely beat the market. In addition to the median PME being above 1.00x for only five vintages from 1997 to 2015, the top-quartile hurdle rate is below 1.00x for six of the 19 vintages.

***Note for consistency, the S&P 500 Total Return Index was used to calculate all KS-PME values in this case study.*

Private market funds are illiquid, charge relatively high fees and require more oversight and effort than many other investments. Therefore, the expectation is straightforward when investors—whether they're a massive sovereign wealth fund, a modest college endowment or a tightly held family office—commit capital to a private capital fund: to generate returns superior to less costly investment options, namely public equity strategies. But determining whether an investor would be better off investing in a private capital fund or something else is not as straightforward as it may seem.

The primary challenges in measuring private capital performance are the illiquidity and the unpredictable timing of cash flows. IRR has long been the industry's standard, but it is seldom used to assess other asset classes—making comparisons difficult—not to mention its laundry list of flaws that have been thoroughly documented by academics and industry professionals. Cash multiples (i.e. DPI, RVPI and TVPI) are helpful and easy to understand but also prove insufficient for cross-asset comparisons, as they fail to adequately account for the inherently sporadic timing of cash flows for private market strategies.

While lesser known outside private capital markets, public market equivalents (PMEs) have become the preferred method for most academics and many leading industry professionals to assess performance. At PitchBook, we typically use pooled PMEs to assess the aggregate performance of private capital strategies relative to other strategies, but this methodology masks the wide degree of dispersion among managers. Indeed, an ongoing question for allocators of capital is what role manager selection plays in the overall performance of a private markets strategy. For this case study, we've calculated individual PMEs for each fund included in PitchBook Benchmarks to provide a more comprehensive picture of how private capital's performance relative to public equities has evolved.

Private equity: Are the good times gone?

Starting with PE, we find that for vintages in the late 1990s and early 2000s, 60%-85% of funds produced a PME of 1.00x or greater, which indicates outperformance. Even the bottom-quartile PME exceeded 1.00x in certain years, underscoring the widespread ability of managers to beat the market. But performance has been less rosy for more recent vintages, which have struggled to keep pace with the incessant rise in public equities.

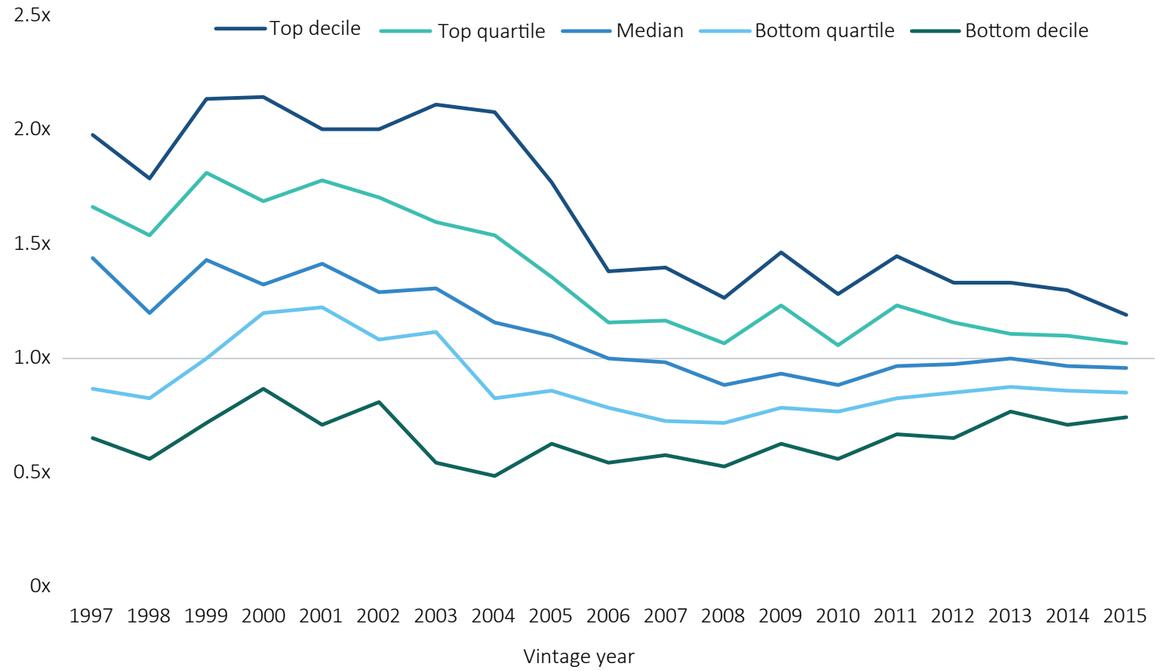
Whereas an investor in PE two decades ago could essentially pick a GP at random and have a better than 75% chance of "beating the market," for vintages since 2006 those odds are worse than a coinflip. As the average return for PE funds has moved lower, so too has the potential for outsized returns. Indeed, while the top-decile PME level crested 2.00x for multiple vintages in late 1990s and early 2000s, it has averaged 1.34x for 2006 to 2015 vintages and hasn't been above 1.50x since 2005. So not only are fewer managers beating the market, but their level of outperformance has shrunk too.

This systematic downturn in PME values is being driven by developments on both sides of the equation. On one side is the decade-long bull run in equity markets. The S&P 500 has posted gains each year since 2009, including three years with returns in excess of 20%, which has made it difficult for PE to keep pace. Another factor is that the average returns on an absolute basis for PE funds have fallen due to a confluence of factors, with the most important being heightened competition that has elevated purchase-price multiples.

The question is whether this sea change will prove cyclical or structural as markets turn. For public equities, while the length of the recovery is not unprecedented, it is unlikely they will continue to perform as strongly in the future. Over the next decade, Morningstar predicts US stocks will post nominal returns of just 1.8% while Vanguard has a slightly more optimistic target of 3%-5%.[1] And while PE returns seem unlikely to revert to the levels seen in the early days of the industry, certain managers have exhibited the ability to consistently outperform both the public equity markets and their peers.

Relative PE performance has fallen for more recent vintages

PE KS-PME percentiles

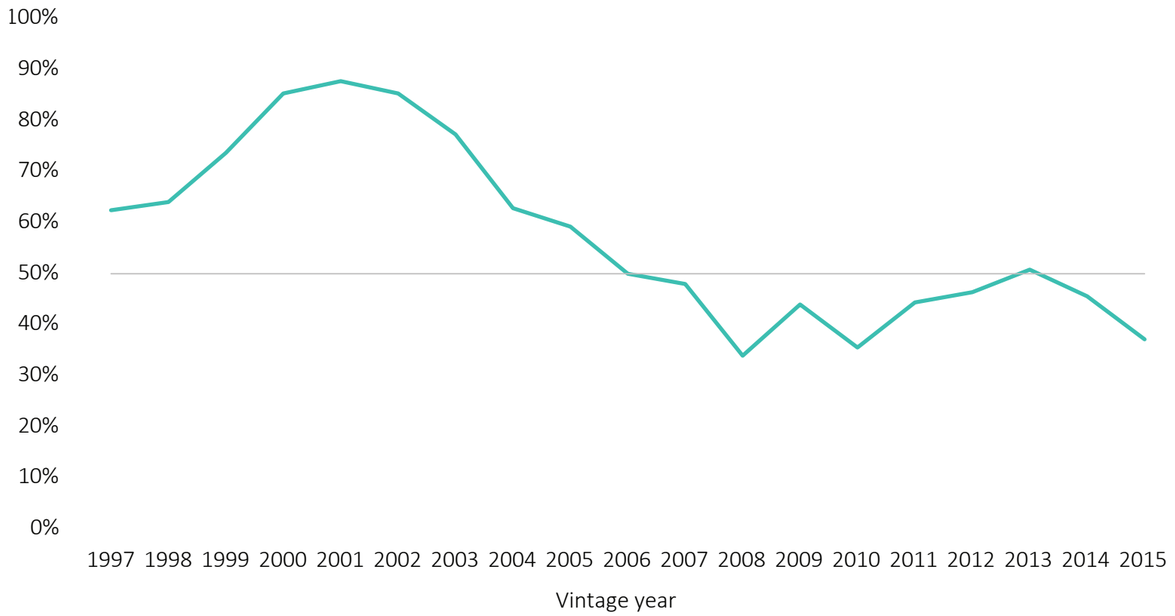


Source: PitchBook | **Geography:** Global
*As of December 31, 2017

1: "Experts Forecast Long-Term Stock and Bond Returns: 2018 Edition," Morningstar, Christine Benz, January 8, 2018

In recent vintages, the average PE manager has failed to beat the market

Percentage of PE funds with a KS-PME > 1



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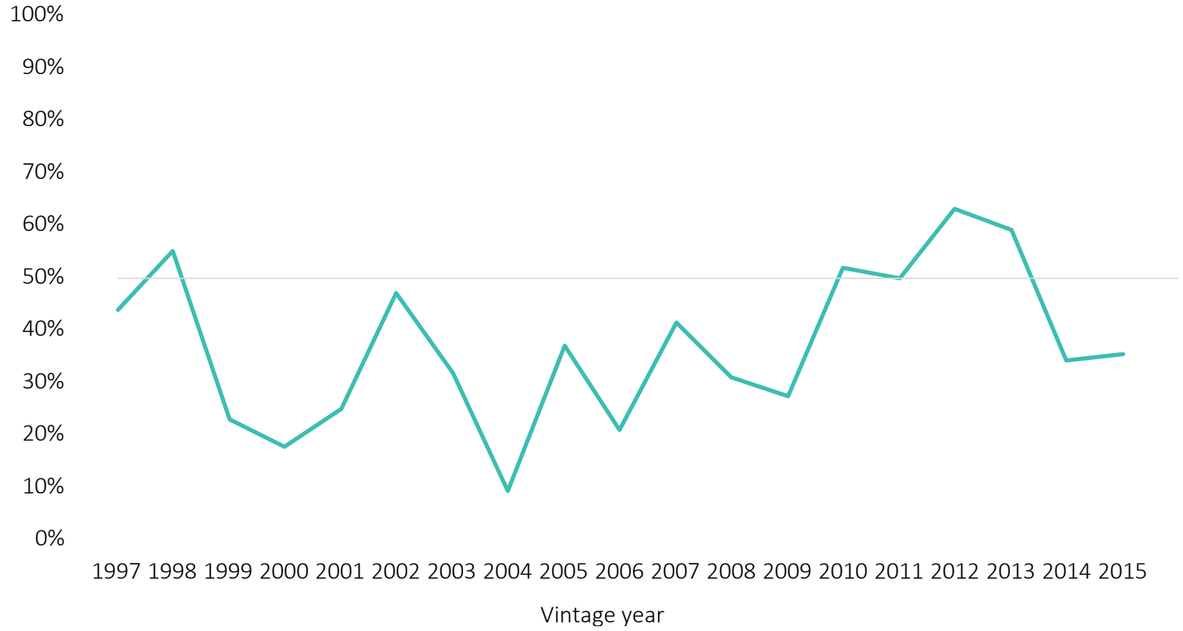
*As of December 31, 2017

VC funds historically have struggled to beat the market

Percentage of VC funds with a KS-PME > 1



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Venture capital: Swinging for the fences

