



PitchBook Benchmarks

PRIVATE MARKETS DATA
AS OF 2Q 2018



Contents

Introduction	3	Venture capital	20-25	PMEs by vintage	36
Methodology	4-5	IRRs by vintage	21	Quarterly return	37
Spotlight: Inflated IRRs	6-9	Multiples by vintage	22-23	Fund-of-funds	38-43
Private capital	11-13	PMEs by vintage	24	IRRs by vintage	39
Horizon IRRs	12	Quarterly return	25	Multiples by vintage	40-41
Equal-weighted horizon IRRs	13	Real assets	26-31	PMEs by vintage	42
Private equity	14-19	IRRs by vintage	27	Quarterly return	43
IRRs by vintage	15	Multiples by vintage	28-29	Secondaries	44-49
Multiples by vintage	16-17	PMEs by vintage	30	IRRs by vintage	45
PMEs by vintage	18	Quarterly return	31	Multiples by vintage	46-47
Quarterly return	19	Debt	32-37	PMEs by vintage	48
		IRRs by vintage	33	Quarterly return	49
		Multiples by vintage	34-35		



Introduction

PitchBook Benchmarks aim to help both LPs and GPs better understand private market fund performance relative to broader asset classes and other PE and VC strategies. Performance is presented through several lenses—including IRRs and cash multiples—to provide a holistic view for assessing performance within and between strategies, as well as across vintage years. Furthermore, the alpha of private market funds is measured relative to easily accessible public market substitutes using a PME metric.

Each edition of our Benchmarks will include a section that highlights a specific aspect of fund performance. In this version, we examine the evolution of performance of private market funds alongside public equities using quarterly return data. To help visualize trends, we employ an indexing methodology starting at a base of 100, then apply the quarterly return on a rolling basis to create a “NAV index.” In addition to assessing relative performance in different periods, viewing data through this lens allows investors to see the correlation between private market fund strategies.

We strive to maintain consistency in each edition of PitchBook Benchmarks, but fund classifications will change occasionally and new funds will be incorporated into the dataset as we gather additional information.

Below you’ll find detailed benchmark statistics across PE, VC, debt, real assets, funds-of-funds and secondaries strategies. To easily access all of the data points found in this PDF, along with benchmark statistics for a host of other sub-strategies and geographies, be sure to download the accompanying Excel data packs ([PE](#), [VC](#), [Debt & Real Assets](#) and [Alternative Access Strategies](#)). Through these data packs, subscribers to the PitchBook Platform can also gain direct access to all the underlying funds and performance metrics used to calculate our Benchmarks.

Our goal is to provide the most transparent, comprehensive and useful fund performance data for private market professionals. We hope that our Benchmarks prove useful in your practice, and we welcome any and all feedback that may arise as you make your way through our various benchmark groupings. Should there be any additional benchmark categories or data points you would like to see included in the future, please contact us directly at benchmarks@pitchbook.com.



Methodology

Data composition

PitchBook's fund returns data is primarily composed of individual LP reports, serving as the baseline for our estimates of activity across an entire fund. For any given fund, return profiles will vary for LPs due to a range of factors, including fee discounts, timing of commitments and inclusion of co-investments. This granularity of LP-reported returns—all available on the PitchBook Platform—provides helpful insight to industry practitioners but results in discrepancies that must be addressed when calculating fund-level returns.

To be included in pooled calculations, a fund must have: (i) at least one LP report within two years of the fund's vintage, and (ii) LP reports in at least 45% of applicable reporting periods. To mitigate discrepancies among multiple LPs reporting, the PitchBook Benchmarks (iii) determine returns for each fund based on data from all LP reports in a given period. For periods that lack an LP report, (iv) a straight-line interpolation calculation is used to populate the missing data; interpolated data is used for approximately 10% of reporting periods. All returns data in this report is net of fees

Definitions

Vintage year:

The vintage year is based on the year of first investment. If year of first investment is unknown, the year of the final close is used as the vintage year. However, if a firm publicly declares via press release or a notice on their website a fund to be of a particular vintage different than either of the first conditions, the firm's classification takes precedence.

Internal rate of return (IRR):

IRR represents the rate at which a series of cash flows are discounted so that the net present value of cash flows equals zero. For fund-level IRRs, any remaining value in the fund is treated as a distribution in the most recent reporting period. This explains why some vintages show high IRRs but low DPI values.

Distributions to paid-in (DPI):

A measurement of the capital that has been distributed back to LPs as a proportion of the total paid-in, or contributed, capital. DPI is also known as the cash-on-cash multiple or the realization multiple.

Remaining value to paid-in (RVPI):

A measurement of the unrealized return of a fund as a proportion of the total paid-in, or contributed, capital.

Total value to paid-in (TVPI):

A measurement of both the realized and unrealized value of a fund as a proportion of the total paid-in, or contributed, capital. Also known as the investment multiple, TVPI can be found by adding together the DPI and RVPI of a fund.

Fund count:

Some funds in our dataset have cash flow data but no reported IRR figure. We do not calculate individual fund IRRs using quarterly cash flows, which means the sample sizes may differ for pooled calculations and median calculations.



Methodology

Median calculations:

Shows the middle data point for a sample group.

Pooled calculations:

All cash flows and NAVs for the sample group are aggregated in the calculation. For vintage-specific calculations, we begin the calculation in 1Q of the vintage year. In cases where the sample has unrealized value, the ending NAV is treated as a cash outflow in the last reporting period.

Equal-weighted pooled calculations:

Each fund's cash flows and ending NAV are expressed as a ratio of fund size. Each fund's ratios are then used to compute pooled calculations for IRR and cash multiples using the methodology outlined above. Regardless of fund size, each fund in these calculations has an equal impact on the output.