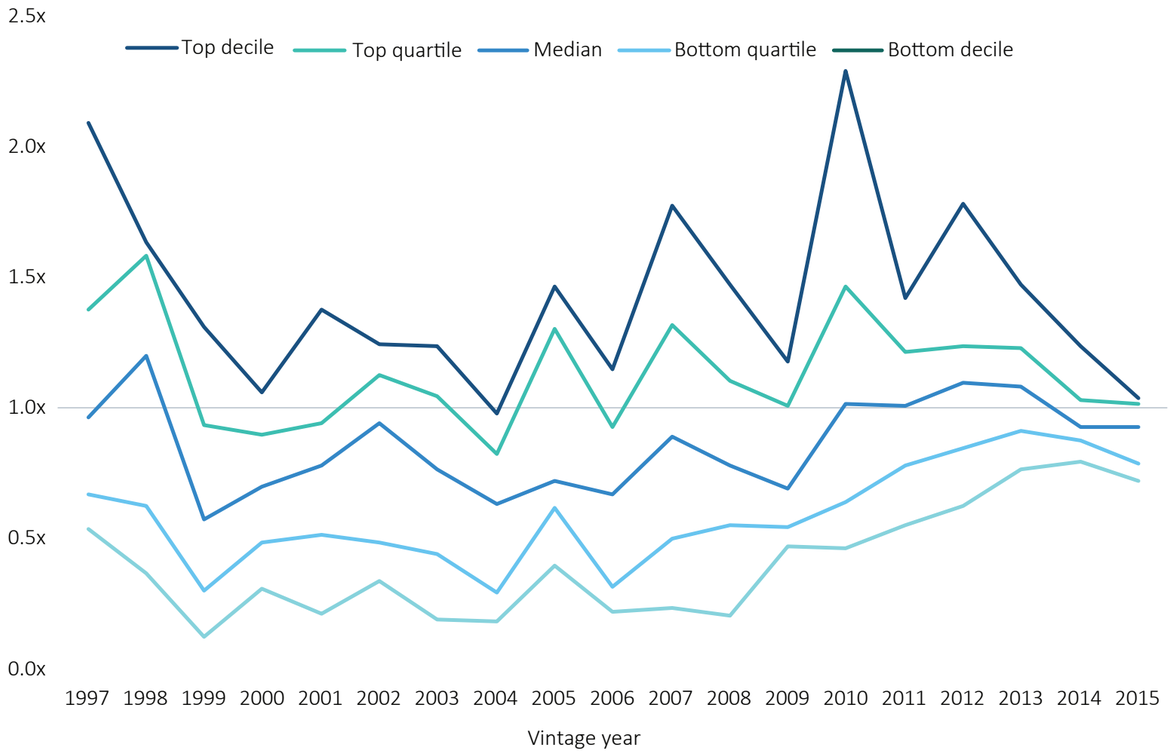
VC investors often use baseball metaphors when discussing performance. Deals are often categorized as strikeouts and homeruns, with VCs expecting outsized successes to carry the performance of the fund. The data suggests that this metaphor holds for limited partners (LPs) committing to VC funds too. The median PME is above 1.00x for only five vintages from 1997 to 2015, four of which occur post-2010 (i.e. vintages with mostly paper gains). This indicates that when LPs are selecting VC funds, it takes a fair amount of skill (and maybe some luck) just to keep pace with public equity markets.

But even choosing a top-quartile fund may not prove a compelling enough proposition to warrant the requisite time and resources associated with VC investing; the top-quartile hurdle rate is below 1.00x for six of the 19 vintages in our sample. The bottom-quartile hurdle rates underscore the significant risk of substantial underperformance. In the PE data, the lowest bottom-quartile PME hurdle rate was 0.72x, while it dipped as low as 0.28x for VC funds. Performance has been better for more recent vintages, but it is important to remember that many of their holdings have yet to be exited and, therefore, we will not know the true performance of these vehicles for many years.

For LPs committing to VC funds, it is important to understand that any particular fund will likely underperform a plain vanilla allocation to public equity markets. But simply beating the market generally isn't the modus operandi for VC investments, and LPs should be seeking out not just the top-decile managers, but those at the very top of the distribution that can and have generated PMEs of 3x, 4x, and, in rare cases, even double-digits. Just as VCs aspire to find the next Google or Facebook, LPs should commit capital with the intent of identifying the next Accel V or Union Square Ventures 2004.

Only the top VC funds tend to outperform

VC KS-PME percentiles



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Taking stock of private market returns

Key takeaways

- Using our quarterly NAV index methodology, we find that PE funds have posted the strongest returns among private market strategies since 2001, as well as over the last five years and 10 years.
- Certain private market strategies—particularly PE, VC and FoFs—exhibit high correlations with each other, but we find the strongest correlation between PE funds and public equities across multiple time horizons. The correlation between the PE NAV index and the S&P 500 TR has been 0.75 since 2001. It is even higher when rebased to 2008, but we have seen the correlation fall to 0.51 since 2013.
- VC funds have significantly underperformed private market peers when compounding returns since 2001 due to the carnage inflicted by the dot-com bubble; however, when rebasing the VC NAV index to more recent periods (i.e. 2008 and 2013), VC funds have posted strong returns on both an absolute and relative basis, outperforming most private market strategies.

Overview

One of the benefits of private market strategies is that they insulate investors from the volatility of public markets. Some argue that this is naïve, and that the perceived lower volatility is really just illiquidity. But even if that is the case, the fact remains that the closed-end fund structure largely restricts investors (i.e. LPs) from panic selling during a downturn.

"I think a lot of people go into [private equity] with very open eyes, knowing the inability to mark to market allows them to be better investors," said Cliff Asness, founder of quantitative investment firm AQR Capital Management, during a recent interview.[1]

But while the long-term perspective of private market funds is one of their purported benefits, investors nonetheless have a desire to evaluate fund performance on a regular basis. This is a difficult undertaking in private markets, however, with quarterly intervals being the shortest feasible timeframe to measure aggregate performance. To assess quarterly performance, we calculate the aggregate percentage change in aggregate NAV for each group of funds in a sample, considering contributions and distributions during the quarter.

$$\text{Quarterly percentage change} = \left[\frac{\left(\text{NAV at end of quarter + distributions during the quarter - contributions during the quarter} \right)}{\text{NAV at the beginning of the quarter}} \right] - 1$$

1: "Cliff Asness - The Past, The Present & Future of Quant," Invest Like the Best, Patrick O'Shaughnessy

This calculation employs the same pooling methodology used for other aggregated metrics in PitchBook Benchmarks. Our default is to use capital-weighted calculations, but equal-weighted versions are also available. When public indices are shown, the quarterly change is based on the average value of the index during the period.

To help visualize this data, we utilize an indexing methodology starting at a base of 100, then apply the quarterly return on a rolling basis to create a "NAV index." Performance across different periods of the market cycle can be made by rebasing the calculation at a different start point. The NAV index can also be tailored to specific fund sizes or geographies, and multiple strategies can be combined to more accurately reflect specific portfolio exposure.

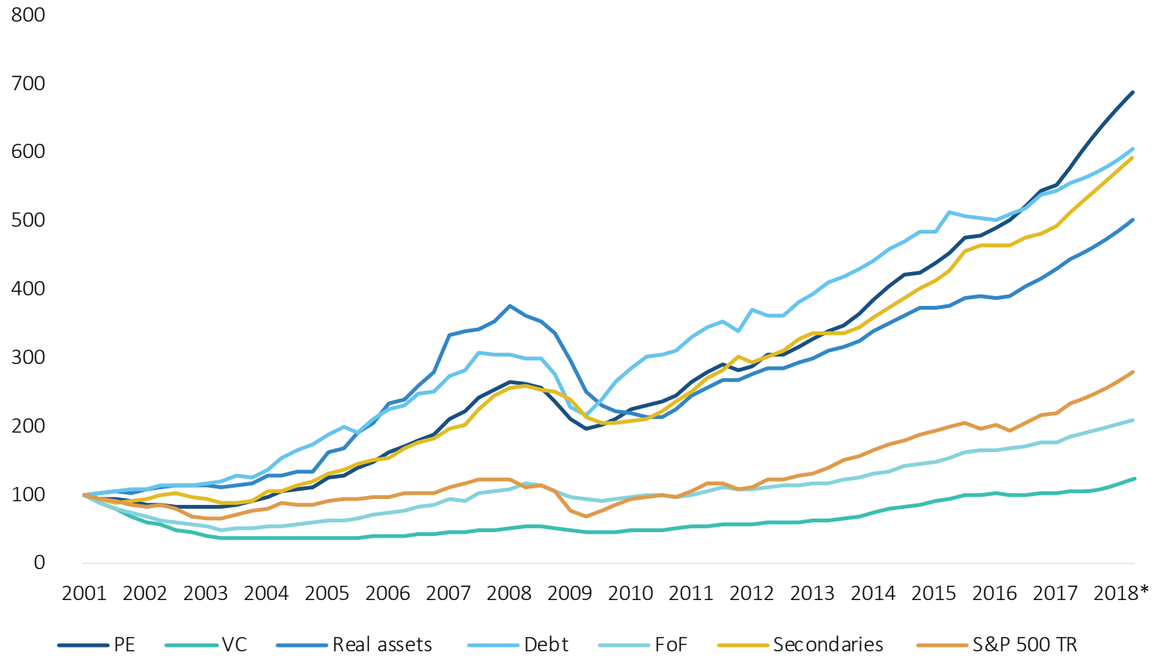
Another benefit of this methodology is that it provides an output with which investors are familiar and that can be easily juxtaposed against public market indices. While there are shortcomings to these comparisons—and we still recommend PME calculations for benchmarking against public market indices—the NAV index view can be instructive when assessing broad market trends.

PE comes out on top

For this spotlight, we rebased our calculation to three different years to assess how performance has evolved over different periods. In terms of aggregate value accretion, PE finishes at the top of the pack among private market strategies across all three timeframes, with some of the most significant outperformance occurring over the last three years. When starting the calculation in 2001, private debt funds had outperformed through 2015, largely due to superior relative performance through the GFC, before ceding the top position to PE in the recent rally.

PE outperforms over the long term

NAV index rebased to 100 in January 2001



Source: PitchBook | **Geography:** Global
*As of March 31, 2018

Over the longest horizon, VC funds have significantly underperformed due to the damage of the dot-com bubble. It took nearly 15 years for VC funds to fully recover, only managing to consistently crest the breakeven point since mid-2016. But the lasting effects of the dot-com bubble perhaps become most evident when rebasing VC returns to more recent periods. When observing performance from either 2008 or 2013, for example, VC funds have posted strong returns on both an absolute and relative basis, outperforming every private market strategy besides PE.

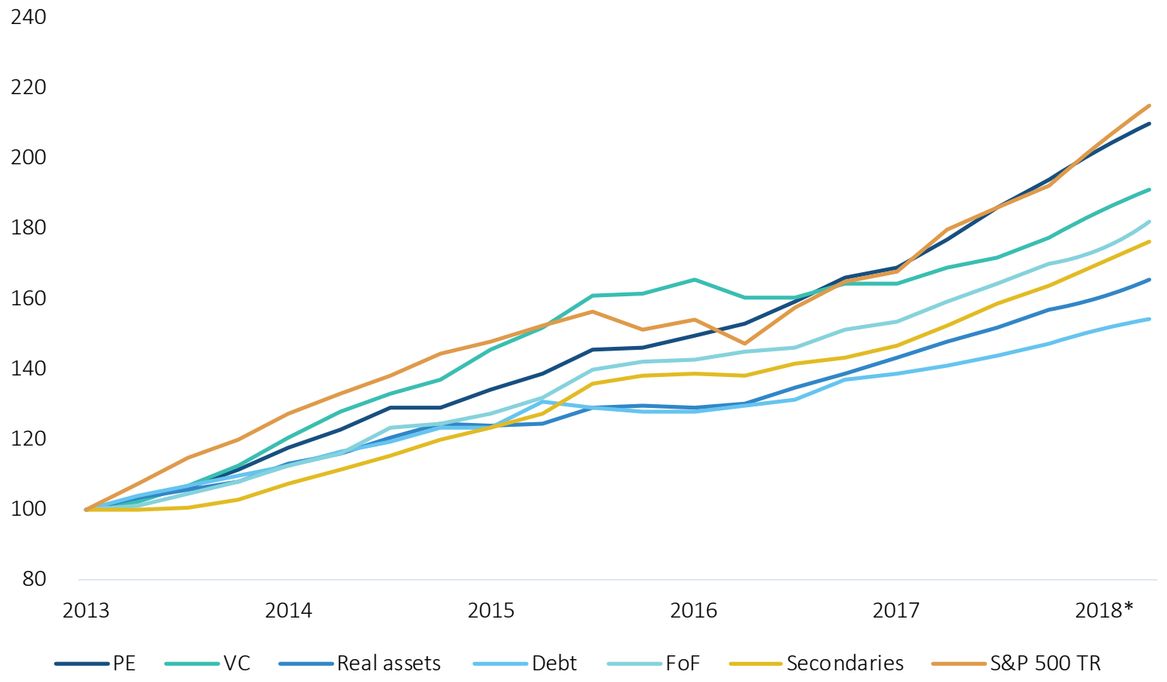
The performance picture looks relatively consistent across the two longest timeframes in our spotlight, but it changes drastically in the most recent period (i.e. when rebasing to 2013). Private debt funds—one of the best-performing strategies over the longest horizon—trail all other strategies in the most recent period. FoFs significantly underperform over the longest horizon, but performance more recently has been better than most private market strategies. One major factor that appears to be contributing to these changes is the powerful performance of equity markets, with the S&P 500 TR beating all private market strategies by a healthy margin since 2013, which has provided a strong rationale for equity-oriented private market strategies to raise their portfolio valuations.

We're not so different after all

In addition to assessing performance, quarterly returns data is useful in determining the correlation between different strategies. Diversification is often touted as a primary benefit of private market strategies, but many detractors have called that into question. PE, for instance, is often accused of being a high-priced strategy that can be replicated in public markets by adding leverage and screening for factors such as size and indebtedness. Indeed, numerous academic studies have found correlations between public equity and PE markets.[2]

Private market strategies recently have failed to keep up with public equities

NAV index rebased to 100 in January 2013



Source: PitchBook | **Geography:** Global
*As of March 31, 2018

2: "Private Equity's Diversification Illusion: Economic Comovement and Fair Va

While our quarterly PE NAV index is not investable, it does corroborate these findings; the correlation between PE NAV index and the S&P 500 TR has been 0.75 since 2001. It is even higher when rebased to 2008 (0.84), but we have seen the correlation fall to 0.51 since 2013. We attribute this to the sizable quarterly moves in the public equities in the last five years, with correlations tending to be lowest in periods of high volatility and dramatic market movements, as well as the significantly fewer number of reporting periods that results in a relatively small sample size. Correlations may be high, and this methodology does not account for differences in variables such as leverage and illiquidity, but the PE NAV index has outperformed the S&P 500 TR by a wide margin across long time horizons.

Between private market strategies, the highest correlations occur between PE and FoFs, which is intuitive given that FoFs are highly allocated to PE funds. Correlations are also high between PE and VC funds, which may be surprising given the documented differences in their risk/return profiles; however, both strategies involve equity investments and, therefore, employ mark-to-market practices that often mirror public equity returns. Many other private market strategies also have higher correlations than may be expected, but the best diversifiers are real asset and secondaries funds.

PE and public equities tend to be highly correlated

Correlation of quarterly returns

Since 2001

	PE	VC	Real assets	Debt	FoF	Secondaries	S&P 500 TR
PE	1						
VC	0.68	1					
Real assets	0.71	0.33	1				
Debt	0.62	0.26	0.38	1			
FoF	0.77	0.82	0.45	0.37	1		
Secondaries	0.57	0.48	0.60	0.29	0.58	1	
S&P 500 TR	0.75	0.58	0.41	0.67	0.57	0.40	1

Source: PitchBook | **Geography:** Global
*As of March 31, 2018

Since 2008

	PE	VC	Real assets	Debt	FoF	Secondaries	S&P 500 TR
PE	1						
VC	0.77	1					
Real assets	0.76	0.68	1				
Debt	0.74	0.50	0.43	1			
FoF	0.70	0.71	0.55	0.56	1		
Secondaries	0.61	0.60	0.80	0.21	0.52	1	
S&P 500 TR	0.85	0.65	0.59	0.76	0.46	0.08	1

Source: PitchBook | **Geography:** Global
*As of March 31, 2018

Inflated IRRs?

Key takeaways

- Despite worries that subscription credit lines are inflating IRR, we do not find any evidence that the IRR of newer vintages is being manipulated by these facilities or other means. The reported IRR of more recent vintages can appear to be "inflated" relative to cash-on-cash returns when compared to historical performance, but we find this apparent inflation dissipates when controlling for the age of the funds.

- If aggressive markups early in the holding period were historically inflating IRR, we would expect to see IRRs peak early in a fund's life and to subsequently fall as the holding period extends. While we do find that most funds tend to hit their peak IRR around year seven, the median fund historically has been able to maintain that level through liquidation. But that still means roughly half of managers eventually are revising their IRRs lower in the end stages of a fund's life.

Overview

When it comes to evaluating PE funds, IRR has been the performance metric of choice for decades, yet it consistently draws scrutiny from industry professionals for its litany of flaws and shortcomings, including its susceptibility to abuse. Most recently, the reliability of IRR has been called into question due to the raised awareness in the LP community about the use of subscription credit lines, also referred to as capital call lines/facilities, which is a financing tool used by GPs to meet near-term funding obligations. GPs have utilized subscription lines for decades as an administrative tool to streamline capital calls between their funds and LPs, but more attention is being paid to them as the terms are beginning to loosen. Even when best practices are employed, these facilities still accrue interest expenses that negatively (albeit generally negligibly) affect net returns, but now some GPs are reportedly taking advantage of the increasing flexibility of subscription lines to intentionally and artificially boost IRRs, in some cases at the detriment to cash-on-cash returns.

The Abraaj Group currently serves as the case study for when things go wrong, after it defaulted on its subscription lines in 2018. This event served as a major catalyst of the recent debate about these facilities, which are secured by LPs capital commitments to the fund, as bankers have sought for Abraaj's LPs to cover the default.[1] We have certainly heard alarming anecdotes since then, such as subscription lines with terms of years (as opposed to weeks or months) or even the use of a subscription line to distribute cash to LPs before an exit is finalized. But while the most egregious practices are assumed to be outliers, concerns persist that widespread changes in the terms and usage of these facilities has led to a systematic inflation of IRR figures. While the lenders and borrowers associated with these facilities certainly know the intimate details of the terms, detailed data linking them to specific funds is lacking. Many analysts have resorted to back-of-the-envelope calculations to quantify their potential impact. These efforts produce a broad range of results depending on the assumptions, with the purported effect on IRR ranging from virtually nothing to several hundred basis points over the life of a fund.

Outside the debate on subscription facilities, we also hear frequent worries about the reliability of performance metrics, particularly when it comes to mark-to-market practices for existing investments. Many LPs worry that GPs are too sanguine in their portfolio valuations, which could lead to write-downs, extended hold times or other knock-on effects further down the road. Recent equity market volatility has only stoked these worries and reinvigorated the debate around the validity of PE fund performance.

Rather than try to measure the precise impact of subscription credit lines on specific funds, here we examine if IRRs of more recent funds are being categorically inflated—whether through subscription credit lines or some other means—to determine if the metric can be trusted by investors. With many private market professionals evaluated and compensated based on IRR performance, the efficacy of the metric has meaningful implications.

1: "Abraaj: A Test Case for Broken Credit Lines," Private Funds Management, Toby Mitchenall, November 23, 2018

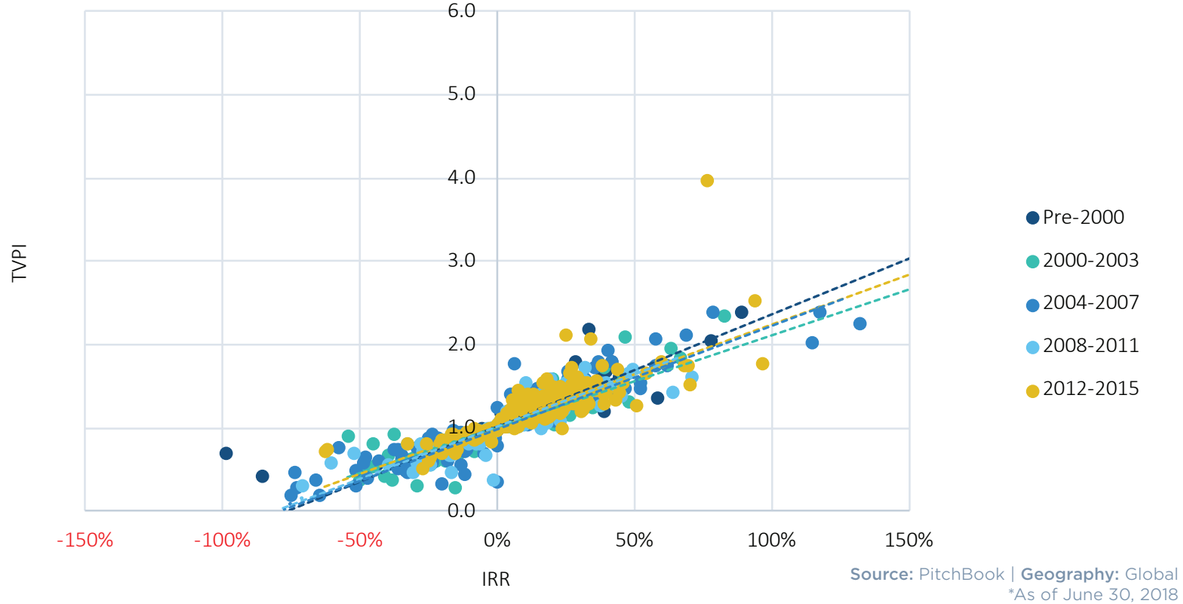
Newer vintage IRRs can appear inflated compared to cash multiples

PE IRR and TVPI by vintage bucket

Source: PitchBook | **Geography:** Global
*As of June 30, 2018

Apparent IRR inflation disappears when observing funds of similar age

PE IRR and TVPI at three-year mark by vintage bucket



Source: PitchBook | **Geography:** Global
*As of June 30, 2018

"You can't eat IRR"

After IRR, cash multiples (i.e. DPI, RVPI and TVPI) are the most popular way to assess the performance of private equity funds. Cash multiples are more straightforward than virtually any other metric and are quite difficult to manipulate because the timing of cash flows is not a factor. As such, we would expect any inflation of the IRR metric to be discernable by comparing its relationship to cash multiples across individual funds. If IRRs are in fact being inflated, we should see a shift in the relationship between IRR and cash multiples such that a specified TVPI value of newer funds is correlated with a higher IRR value than has been the case historically.

At first blush, the data seems to strongly corroborate the notion that PE IRRs are being inflated. For 2012-2015 vintage bucket, based on a simple linear regression, an IRR of 15% correlates to a TVPI value of 1.39x, which compares to values ranging from 1.63x to 1.81x for the other vintage buckets. But we know that even without manipulation, younger funds will exhibit higher IRRs for a given TVPI level than older funds. For example, if two funds are each reporting a TVPI of 1.5x but one is a 2015 vintage and the other is a 2012 vintage, we would naturally expect the IRR of the former to be higher because it had produced the same cash return in a shorter period. Going out to the 12-year mark of a fund's life (which inherently limits us to the 2006 vintage), we find a clear evolution of lower reported IRRs lining up with higher TVPI values as the fund ages. The shorter timeframe and wide variability of drawdown rates in the very early stages of fund life also lead to a high standard deviation of reported IRRs between funds, which dissipate as funds age.

Knowing these characteristics of younger funds, the next question is whether the apparent IRR inflation observed in the newer vintages was unique or simply a function of the younger nature of those funds. We started by isolating funds at their three-year mark and found no discernable difference in the IRR to TVPI relationship across vintage years. In other words, the apparent inflation in the IRR values of the 2012-2015 vintage bucket essentially disappears when you observe funds at similar stages of their life. Using a 15% IRR as the baseline, like our previous example, we find the correlated TVPI value for all of the vintage buckets is in a tight range of 1.17x-1.22x. This correlation consistency across vintage buckets proved true when examining the relationship at the five-, seven-, 10- and 12-year marks as well.

In aggregate, we do not find any evidence that IRR is being distorted for funds of more recent vintages. However, we think it is important for capital allocators to appreciate how the relationship between IRR and cash multiples evolves over the life of a fund. As we have shown, a particular IRR will correspond to a relatively lower TVPI early in a fund's life, which can make IRR appear inflated compared to older funds. It is important to note that this is not unique to the current environment and is consistently observed across vintage years going back more than two decades, so it does not appear that IRR is being distorted (at least not any more than it has been in the past). Even if IRRs are not being inflated in the current environment, there is still the question of whether the metric has ever been trustworthy. Aside from the pure mechanics of the IRR calculation discussed previously, additional factors need to be considered when analyzing the metric for funds that are not yet fully liquidated.