Horizon IRR:

Horizon IRR is a capital-weighted pooled calculation that shows the IRR from a certain point in time. For example, the one-year horizon IRR figures in this report show the IRR performance for the one-year period beginning in 3Q 2017 through the end of 2Q 2018, while the three-year horizon IRR is for the period beginning in 3Q 2015 through the end of 2Q 2018.

Quarterly NAV change:

The percentage change in aggregate NAV is calculated for each group of funds in a sample, considering contributions and distributions during the quarter.

Standard deviation:

Calculated using the sample-based standard deviation methodology.

Public market index returns:

Instances where the return of a public market index is cited, we have calculated the annualized return for the given period. All public indices are total return and denominated in US dollars.

Public market equivalent (PME) calculations:

PME metrics benchmark the performance of a fund (or group of funds) against an index. A white paper detailing the calculations and methodology behind the PME benchmarks can be found at pitchbook.com. PitchBook News & Analysis also contains several articles with PME benchmarks and analysis. These can be read [here](#). All PME figures are calculated using the Kaplan-Schoar PME method:

$$PME_{KS-TVPI, T} = \frac{\frac{NAV_T}{I_T} + \sum_{t=0}^T \left(\frac{\text{distribution}_t}{I_t} \right)}{\sum_{t=0}^T \left(\frac{\text{contribution}_t}{I_t} \right)}$$

When using a KS-PME, a value greater than 1.0 implies outperformance of the public index (net of all fees).

Fund classifications

Private equity

Buyout
Growth/expansion
Mezzanine
Restructuring/turnaround
Diversified PE

Debt

Direct lending
Bridge financing
Distressed debt
Credit special situations
Infrastructure debt
Venture debt
Real estate debt

Real assets

Real estate core
Real estate core plus
Real estate distressed
Real estate opportunistic
Real estate value added
Energy
Infrastructure
Timber
Mining

Venture capital

Secondaries

Fund-of-funds



Spotlight: 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.

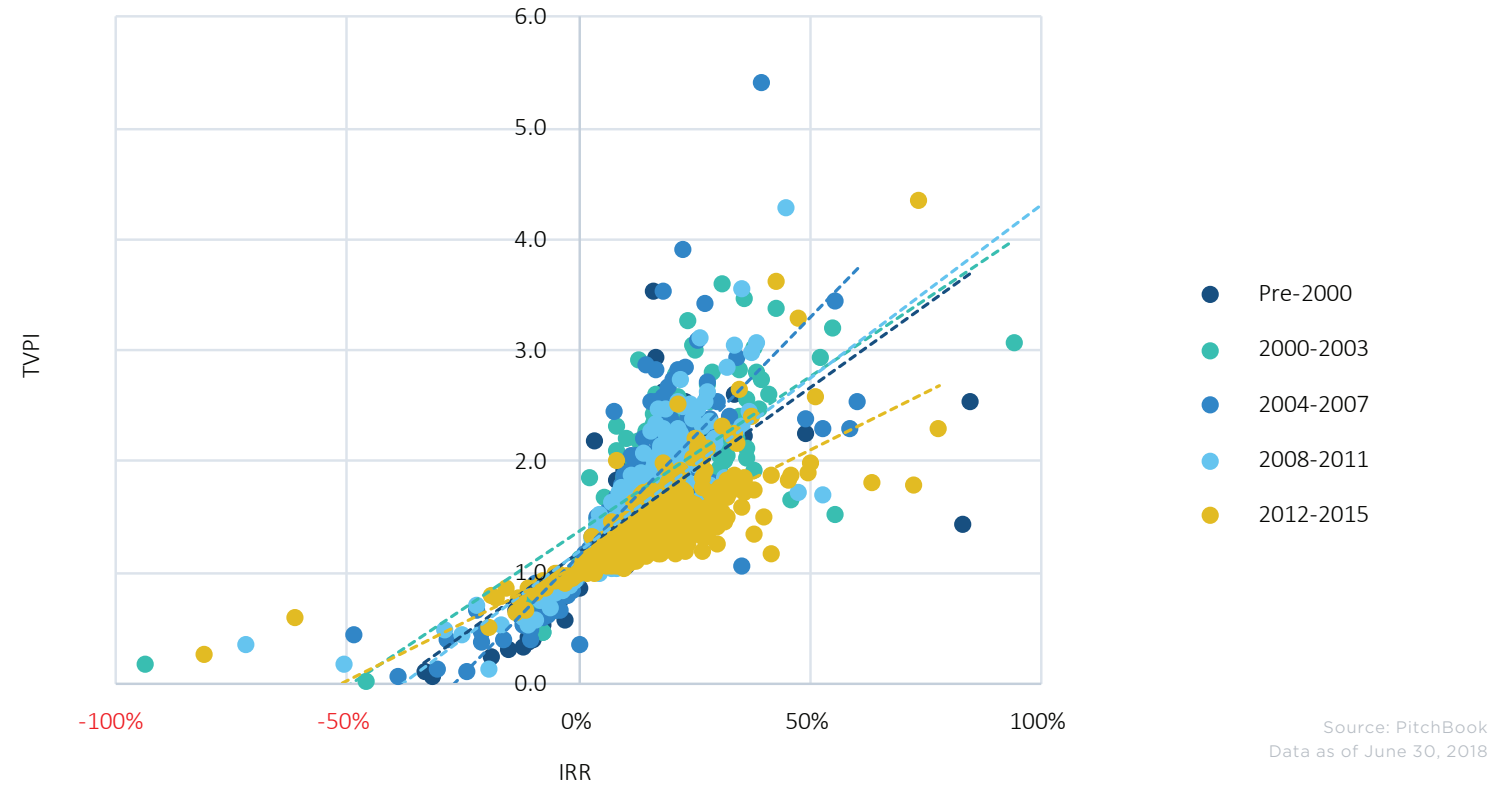
Outside the debate on subscription facilities, we also hear frequent worries about the reliability of performance metrics, particularly when it comes to mark-to-market practices for existing investments. Many LPs worry that GPs are too sanguine in their portfolio valuations, which could lead to write-downs, 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.