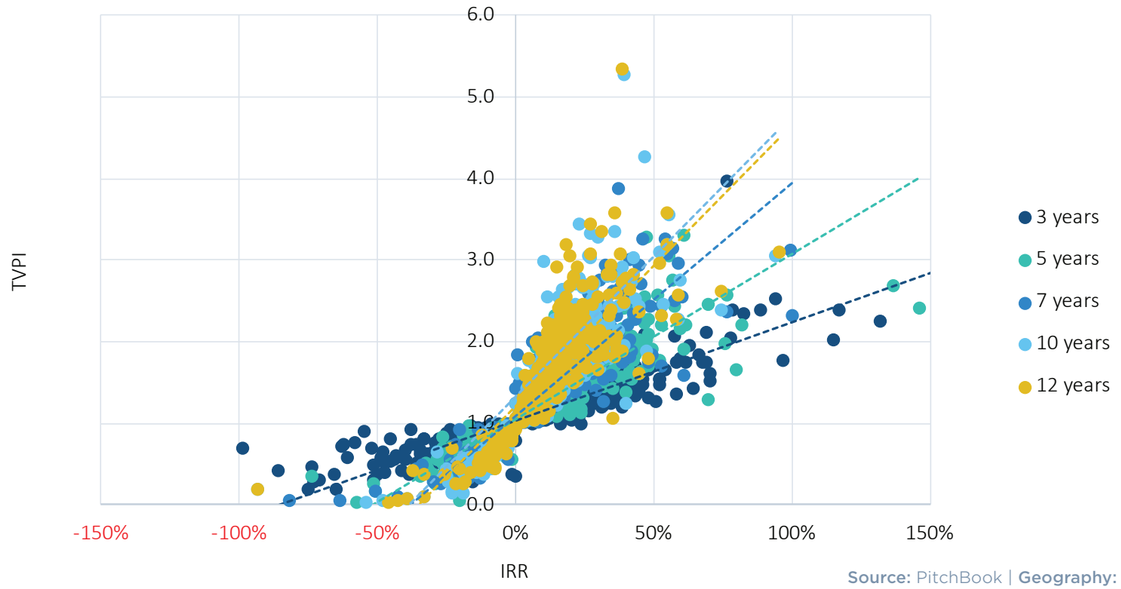
One factor is that quick distributions back to LPs—whether through full exits, dividend recaps or other means—can have a large and lasting impact on IRR. Another important consideration is that performance metrics are much more volatile early in a fund's life when less capital has deployed. For example, if a fund charges a management fee on committed capital, the IRR naturally goes deeply negative at first until an initial investment is made. As a result, early in funds' lives we observe extremely high levels of standard deviation—both in individual fund reporting and in the variation of performance figures reported by funds of a given vintage.

Mark-to-market practices can also play a pivotal role in the IRR calculation. Most of the value in more recent vintages is still held in unrealized investments; as such, while IRRs do not currently appear to be inflated, much of that conclusion is predicated on the assumption that GPs will be able to realize investments at (at least) their current carrying value. Regardless of whether current portfolio valuations are fair, an implicit assumption in the IRR calculation for funds that are not yet fully liquidated is that any remaining value can simply be treated as a terminal cash flow in the most recent reporting period. It does not take detailed analysis to ascertain that this practice has the potential to inflate IRRs for younger funds if the GP marks up investments too eagerly in the early days and is unable to maintain that growth rate going forward.

Indeed, a primary concern today for many investors—particularly in VC funds—is that GPs over-aggressively mark up their portfolios early in the holding period, leading to outsized "paper gains." Prior research into mark-to-market practices of private market funds has produced mixed results. Some researchers have found that "fund valuations are inflated

Younger funds consistently exhibit relatively higher IRRs for given TVPI

PE IRR and TVPI by time since inception



Source: PitchBook | **Geography:** Global
*As of June 30, 2018

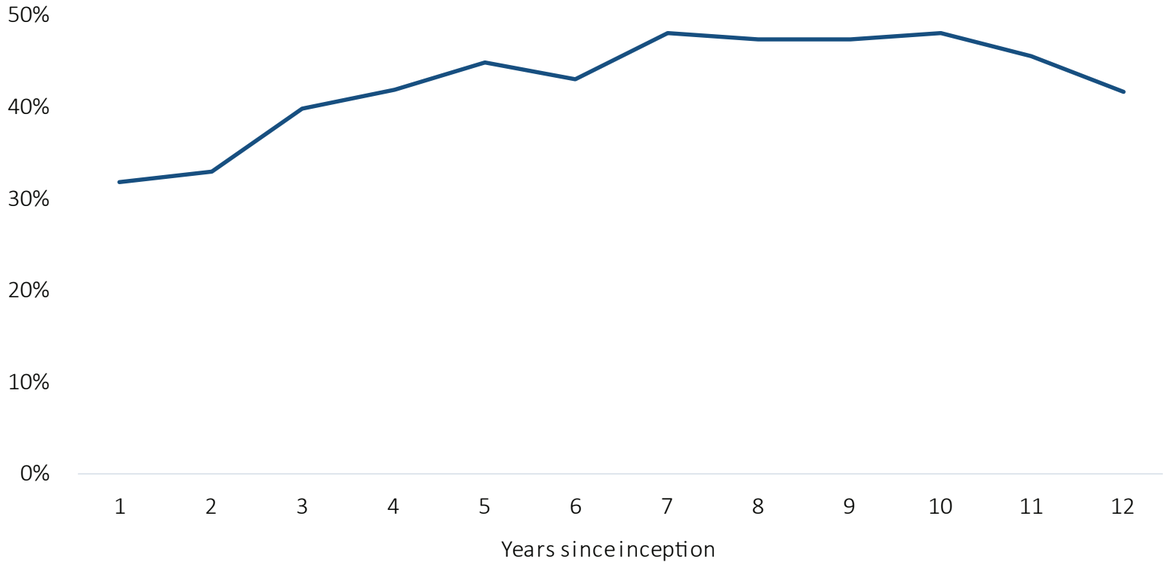
during the fundraising period,"[2] while others assert that "fund managers time fundraising with strong current fund performance instead of manipulating interim performance estimates."[3] Our own findings suggest that GPs in aggregate historically have been relatively conservative when adjusting valuations relative to public market activity—both on the upside and the downside.

If aggressive markups early in the holding period were a persistent issue, we would expect to see IRRs peak early in a fund's life and to subsequently fall as the holding period extends. While we do find that most funds tend to hit their peak IRR around year seven, the median fund historically has been able to maintain that level through liquidation. But that still means roughly half of managers eventually report lower IRRs in the end stages of a fund's life.

2: "Interim Fund Performance and Fundraising in Private Equity," Brad M. Barber, October 31, 2014
3: "Raising Funds on Performance: Are Private Equity Returns Too Good to Be True," Niklas Hüther, January 27, 2016

Nearly half of funds revise IRR lower at later stage of fund life …

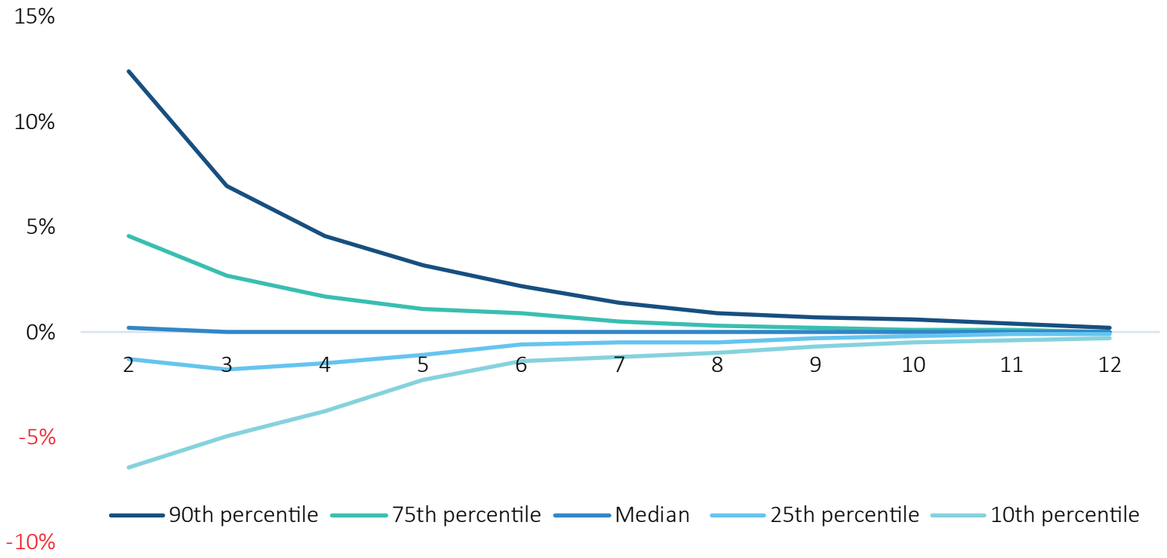
Proportion of PE funds reporting lower IRR compared to prior reporting period



Source: PitchBook | **Geography:** Global
*As of June 30, 2018

… but downward revisions tend to be relatively small

Range of QoQ changes in IRR by time since inception (all vintages)



Source: PitchBook | **Geography:** Global
*As of June 30, 2018

Of course, there's a big difference between an IRR falling by a few basis points and a GP being forced to take a large write-down on an entire position. To that end, when we look at the absolute QoQ change in IRR at these later stages of a fund's life, we find the distribution is similar for both positive and negative markups. For example, when we examine the distribution of quarterly IRR changes in year nine of a fund's life, the top decile is 2.5% while the bottom decile is -2.4%.

Can IRR be trusted?

To be sure, subscription credit lines can alter the relationship between "true" cash-on-cash returns and IRR, but the data does not show any systematic changes in the more recent vintages that would indicate widespread issue has taken hold. This suggests that imprudent use of credit facilities and other mechanisms to meaningfully boost IRRs are relatively isolated. For those concerned about subscription lines, the best remedy is to be informed about how the GP intends to use these facilities and to ensure those terms are detailed in the limited partnership agreement. The ILPA has established specific considerations for both GP and LPs.[4]

Aside from the current debate about subscription lines, we think it is important to emphasize that IRR tends to be relatively overstated relative to cash-on-cash returns early in a fund's life due to the mechanics of the calculation. Furthermore, IRR metrics tend to be highly volatile in the early years through the investment period. As such, we suggest that industry professionals deemphasize the importance of IRR, at least until the fund is fully invested.

4: "Subscription Lines of Credit and Alignment of Interests: Considerations and Best Practices for Limited and General Partners," Institutional Limited Partners Association, June 2017

Direct Alpha

Key takeaways

- While IRR is susceptible to manipulation, Direct Alpha is more resistant to exploitation due to the external factor of a public market index. As such, we think it provides a better way to gauge the annualized returns of private market funds with the added benefit of accounting for the macro environment in which the fund is operating.

- PE funds of the early 2000s significantly outperformed the S&P 500, based on the Direct Alpha metric. Performance suffered for vintages in the mid-to-late 2000s but has been positive for each PE vintage since 2011; however, the recent outperformance is a fraction of what it has been in the past.

- We find that the distribution of Direct Alpha has been fairly static over the last decade, with the only notable exception occurring in the top-decile hurdle of Direct Alpha values, which is above 15% for recent vintages after being in the single digits for many crisis-era vintages. When considered in conjunction with the rising pooled Direct Alpha figures, this suggests that the uptick in aggregate alpha is largely being driven by improved performance from the top tier of funds.

Overview

In previous editions of PitchBook Benchmarks, we cast doubt on many of the generally accepted methods for measuring private market fund performance: cash multiples fail to account for the time value of money; simple annualized returns do not consider the erratic timing of cash flows; and the most common gauge of private market performance, IRR, is prone to manipulation and plagued by a **plethora of other shortcomings.**

For decades, academics and industry professionals have sought a better formula to holistically evaluate performance, leading to the development of public market equivalent (PME) metrics. The first iterations of PME were relatively complex, involving the creation of a hypothetical vehicle based on a fund's cash flows, and they produced unusable results when performance of the private market fund was particularly strong or weak. Improvements were made on the margin to make PME compute in all scenarios, but the calculations remained arcane and generally have been used only by academics.

The thinking around PMEs changed with the introduction of KS-PME. Developed by Steven Kaplan—a board member of Morningstar, PitchBook's parent company—and Antoinette Schoar, KS-PME is a simple cash multiple metric calculated by discounting private capital fund's cash flows by the returns of a reference public equity index, rather than creating a hypothetical PME vehicle against which to compare performance. But while KS-PME is simple and accounts for activity in public markets, it suffers from the same drawback as traditional cash multiples in that the length of the investment period is not considered.