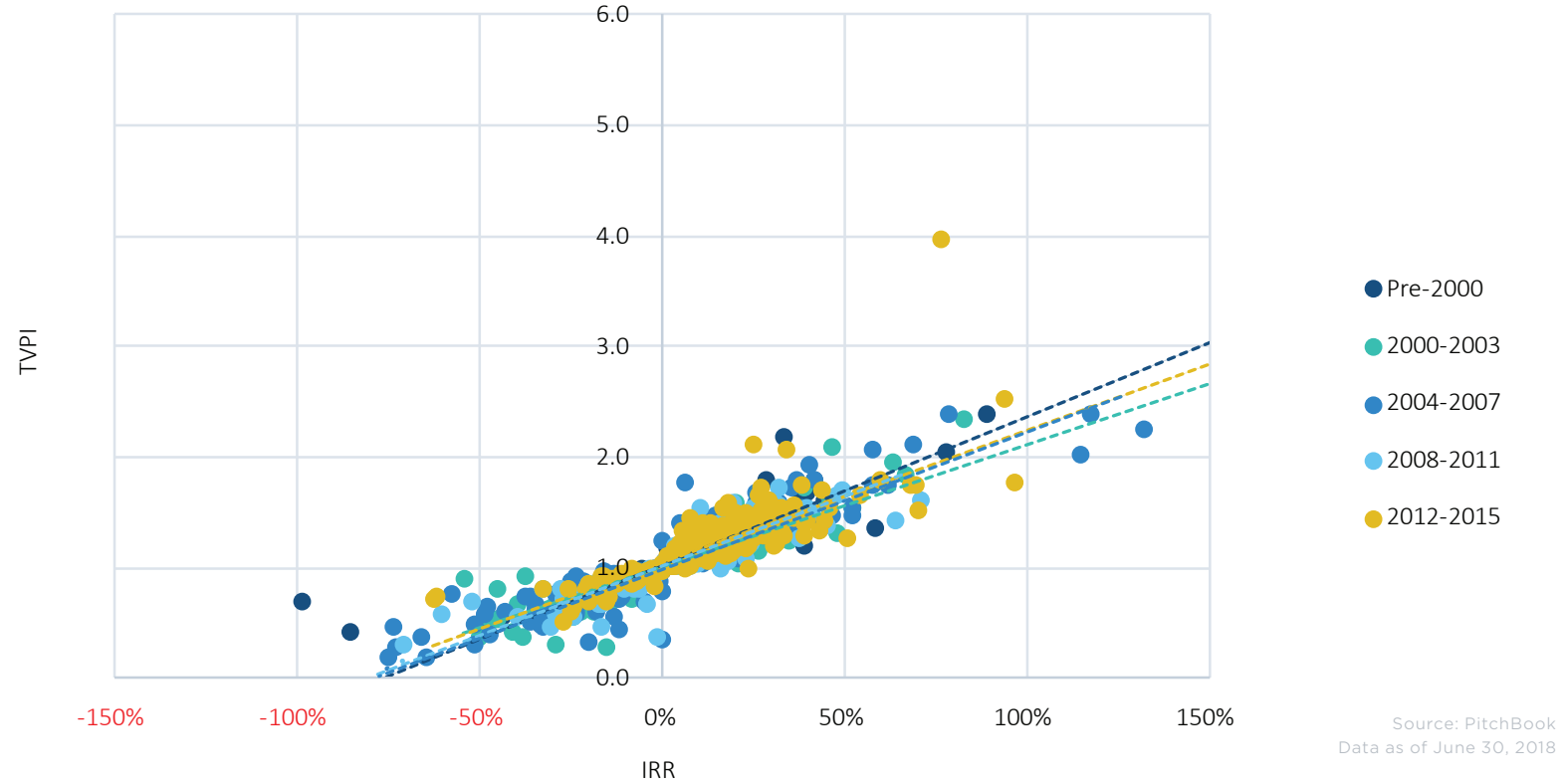
¹: “Abraaj: A Test Case for Broken Credit Lines,” *Private Funds Management*, Toby Mitchenall, November 23, 2018



Newer vintage IRRs can appear inflated compared to cash multiples PE IRR and TVPI by vintage bucket



Apparent IRR inflation disappears when observing funds of similar age PE IRR and TVPI at three-year mark by vintage bucket



“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.



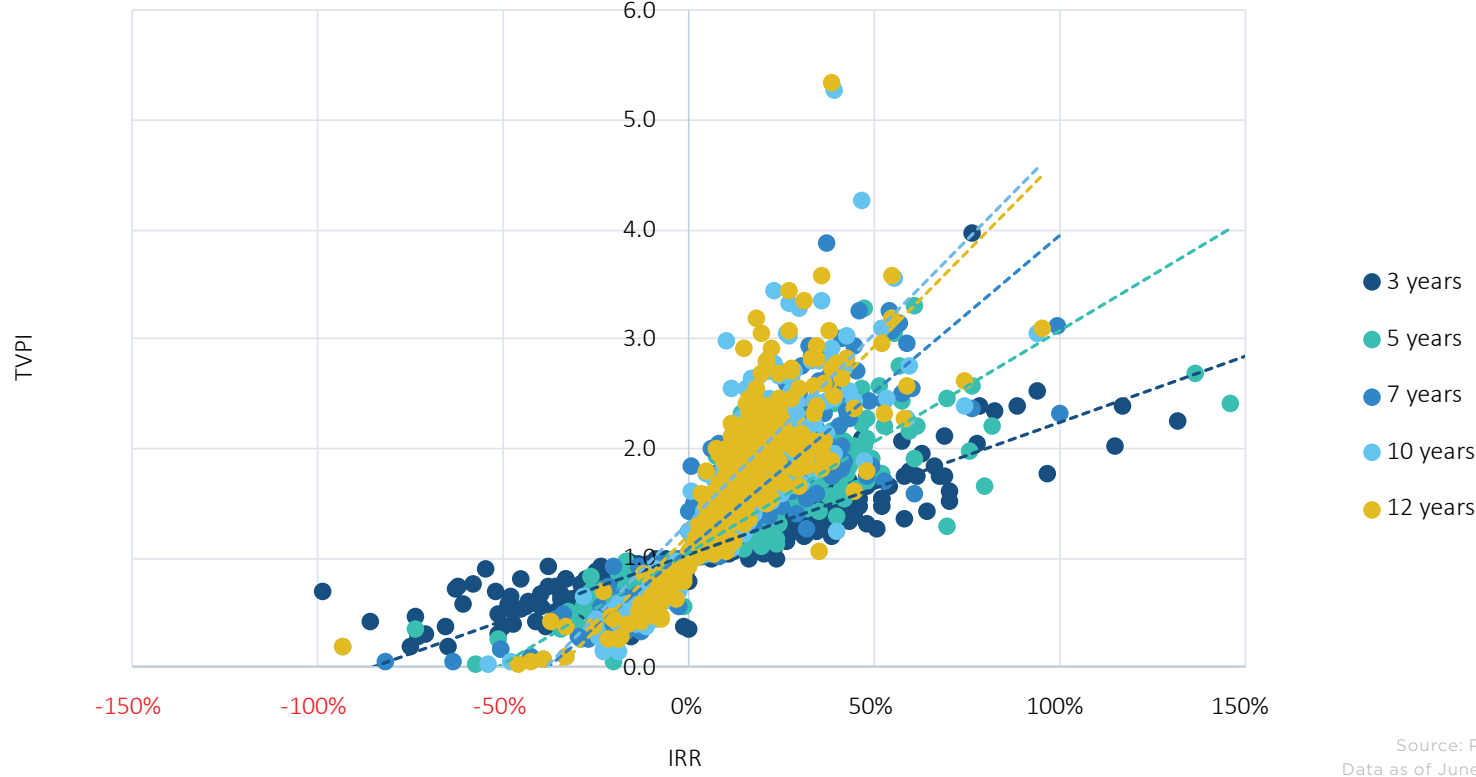
In aggregate, we do not find any evidence that IRR is being distorted for funds of more recent vintages. However, we think it is important for capital allocators to appreciate how the relationship between IRR and cash multiples evolves over the life of a fund. As we have shown, a particular IRR will 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



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.

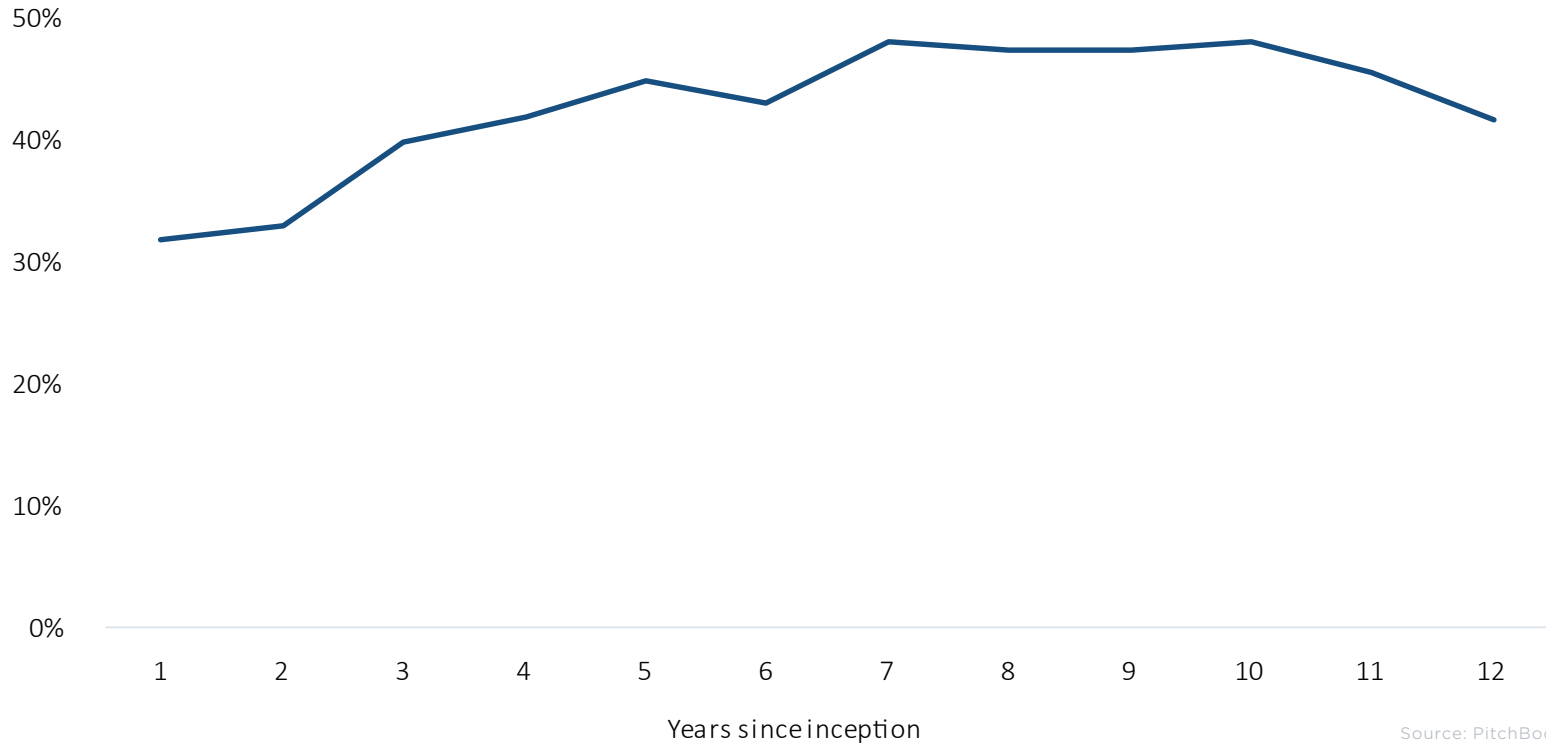
If aggressive markups early in the holding period were a persistent issue, we would expect to see IRRs peak early in a fund’s life and to subsequently fall as the holding period extends. While we do find that most funds tend to hit their peak IRR around year seven, the median fund historically has been 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 ...