This issue was not insurmountable, however. Subsequent research applied the basic IRR calculation to the adjusted cash flows of the KS-PME to produce a new metric, "Direct Alpha," that shows "the precise rate of excess return between the cash flows of illiquid assets and the time series of returns of a reference benchmark." At its most basic level, "one can think of Direct Alpha as an annualized KS-PME taking into account both the performance of the reference benchmark and the precise times at which capital is actually employed." Not only does this account for the opportunity cost of investing in a private market fund, it also captures the impact of investment period length.

Note: The S&P 500 TR is the reference index for all calculations.

Performance panacea?

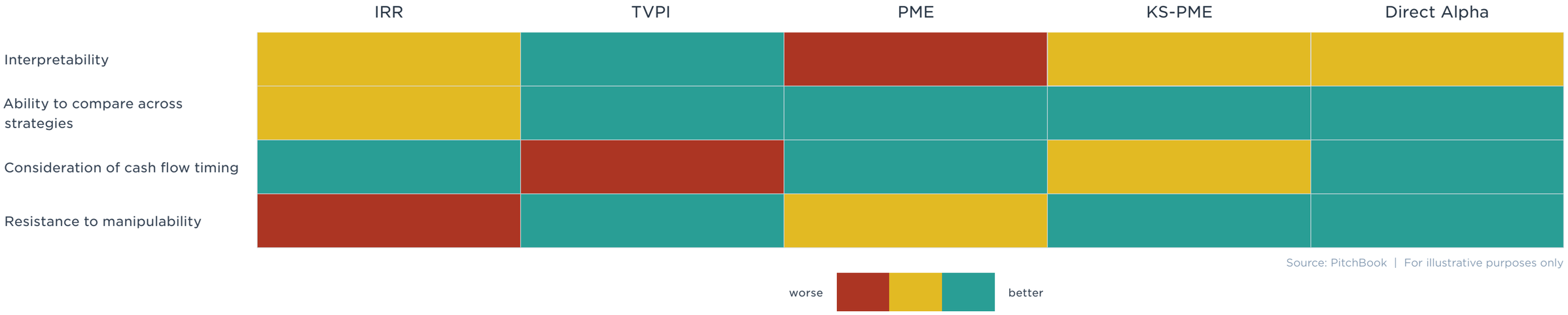
Like PME calculations, Direct Alpha does not tell an investor anything about the absolute return of the fund, but rather how it performed relative to the index. Theoretically, this means that a private market fund could produce strong returns on an absolute basis but still have a negative Direct Alpha if the reference index produced superior returns over the period. Conversely, Direct Alpha may be positive when the private market fund has negative absolute returns.

As we detailed last quarter, IRR is fraught with issues, including its susceptibility to manipulation. While we did not find evidence of widescale distortion of IRRs, devious practices certainly have the potential to skew the IRR of individual funds. Direct Alpha is not a silver bullet, but it does have characteristics that make it more difficult to manipulate. Traditional IRR is prone to chicanery because cash flow timing is germane to the calculation, and the relationship is straightforward (i.e. shorter investment timeframe equates to higher IRR). Accordingly, if a GP knows it can delay calling capital or expedite distributions (which can be easily achieved with capital call loans), this will certainly have a favorable impact on IRR. The influence of additional variables and external factors does not need to be considered.

While the specific timing of cash flows is also of paramount importance for Direct Alpha, GPs trying to game Direct Alpha will have a greater challenge due to the external factor of a public market index. Direct Alpha will be higher if the private market fund is calling capital during times in which the index is relatively high and distributing while it is low, which is difficult to predict. As a result, artificially manipulating the cash flows could have unexpected consequences on Direct Alpha.

Take, for example, a GP that uses a subscription credit line to delay a capital call to LPs for 90 days. Without knowing the specifics of the fund, we can be certain this will lead to a relatively higher IRR and lower TVPI than if a subscription line was not used because: (i) capital calls from LPs will occur at a later date than they would otherwise, meaning that capital will be invested for a shorter period; and (ii) interest accrued on the subscription line will be charged to the fund, resulting in lower cash-on-cash returns (i.e. TVPI). The impact on the Direct Alpha calculation, however, is less clear.

The merits of metric



Source: PitchBook | For illustrative purposes only

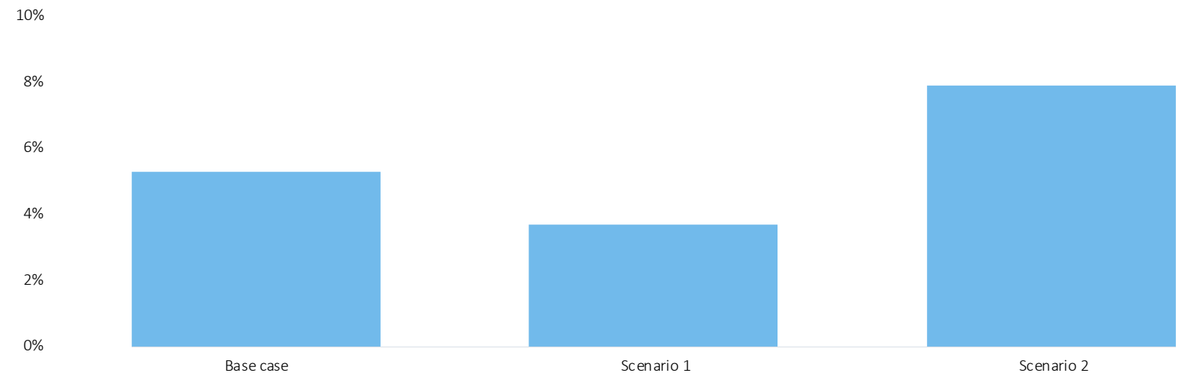
The accompanying tables and charts provide a simple, illustrative example of how market movements can affect Direct Alpha. In the base case scenario, the GP acquires a company for $100 million and exits after three years at $150 million (ignoring leverage, fees, etc.). Under scenario 1, the same investment is considered but with the GP delaying the initial capital call by 90 days, during which the public market index depreciates by 5%. As can be seen, this has a deleterious effect on the Direct Alpha calculation because the contribution amount is adjusted for a lower public index value, which is tantamount to buying the public index at a discounted level (i.e. if the public index is purchased at a discount, it is accretive to the public equity side of the equation, translating to lower relative performance and Direct Alpha for the private market fund). The inverse is also true; if the index were to appreciate during the delay in the capital call, it would prove accretive to Direct Alpha because the private market cash flows will be adjusted for a period in which the public equity index was at a premium.

Delaying capital calls has unpredictable effects on Direct Alpha

Base case	Hypothetical scenario 1	Hypothetical scenario 2
Company acquired for $100M and sold in three years for $150M	Initial capital call delayed by 90 days, during which the reference public market index decreases 5%	Initial capital call delayed by 90 days, during which the reference public market index increases 5%

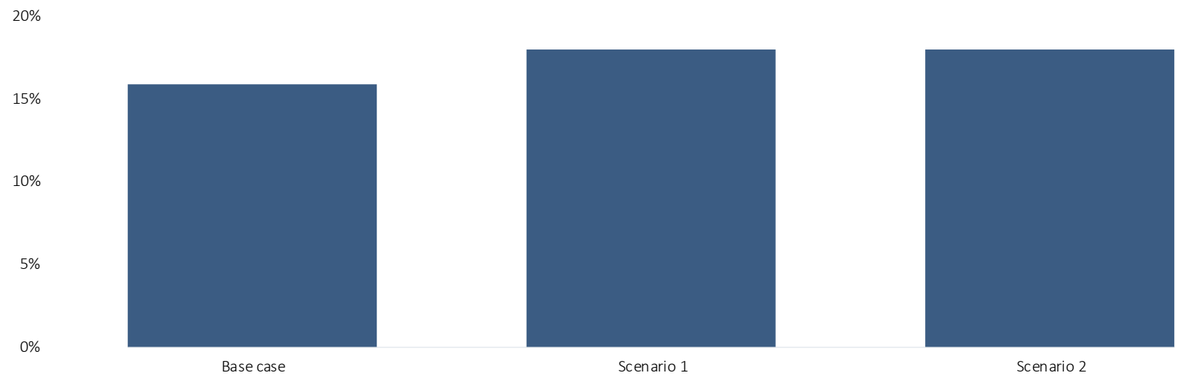
Note: Each scenario assumes that the reference public market index rises to the same level in the final period.

Direct Alpha



Source: PitchBook | For illustrative purposes only

IRR



Source: PitchBook | For illustrative purposes only

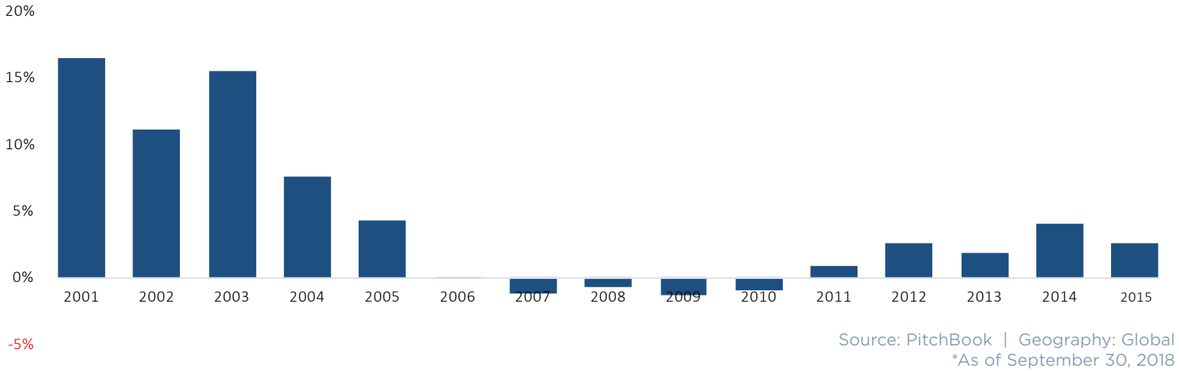
Alpha on the rise?

Absolute returns of PE funds have rebounded strongly since the global financial crisis (GFC), but a persistent question is how much of these returns can be explained by public market tailwinds. In prior research, we analyzed KS-PME values across more than two decades of private market fund performance and found a substantial downturn in the level of outperformance for recent vintages, suggesting that manager skill (i.e. alpha) is playing a smaller role in return creation. But this does not tell the whole story, since value creation takes time and KS-PME does not account for how long capital was put to work. Since an IRR calculation is embedded in the methodology, Direct Alpha is a useful tool to account for the time value and to fill in the gaps.

For vintages in the early 2000s, PE funds in aggregate generated Direct Alpha values ranging from 7.5% to 16.4%. This outperformance began a downward trajectory in 2003, however, and crossed over into negative territory in 2006—a vintage that comprises funds investing at the peak of the pre-crisis bubble. The pooled Direct Alpha figure continues to languish in negative territory for the next several vintages. While pooled Direct Alpha has been positive for vintages since 2011, the level of outperformance is less than half what it was at the turn of the century.

Alpha is on the rise for newer vintages, but continues to lag historically

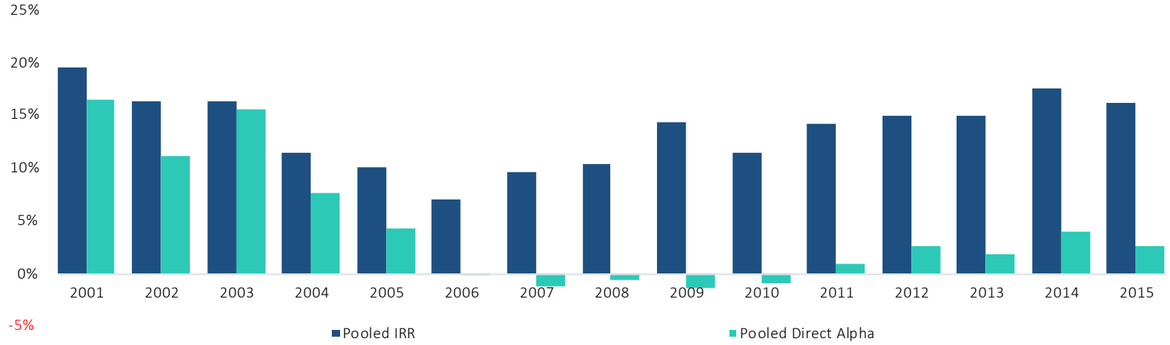
Inception to date pooled Direct Alpha for PE funds by vintage year



Source: PitchBook | Geography: Global
*As of September 30, 2018

Pooled IRR and Direct Alpha can vary widely ...