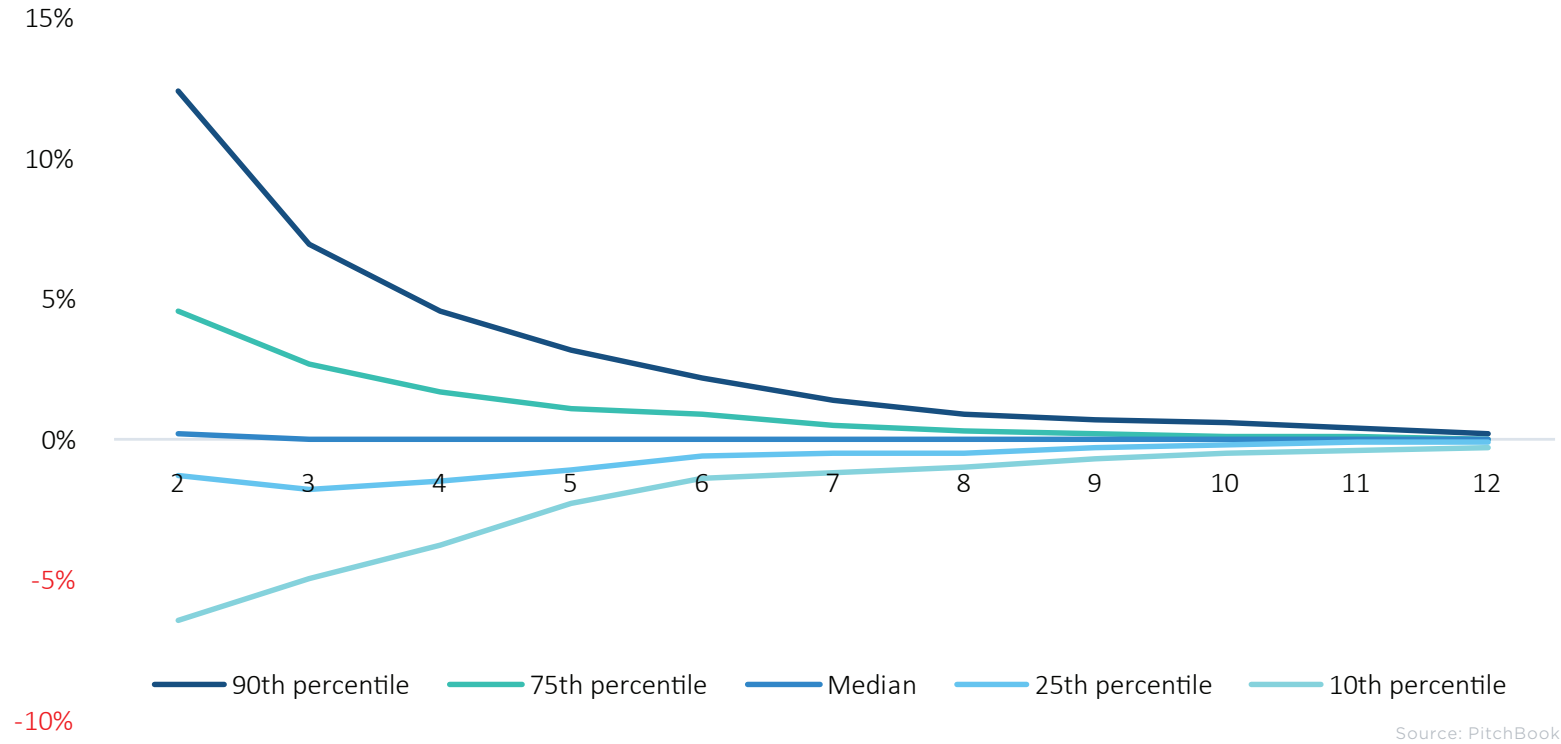
Proportion of PE funds reporting lower IRR compared to prior reporting period



Source: PitchBook Data as of June 30, 2018

... but downward revisions tend to be relatively small

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



Source: PitchBook Data 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

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Contents

- General Information
- Contact Information
- Recent Notes
- Fund Service Providers
- Fund Team (5)
- Limited Partners (49)
- Fund Investments (34)
- Investment Preferences
- Returns Data
- Fund Cash Flow
- Dry Powder
- Fund Returns History**
- Benchmark

Fund Returns History

Period	Contribution £ (by all LPs)	Dry Powder £	Distribution £ (to all LPs)	NAV £	Total Fund £ Distr+NAV	IRR	DPI	RVPI	TVPI
2017	2,669,17	57,29	2,418,55	2,671,53	5,092,68	20,04%	0,90x	1,00x	1,91x
3Q17	2,572,54	458,21	3,089,00	2,262,00	5,350,99		1,07x	0,79x	1,86x
2Q17	2,669,14	57,66	2,421,07	2,671,15	5,092,97	19,84%	0,91x	1,00x	1,91x
1Q17	2,669,17	57,26	1,486,32	3,492,48	4,981,92	20,13%	0,56x	1,31x	1,88x
2016	2,647,36	166,31	1,482,77	3,299,39	4,782,16	20,19%	0,55x	1,25x	1,81x
4Q16	2,647,36	136,64	1,485,90	3,298,98	4,784,88	19,94%	0,56x	1,25x	1,81x