Inception to date performance by vintage year



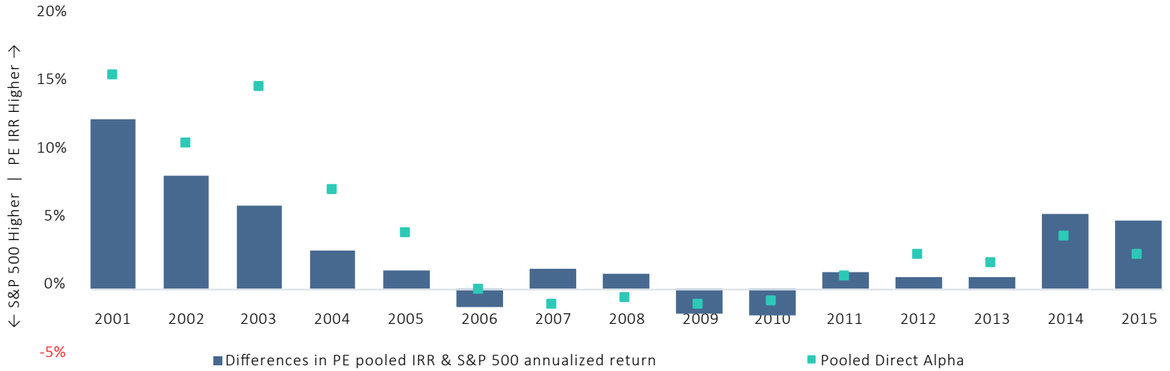
Source: PitchBook | Geography: Global
*As of September 30, 2018

To better understand why relative performance has evolved in this manner, we compared absolute returns for private and public markets by juxtaposing pooled IRRs by vintage with the annualized total return of the S&P 500 from the beginning of the designated year. As can be seen, public equity and PE returns have been highly correlated over time, which our **prior research** has also shown. In the early 2000s, the superior Direct Alpha figures produced by PE funds is due to a combination of below-average returns from public equities and above-average gains generated by PE funds. The period of most challenging relative performance in and around the GFC coincides with some of the lowest points of absolute performance in both public and private markets.

The evolution of performance most recently warrants a closer look. While public equity markets continue to climb, they have lost some steam after nearly a decade, and the annualized total return of the S&P 500 has been slipping when the calculation begins in more recent years. At the same time, newer PE vintages are posting the strongest absolute returns since the early 2000s on an IRR basis. These trends have combined to push Direct Alpha positive for vintages since 2011, but the outperformance is a fraction of what it was in the past.

... depending on the performance of public markets

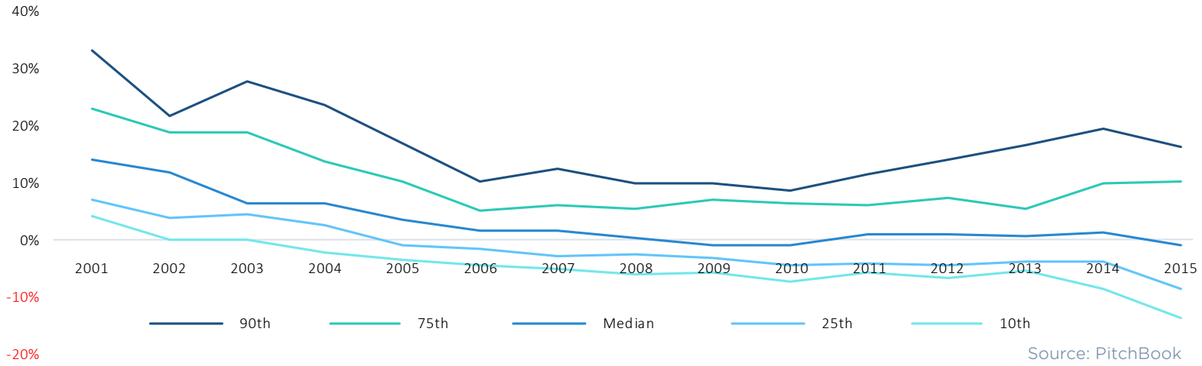
Inception to date performance by vintage year/start of CAGR



Source: PitchBook | Geography: Global
*As of September 30, 2018

Direct Alpha is improving for the top tier of funds in newer vintages

Direct Alpha percentiles for PE funds by vintage



Source: PitchBook
*As of September 30, 2018

Digging beyond the headline figures, we find that the distribution of Direct Alpha has been fairly static over the last decade, with the median stagnating around 0% and the lower bounds also barely budging. Even the top-quartile rate has been relatively unchanged. The only notable exception is in the top-decile hurdle of Direct Alpha values, which is above 15% for recent vintages after being in the single digits for many crisis-era vintages. When considered in conjunction with the rising pooled Direct Alpha figures cited previously, this suggests that the uptick in aggregate alpha is largely driven by improved performance from the top tier of funds.

It is worth noting here that, like all metrics, Direct Alpha provides the most value when evaluating a fully liquidated fund. Similar to other metrics, the calculation assumes that any remaining value in the fund can be treated as an immediate distribution, which can have outsized effect on the output because distributions are such a critical component of the calculation. This is particularly pertinent in the newer vintages that are showing better relative performance, as these vehicles are often holding two-thirds to three-quarters of their value in unrealized gains.

Additionally, while Direct Alpha addresses many of the shortcomings of other metrics, it does not account for illiquidity or leverage. Still, Direct Alpha is a useful tool for assessing performance of private markets, particularly for an analysis of individual funds, as well as comparing performance to other alternative investment strategies, namely hedge funds.

Alpha is harder to find

Alpha is a familiar concept in hedge fund investing, where it can be precisely measured by decomposing returns and attributing performance to specific factors. As investors have developed a penchant for passive strategies over the last decade, hedge funds have come under fire for failing to deliver alpha. Top-performing hedge funds certainly continue to beat the broader market, with most of the criticism coming through the lens of aggregate hedge fund performance. Perhaps the most high-profile example is the decade-long wager between Warren Buffet and Protégé Partners, with the Oracle of Omaha betting that a plain vanilla index fund would outperform a basket of hedge funds. With the wager initiated in 2007, the equity index returned an annually compounded 7.1%, compared to a paltry 2.2% for the hedge funds.

Admittedly, the last decade experienced one of the longest bull runs in history (the initial market crash notwithstanding), and as such, it has been a particularly favorable environment for equity-oriented portfolios. Despite this headwind, many investors believe the recent inability for hedge funds to produce alpha en masse is a categorical shift that will persist. The common rationale for the relative performance struggles of hedge funds mirrors recent critiques of actively managed strategies: new tools and an influx of managers have evaporated arbitrage opportunities; a deluge of data has minimized information asymmetries; and fewer publicly traded companies has limited scalable investment options.

As the merit of active public market strategies has been called into question, PE investors have claimed they can produce alpha that is irreplaceable in public markets. One reason commonly asserted is that private market managers wield a high degree of influence and control that allows them to dictate the course of a business. Another purported driver of alpha in private markets is the idiosyncratic nature of the underlying investments; while investors have a multitude of options for accessing asset classes such as public equities, fixed income, currencies and other liquid securities, a private company is inherently unique. But these seeming advantages have been called into question, as the return profiles of some private market strategies have been replicated through relatively basic levered public equity strategies.

Deconstructing returns and conducting performance attribution is fairly straightforward for many hedge funds, which tend to invest in relatively liquid securities that enable returns to be deconstructed on a granular level. While the term “alpha” is often used colloquially in private markets to discuss manager skill or a general ability to “outperform,” it tends to not be quantified, which is one reason why Direct Alpha is valuable.

Basics of cash flow management

Series summary

Analyses of private market performance tend to focus on how the GP generates returns—and understandably so. But while selecting top-tier managers and funds is paramount, the treatment of uncalled capital is also critical when evaluating the total return of a private market allocation, which is what truly matters to investors. An LP's decision to commit to a fund often comes several years before that capital is ever transferred to the GP to be invested. This creates a challenge for LPs, who must balance the need to meet capital calls with the desire to maximize return.

Effective management of uninvested capital, primarily minimizing the amount of capital held in reserve while maximizing its return, can have a material impact on the ultimate performance of a private market allocation. Conversely, LPs need to formulate a strategy to efficiently redeploy capital as it is distributed back.

Warren Buffett and his vice chair at Berkshire Hathaway, Charlie Munger, thrust this rather arcane aspect of private markets into the spotlight in the first half of 2019 when they criticized the PE industry for not accounting for this potential drag from uninvested capital. "We have seen a number of proposals from private equity funds where the returns are really not calculated in a manner that I would regard as honest," Buffett said. "It makes their return look better if you sit there for a long time in Treasury bills. It's not as good as it looks."

A thorough understanding of cash flow patterns will allow LPs to better plan for both capital calls and distributions, enabling them to enhance returns by keeping a smaller portion of their uncalled commitment in low-yielding liquid assets. But even the most sophisticated LPs, who can reliably predict their capital calls and distributions, will inevitably have to allocate some portion of uncalled capital to an asset with inferior returns to private market funds. The precise timing of contributions and distributions is impossible to know in advance, but historical data can offer helpful insight. In this series, we'll explore various aspects of private market funds to help investors better understand how to manage a private market allocation and evaluate its true overall performance.

In this first installment, we'll use cash flow data from PE funds to help answer some of these questions and highlight some of the main variables to consider when evaluating cash flows.

Key takeaways

- On average, PE funds call down about 5% of committed capital per quarter during the heart of the investment period, but the size of contributions can swing widely; half of all PE funds historically have made a capital call of at least 18.9% of the total commitment size at some point in the fund's life, but a fund may also experience multiple consecutive quarters without capital being called.
- When trying to anticipate capital calls, fund age and dry powder prove to be the most reliable indicators. Capital calls taper off during a fund's third year, which typically corresponds with dry powder falling to 25% of the fund size.
- Drawdown rates evolve throughout the market cycle, with PE funds calling capital more quickly during economic expansions. Furthermore, we observe a structural slowdown in the pace of capital deployment for more recent vintages.

Introduction

Investing in private funds is unique in that the investment decision isn't accompanied by an immediate deployment of capital. In fact, when an LP commits to a fund, it now typically takes more than five years for a GP to call down all that capital. This creates a challenge for LPs, who must balance the need to meet capital calls with the desire to maximize return. Threading the needle between risk and return while maintaining adequate liquidity is a fundamental challenge of allocating to private market funds. The worst-case scenario is failing to make a capital call, which has serious repercussions, but a sin nearly as egregious for an LP is to simply let uncalled capital sit idly in a cash account. Most LPs are willing to go out a little further on the risk spectrum than a simple cash allocation, with many opting to park uncalled capital in Treasurys, but this still leaves much to be desired. Indeed, even incremental improvement to the management of uncalled capital can reap major returns for LPs, particularly those with large and mature portfolios.

It is unrealistic to think that an LP could ever perfectly time cash flows, but LPs can more effectively manage their portfolio by better understanding the mechanics of how funds tend to function. How often do capital calls tend to occur? What is the biggest capital call that can be expected? Does the business cycle have an impact on cash flows? Additionally, LPs need to consider how their unique circumstances affect portfolio management. What is the total expected return, and how will uncalled capital be managed accordingly? How much risk can and will be assumed?

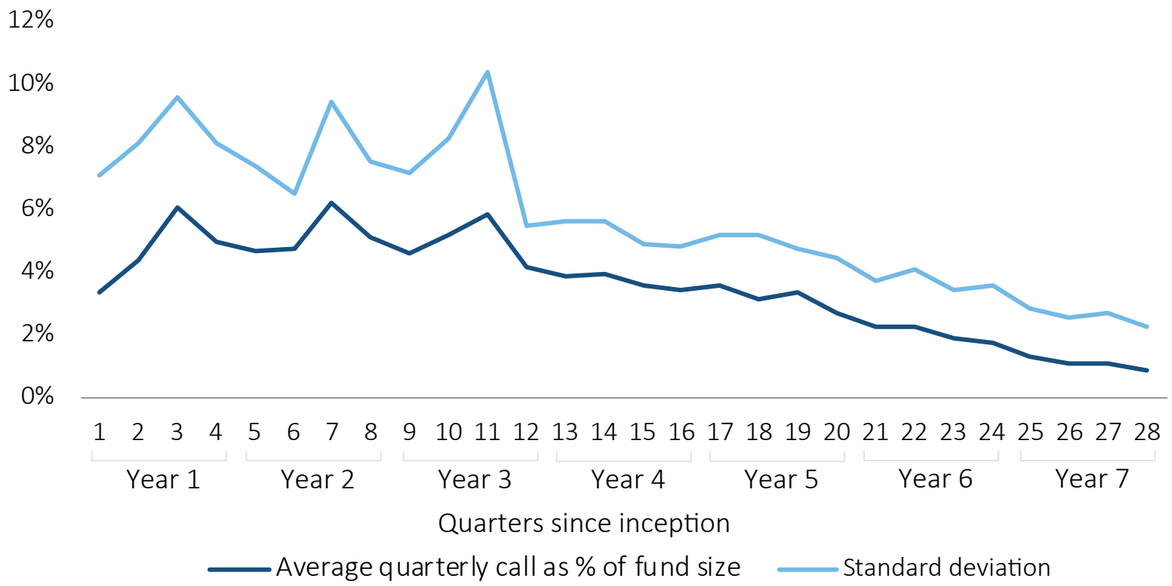
Understanding cash flow patterns

Age and dry powder

On average, PE funds call down about 5% of committed capital each quarter through the heart of the investment period, which has continued to lengthen—as we will examine in the next section. Keep in mind this is only on average, and the size of capital calls can vary widely. While most tend to be relatively small, LPs need to be prepared to write larger checks because half of all PE funds historically have made a capital call of at least 18.9% of the total commitment size at some point in the fund's life. Furthermore, one quarter of PE funds have made a capital call of at least 24.6% of the total commitment size. These large capital calls naturally tend to occur toward the initiation of the fund's investment period, when the fund is most likely to be executing large platform deals. The standard deviation of capital calls is also significantly higher at the early part of the investment period, steadily declining as the fund ages.

The size of capital calls drops sharply during a fund's third year

Average capital call as % of fund size by quarters since inception



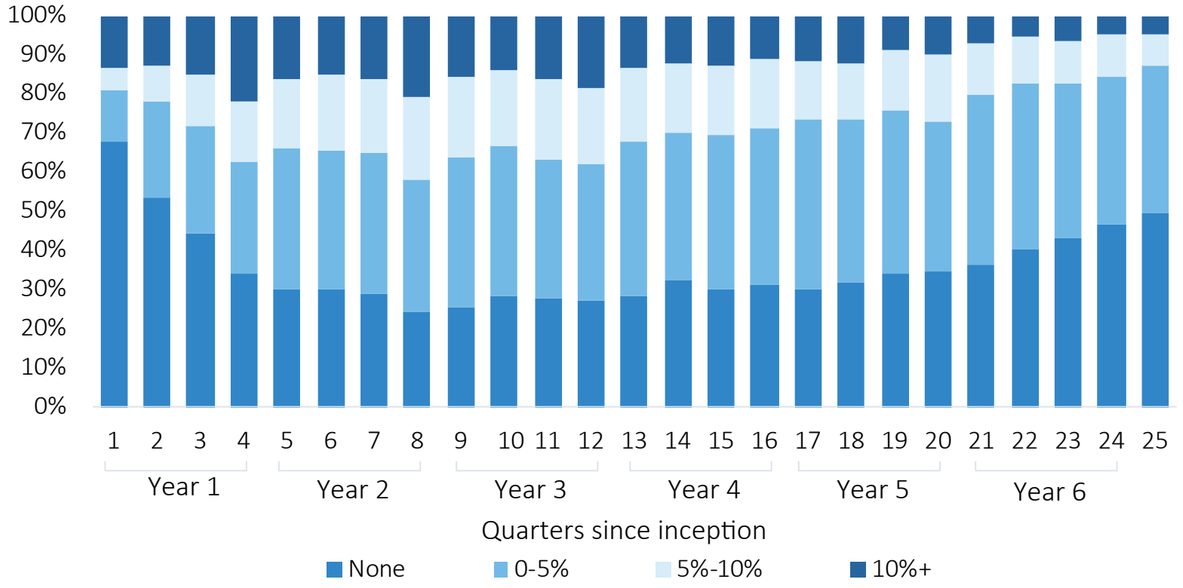
Source: PitchBook
*As of December 31, 2018

A fund's age is a straightforward way to gauge its maturity, but incorporating its dry powder into the equation provides a better way for investors to anticipate the magnitude of capital calls. As to be expected, funds with more dry powder tend to make larger capital calls. The average and median sizes of a capital call hover around 5% of the commitment size until 75% of the fund is invested, at which point the average tapers off. This is in part because funds simply have less capital to deploy, but PE funds also tend to transition their strategy during the investment period. Particularly in recent years, many GPs have emphasized add-on deals as a cornerstone of value creation strategies. These transactions naturally come later in the fund's investment period and require smaller checks, as the businesses are intended to be bolted on to larger platforms.

Even though the size of capital calls begins to taper once 75% of a fund has been called, we find the frequency of capital calls stays relatively consistent. It is not until more than 90% of a fund is called that we see a precipitous drop in the frequency of capital calls.

Capital calls are largest and most frequent in a fund's second and third year

Capital calls (#) as percentage of fund size by quarters since inception



Source: PitchBook
*As of December 31, 2018

Vintage and cyclicality

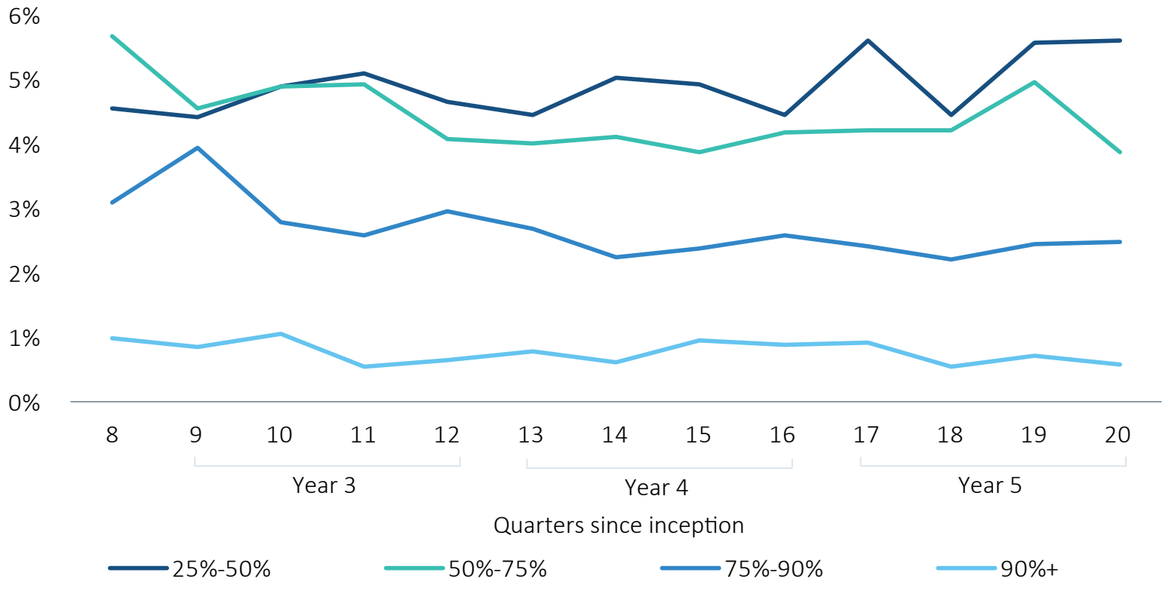
The prior charts and analyses have amalgamated PE funds across every vintage year; however, vintage year proves to be pivotal in determining the trajectory of cash flows for two reasons. The first is that drawdown rates of PE funds have fundamentally changed over the last two decades. Prior to 2000, on average, PE funds hit the 75% drawdown mark during their third year. More recently, however, it has taken nearly five years for funds to reach that mark, with the trend of slower drawdowns consistent throughout the stages of the investment period. We have certainly seen funds extending their investment periods in order to fully deploy their lot of capital, with most funds now calling capital well into their sixth year.

Bucketing funds by vintage year helps remove some of the noise and identify long-term trends, but assessing the drawdown patterns of individual vintages also proves interesting. In addition to long-term structural changes in drawdown rates, we found that the pace of PE investment ebbs and flows with the broader investment cycle. This cyclicality can be seen by taking a snapshot of how much capital different vintages had called at the three-year mark, juxtaposed with global GDP growth data from the subsequent three-year period to illustrate the prevailing market environment during the heart of the investment period.

Broadly speaking, PE funds deploy capital more quickly in positive economic environments, particularly in the run-ups to major downturns such as the dotcom bubble and global financial crisis. The inverse is also true, with funds that are active through the depths of recessions deploying capital more slowly. This aligns with broader trends in M&A markets and makes sense from an intuitive perspective. But it also seems to suggest that PE firms are prone to the same foibles as all investors, exuberant when prices are high but reluctant in tumultuous times when bargains are likely to be found. That said, the best GPs are likely to be those willing and able to invest through those turbulent times, as many of the top-performing funds historically have been those that were able to identify opportunities in the aftermath of downturns.

The size of capital calls drops once funds are about 75% invested

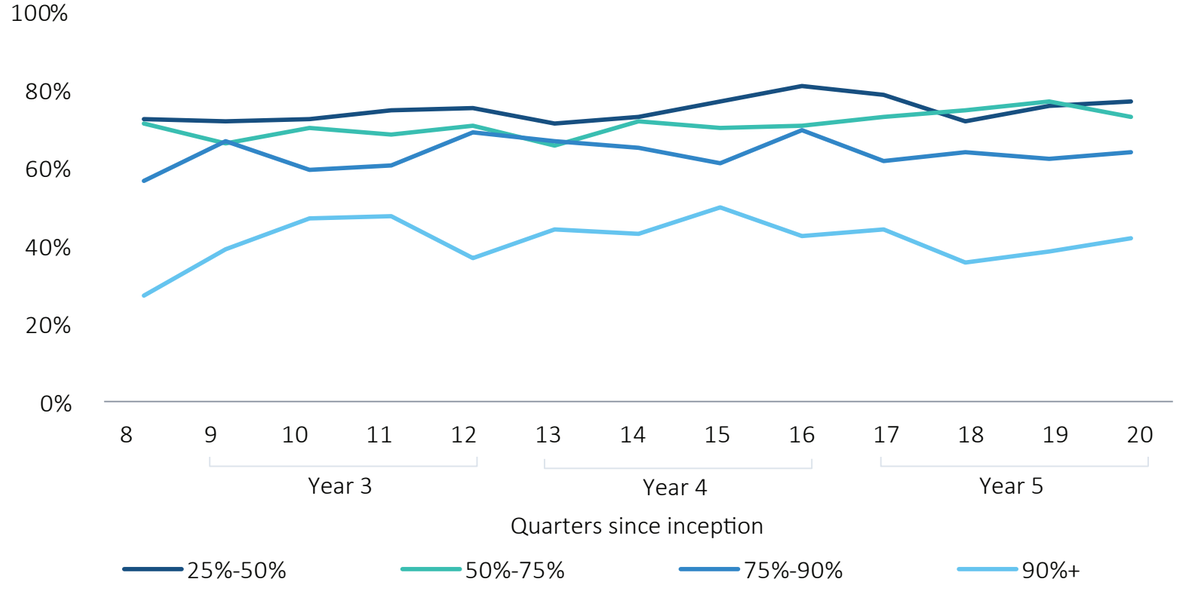
Average capital call size as % of commitments by total capital called