Date	Reported by/Limited Partner	IRR	DPI	RVPI	TVPI	Individual LP Committed	Individual LP Contributed	Dry Powder	Individual LP Distributed	Individual LP NAV	Individual LP Distr+NAV	Gain
31-Dec-2016	New York City Fire Department Pension Fund	20,60%	0,58x	1,21x	1,79x	28,46	28,44	0,02	16,60	34,36	50,96	
31-Dec-2016	New York City Police Pension Fund	20,60%	0,58x	1,21x	1,79x	66,40	66,07	0,33	38,39	80,18	118,56	
31-Dec-2016	Teachers' Retirement System of the City of ...	20,57%	0,57x	1,26x	1,82x	94,86	91,14	3,72	51,66	114,54	166,20	
31-Dec-2016	New York City Employees' Retirement System	20,40%	0,59x	1,19x	1,78x	94,86	96,28	0,00	57,10	114,54	171,64	
31-Dec-2016	Houston Municipal Employees' Pension Syst...	20,19%	0,56x	1,24x	1,80x	18,97	18,47	0,50	10,32	22,96	33,28	
31-Dec-2016	Maryland State Retirement and Pension Sys...	20,00%	0,51x	1,40x	1,91x	47,43	40,96	6,47	20,73	57,40	78,13	
31-Dec-2016	Indiana Public Retirement System	19,95%	0,52x	1,25x	1,89x	47,43	46,07	6,47	30,07	57,40	87,47	
31-Dec-2016	Los Angeles County Employees' Retirement ...	19,92%	0,55x	1,29x	1,83x	94,86	89,07	5,79	48,66	114,78	163,44	
31-Dec-2016	Teachers Retirement System of the State of ...	19,92%	0,51x	1,40x	1,91x	94,86	81,91	12,94	41,51	114,79	156,30	
31-Dec-2016	Massachusetts Pension Reserves Investmen...	19,92%	0,56x	1,25x	1,81x	142,29	138,19	4,10	77,57	172,19	249,77	
31-Dec-2016	Louisiana State Employees Retirement Syst...	19,92%	0,51x	1,40x	1,91x	33,20	28,62	4,58	14,48	40,18	54,66	
31-Dec-2016	Oregon Public Employees Retirement System	19,90%	0,56x	1,25x	1,81x	94,86	92,11	2,75	51,70	114,78	166,48	
31-Dec-2016	State of Wisconsin Investment Board	19,90%	0,56x	1,25x	1,81x	94,86	92,11	2,75	51,70	114,78	166,48	
31-Dec-2016	Baltimore County Employees' Retirement Sy...	19,72%	0,51x	1,39x	1,89x	9,49	8,18	1,29	4,13	11,34	15,47	
31-Dec-2016	Visiting Nurse Service of New York Care Pen...									1,05		
31-Dec-2016	New Jersey Division of Investment		0,61x	1,13x	1,74x	189,72	197,63	25,89	120,46	223,52	343,98	
31-Dec-2016	Los Angeles Department of Water and Powe...					23,71				28,01		
31-Dec-2016	New England Carpenters Guaranteed Annu...									2,74		
31-Dec-2016	New York State Teachers' Retirement System					71,14	61,44	9,71				

Secondary Commitment
Partial Commitment

3Q16	2,647,36	165,26	1,239,21	3,465,75	4,703,50	20,70%	0,47x	1,31x	1,78x
2Q16	2,628,21	243,02	1,232,89	3,459,80	4,692,73	21,92%	0,44x	1,32x	1,80x
1Q16	2,623,57	115,54	1,192,13	3,431,05	4,621,61	22,91%	0,45x	1,31x	1,76x
2015	2,453,71	294,63	1,004,40	3,294,89	4,269,12	23,02%	0,39x	1,34x	1,75x
2014	2,291,69	434,74	87,25	2,996,15	3,037,98	15,87%	0,04x	1,29x	1,33x

PitchBook clients get greater insight into underlying fund data

Get aggregate fund-level performance at a glance.

Get access to individual LP reports and the underlying fund performance data that is used to construct our benchmarks.

Get an even more transparent and comprehensive look into benchmarks with the PitchBook Platform.

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The background features a dark blue triangle on the left side, pointing towards the top right. The rest of the background is white, with several light gray lines that create a sense of depth and perspective, resembling a series of parallel planes or a stylized architectural structure.

Private capital



Private capital

Horizon IRRs

Strategy	1-year	3-year	5-year	10-year	15-year	18-year
Private capital	13.81%	11.34%	13.09%	9.35%	11.46%	9.86%
Private equity	14.78%	13.49%	15.10%	10.51%	13.65%	11.47%
Venture capital	18.14%	7.73%	13.96%	8.93%	8.86%	5.39%
Real assets	11.22%	9.45%	9.97%	6.58%	7.45%	7.41%
Debt	9.43%	7.05%	8.10%	8.76%	9.27%	9.33%
Fund-of-funds	14.84%	10.31%	12.59%	7.91%	9.41%	8.15%
Secondaries	15.47%	10.14%	12.74%	10.24%	11.78%	11.27%
S&P 500	11.57%	11.92%	11.96%	10.34%	9.29%	5.80%
Russell 2000 Growth	18.33%	11.31%	11.43%	10.93%	10.11%	5.83%
Russell 3000	11.16%	12.19%	12.24%	10.29%	9.04%	5.44%
Morningstar US Real Assets	4.23%	2.43%	1.67%	3.37%	6.27%	7.20%
Bloomberg Barclays US Corporate High Yield	1.53%	6.06%	5.15%	8.38%	7.74%	7.27%

Source: PitchBook. Data as of June 30, 2018



Private capital

Equal-weighted horizon IRRs

Strategy	1-year	3-year	5-year	10-year	15-year	18-year
Private capital	14.06%	10.58%	12.39%	9.05%	10.54%	8.19%
Private equity	15.66%	13.05%	13.55%	10.12%	13.43%	10.46%
Venture capital	16.45%	6.28%	12.58%	8.25%	7.72%	4.12%
Real assets	10.59%	10.60%	10.34%	7.03%	8.26%	8.21%
Debt	10.14%	6.79%	8.75%	8.24%	9.26%	9.49%
Fund-of-funds	15.61%	11.09%	13.15%	9.90%	10.35%	9.15%
Secondaries	11.98%	9.10%	11.15%	9.09%	11.35%	10.31%
S&P 500	11.57%	11.92%	11.96%	10.34%	9.29%	5.80%
Russell 2000 Growth	18.33%	11.31%	11.43%	10.93%	10.11%	5.83%
Russell 3000	11.16%	12.19%	12.24%	10.29%	9.04%	5.44%
Morningstar US Real Assets	4.23%	2.43%	1.67%	3.37%	6.27%	7.20%
Bloomberg Barclays US Corporate High Yield	1.53%	6.06%	5.15%	8.38%	7.74%	7.27%

Source: PitchBook. Data as of June 30, 2018

The background features a dark blue triangle on the left side, which expands towards the right. Overlaid on this are several thin, light gray lines that create a series of parallel, slightly curved paths, giving the impression of a stylized architectural structure or a modern graphic design.

Private equity



Private equity

IRRs by vintage

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
Pre-2001	11.16%	9.33%	184	23.55%	15.80%	9.78%	2.99%	-6.28%	14.46%	180
2001	23.81%	19.54%	31	38.80%	27.78%	16.78%	11.49%	8.17%	19.57%	31
2002	18.68%	16.35%	35	34.53%	27.13%	17.03%	7.82%	5.58%	17.45%	34
2003	23.18%	16.34%	22	37.83%	24.92%	12.04%	6.35%	-2.30%	27.37%	22
2004	12.77%	11.44%	50	28.09%	16.66%	10.35%	4.60%	-0.92%	18.38%	50
2005	9.88%	9.99%	76	20.54%	13.10%	8.33%	3.98%	0.05%	10.78%	73
2006	7.25%	7.06%	109	14.60%	11.47%	7.93%	4.30%	-2.43%	9.30%	105
2007	9.30%	9.60%	109	19.66%	14.90%	9.54%	4.86%	-0.90%	9.68%	105
2008	12.48%	10.40%	113	22.10%	16.25%	11.21%	5.12%	-1.64%	10.24%	110
2009	13.46%	14.38%	47	26.35%	22.03%	11.80%	6.70%	0.64%	16.38%	45
2010	13.25%	11.50%	65	22.43%	15.00%	10.66%	6.70%	-1.70%	12.36%	57
2011	15.52%	14.20%	78	28.37%	20.42%	13.89%	9.52%	2.98%	16.50%	71
2012	17.11%	15.02%	110	27.95%	21.16%	14.22%	8.10%	2.35%	14.95%	105
2013	16.13%	14.90%	94	30.32%	19.84%	14.00%	8.66%	5.11%	10.20%	82
2014	18.24%	17.51%	92	29.66%	21.39%	14.47%	8.50%	1.50%	14.91%	85
2015	19.59%	16.16%	127	29.78%	21.13%	13.37%	6.57%	-1.79%	15.82%	104
2016	17.76%	18.69%	104	31.37%	16.73%	9.60%	-0.35%	-16.22%	24.94%	88

Source: PitchBook. Data as of June 30, 2018



Private equity

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.63x	1.62x	0.01x	1.52x	1.51x	0.02x	184
2001	2.16x	2.13x	0.03x	1.99x	1.97x	0.02x	31
2002	1.86x	1.82x	0.04x	1.77x	1.72x	0.05x	35
2003	2.02x	1.95x	0.07x	1.82x	1.76x	0.06x	22
2004	1.74x	1.66x	0.07x	1.64x	1.54x	0.10x	50
2005	1.61x	1.51x	0.10x	1.61x	1.49x	0.12x	76
2006	1.45x	1.31x	0.14x	1.42x	1.24x	0.19x	109
2007	1.50x	1.23x	0.27x	1.54x	1.24x	0.30x	109
2008	1.61x	1.27x	0.34x	1.52x	1.17x	0.35x	113
2009	1.63x	1.29x	0.34x	1.68x	1.29x	0.38x	47
2010	1.54x	0.96x	0.58x	1.49x	0.88x	0.61x	65
2011	1.63x	0.78x	0.85x	1.58x	0.72x	0.86x	78
2012	1.55x	0.62x	0.93x	1.49x	0.60x	0.90x	110
2013	1.39x	0.41x	0.98x	1.40x	0.40x	1.00x	94
2014	1.36x	0.34x	1.02x	1.36x	0.35x	1.01x	92
2015	1.28x	0.18x	1.11x	1.26x	0.18x	1.08x	127
2016	1.16x	0.15x	1.02x	1.19x	0.15x	1.04x	104