Source: PitchBook
*As of December 31, 2018

The frequency of capital calls plummets after funds are 90% deployed

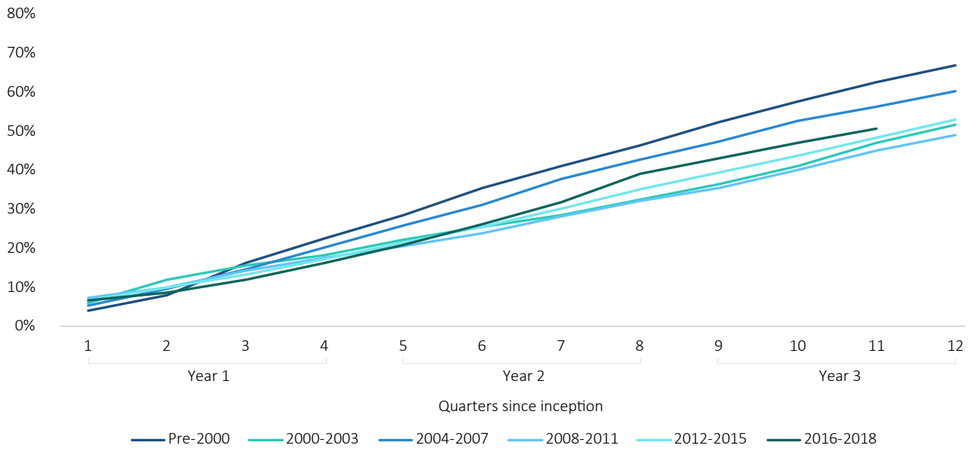
Percentage of funds with a capital call in the quarter by total capital called



Source: PitchBook
*As of December 31, 2018

Newer vintages have been calling capital more slowly

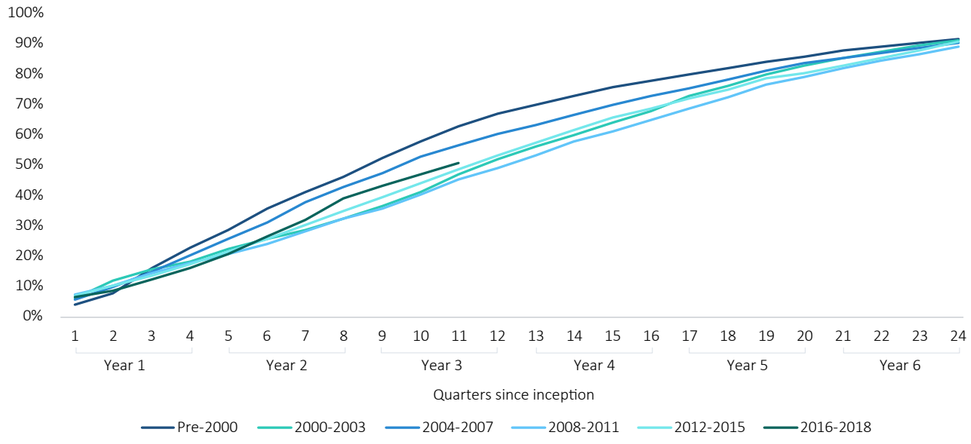
Total capital called by vintage bucket by quarter since inception



Source: PitchBook
*As of December 31, 2018

Most funds now call capital well into their sixth year

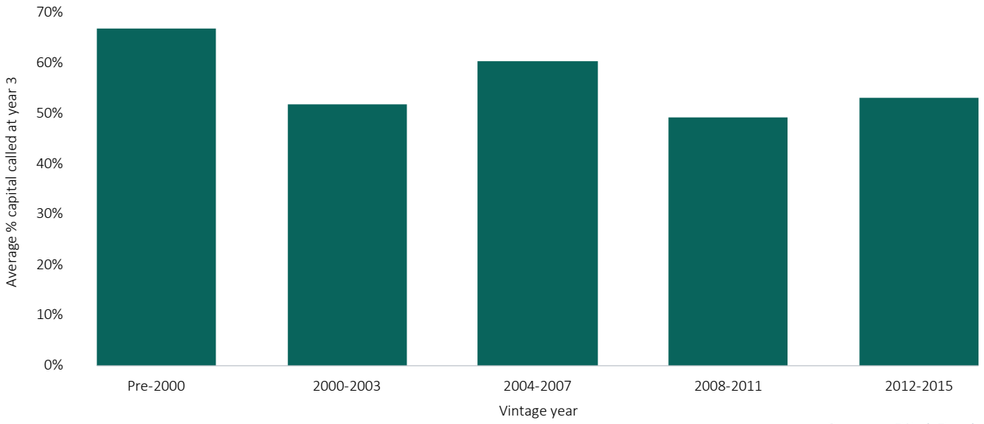
Total capital called by vintage bucket by quarter since inception



Source: PitchBook
*As of December 31, 2018

It now takes about three years for a fund to be 50% called

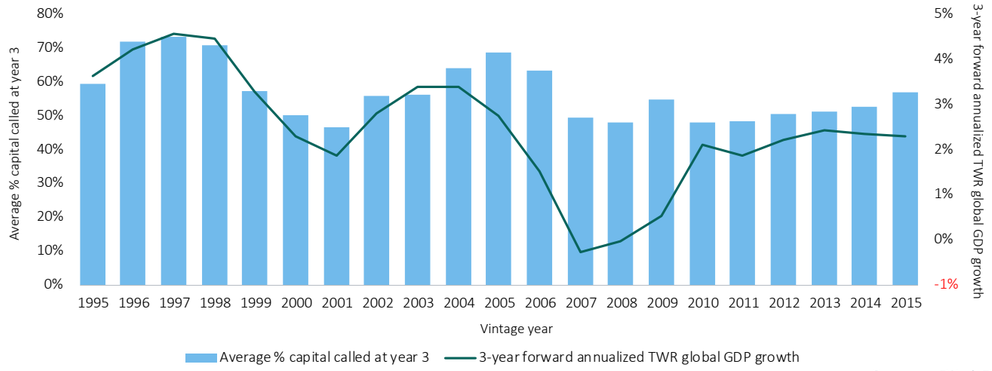
Average PE capital called at 3-year mark by vintage



Source: PitchBook
*As of December 31, 2018

Drawdown rates exhibit a high level of cyclicality

Average PE capital called at 3-year mark by vintage, with 3-year forward annualized TWR global GDP growth



Source: PitchBook
*As of December 31, 2018

Size

Regardless of the strategy, it's an investing truism that larger pools of capital are more difficult to deploy—and private markets are no exception. Fund size is negatively correlated with drawdown rates (i.e. larger funds call capital more slowly), particularly in the first two years of the investment period. The gap is particularly pronounced for the largest and smallest vehicles. On the smaller end of the spectrum, GPs often execute fewer deals per fund, which translates large checks relative to the fund size and more concentrated portfolios. They also tend to rely less on buy-and-build strategies, diminishing the need to maintain reserve capital.

Conversely, mega-funds are almost uniformly raised by massive GPs that are in perpetual fundraising mode for all intents and purposes. This means that GPs often have dry powder remaining to be deployed in one fund when the successor fund has already been raised, which can be a drag on early capital deployment. Importantly, however, larger funds accelerate their pace of investment through the back half of the investment period, with total capital called converging with smaller vehicles at the midway point of their fourth year.

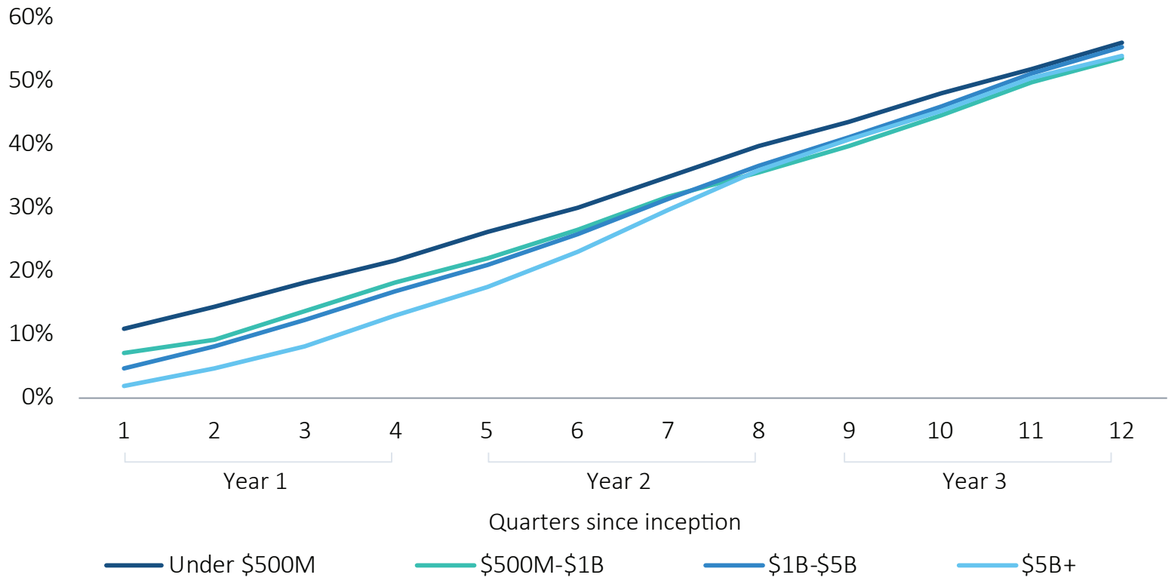
Diversification

Understanding the general mechanics of private market funds can provide insight into how a fund's cash flows are likely to materialize. But even in the best-case scenario, cash flow predictions for any individual fund are likely to conform only loosely to reality. An investor can remove some of the volatility in cash flows, however, by diversifying their private market exposure across a variety of funds. Just as adding more stocks to an equity portfolio dampens volatility, the addition of new fund commitments to a private market allocation results in smoother, more predictable cash flow patterns.

But diversification is inherently limited if investors restrict themselves to a single private market strategy. To that end, similar to how investors in public markets would be ill-served to allocate entirely to stocks, bonds or commodities, investors in the private markets benefit from expanding their purview beyond a single strategy, as we will explore in a future installment in the series.

Larger funds take longer to deploy capital …

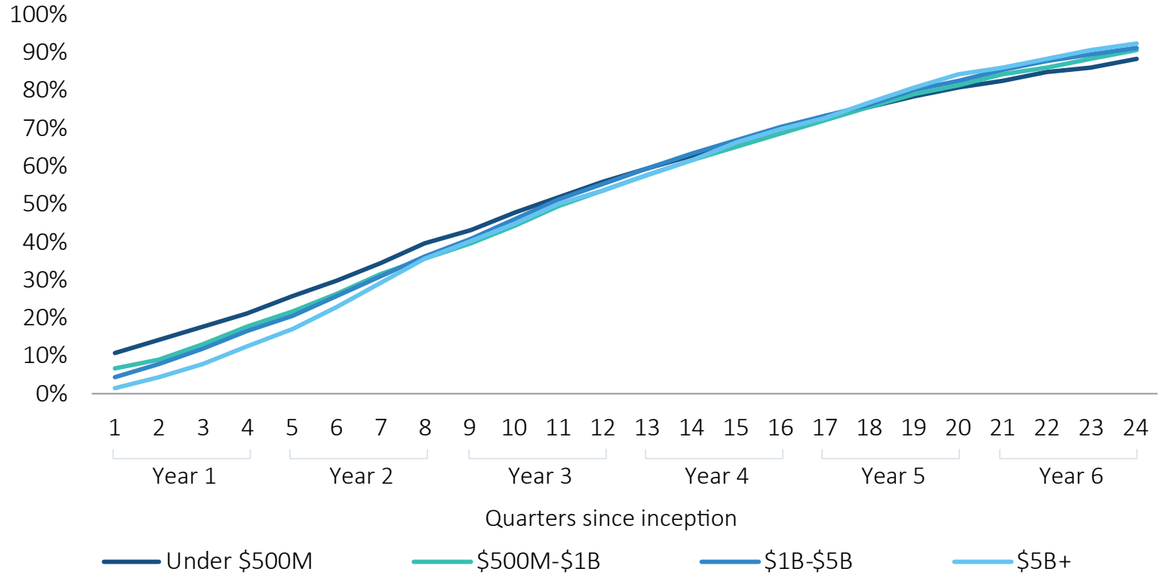
Total capital called by fund size bucket by quarter since inception



Source: PitchBook
*As of December 31, 2018

… and have relatively more activity in their fourth and fifth year

Total capital called by fund size bucket by quarter since inception



Source: PitchBook
*As of December 31, 2018

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