Source: PitchBook. Data as of June 30, 2018



Private equity

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	2.26x	1.92x	1.52x	1.14x	0.69x	2.26x	1.91x	1.51x	1.13x	0.69x	184
2001	2.92x	2.53x	1.88x	1.57x	1.30x	2.92x	2.50x	1.88x	1.53x	1.23x	31
2002	2.65x	2.15x	1.70x	1.33x	1.21x	2.45x	2.14x	1.65x	1.31x	1.16x	35
2003	2.99x	1.94x	1.69x	1.50x	0.87x	2.84x	1.93x	1.67x	1.49x	0.80x	22
2004	2.53x	2.00x	1.60x	1.33x	0.92x	2.32x	1.93x	1.56x	1.12x	0.67x	50
2005	2.37x	1.86x	1.51x	1.21x	1.00x	2.30x	1.77x	1.36x	1.13x	0.75x	76
2006	1.96x	1.66x	1.42x	1.17x	0.77x	1.76x	1.53x	1.31x	0.98x	0.49x	109
2007	2.16x	1.88x	1.49x	1.17x	0.94x	1.96x	1.63x	1.19x	0.88x	0.60x	109
2008	2.08x	1.81x	1.52x	1.19x	0.93x	1.72x	1.49x	1.18x	0.86x	0.53x	113
2009	2.49x	2.09x	1.54x	1.28x	0.95x	2.12x	1.72x	1.19x	0.94x	0.64x	47
2010	2.08x	1.72x	1.46x	1.19x	0.91x	1.52x	1.23x	0.83x	0.55x	0.35x	65
2011	2.23x	1.84x	1.48x	1.28x	1.04x	1.38x	1.02x	0.62x	0.34x	0.18x	78
2012	1.92x	1.71x	1.44x	1.23x	0.98x	1.09x	0.84x	0.57x	0.29x	0.13x	110
2013	1.84x	1.50x	1.34x	1.21x	1.09x	0.91x	0.61x	0.30x	0.12x	0.02x	94
2014	1.76x	1.42x	1.28x	1.14x	1.03x	0.82x	0.48x	0.25x	0.06x	0.00x	92
2015	1.53x	1.38x	1.22x	1.07x	0.96x	0.39x	0.22x	0.11x	0.01x	0.00x	127
2016	1.50x	1.21x	1.10x	0.98x	0.89x	0.43x	0.16x	0.02x	0.00x	0.00x	104

Source: PitchBook. Data as of June 30, 2018



Private equity

PMEs by vintage

S&P 500 index

Russell 3000 index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	23.81%	6.55%	1.69	23.81%	6.94%	1.65	31
2002	18.68%	7.66%	1.43	18.68%	8.01%	1.40	35
2003	23.18%	10.02%	1.58	23.18%	10.37%	1.56	22
2004	12.77%	8.51%	1.36	12.77%	8.72%	1.34	50
2005	9.88%	8.62%	1.20	9.88%	8.81%	1.19	76
2006	7.25%	8.53%	0.99	7.25%	8.57%	0.98	109
2007	9.30%	8.14%	0.95	9.30%	8.19%	0.95	109
2008	12.48%	9.33%	0.98	12.48%	9.48%	0.98	113
2009	13.46%	16.38%	0.96	13.46%	16.59%	0.95	47
2010	13.25%	13.57%	0.97	13.25%	13.58%	0.98	65
2011	15.52%	12.94%	1.05	15.52%	12.75%	1.06	78
2012	17.11%	14.14%	1.10	17.11%	14.02%	1.10	110
2013	16.13%	14.01%	1.07	16.13%	13.83%	1.08	94
2014	18.24%	11.83%	1.09	18.24%	11.38%	1.10	92
2015	19.59%	10.93%	1.07	19.59%	10.69%	1.06	127
2016	17.76%	17.99%	1.02	17.76%	18.57%	1.02	104

Source: PitchBook. Data as of June 30, 2018



Private equity

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	2.56%	3Q 2008	-7.73%	1Q 2012	5.78%	3Q 2015	0.39%
2Q 2005	8.39%	4Q 2008	-10.97%	2Q 2012	0.74%	4Q 2015	2.61%
3Q 2005	7.06%	1Q 2009	-7.22%	3Q 2012	3.70%	1Q 2016	2.04%
4Q 2005	9.66%	2Q 2009	3.20%	4Q 2012	3.36%	2Q 2016	4.20%
1Q 2006	4.26%	3Q 2009	3.64%	1Q 2013	3.11%	3Q 2016	4.49%
2Q 2006	5.47%	4Q 2009	6.86%	2Q 2013	3.05%	4Q 2016	1.59%
3Q 2006	4.27%	1Q 2010	3.03%	3Q 2013	4.68%	1Q 2017	4.65%
4Q 2006	12.44%	2Q 2010	1.66%	4Q 2013	5.67%	2Q 2017	5.18%
1Q 2007	6.07%	3Q 2010	4.55%	1Q 2014	4.57%	3Q 2017	4.33%
2Q 2007	8.52%	4Q 2010	7.70%	2Q 2014	4.92%	4Q 2017	4.25%
3Q 2007	4.48%	1Q 2011	5.05%	3Q 2014	0.20%	1Q 2018	3.58%
4Q 2007	4.17%	2Q 2011	4.73%	4Q 2014	3.62%	2Q 2018	1.84%
1Q 2008	-0.66%	3Q 2011	-2.80%	1Q 2015	3.40%		
2Q 2008	-1.70%	4Q 2011	1.31%	2Q 2015	4.92%		

Source: PitchBook. Data as of June 30, 2018



Venture capital



Venture capital

IRRs by vintage

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
Pre-2001	1.40%	5.50%	144	20.36%	7.00%	0.00%	-8.40%	-14.70%	31.47%	137
2001	6.22%	3.69%	35	11.89%	5.96%	2.77%	-3.30%	-15.34%	11.58%	34
2002	3.19%	2.98%	17	10.95%	9.12%	3.61%	-6.78%	-11.21%	10.11%	16
2003	4.72%	0.97%	19	10.39%	6.40%	2.76%	-2.45%	-20.80%	17.26%	16
2004	2.14%	0.55%	22	6.65%	5.13%	1.59%	-7.96%	-14.04%	9.82%	22
2005	8.68%	10.59%	33	15.53%	9.78%	3.49%	0.25%	-4.30%	13.93%	32
2006	5.26%	3.33%	41	13.36%	8.69%	2.85%	-7.78%	-14.78%	12.82%	40
2007	12.80%	12.21%	46	31.26%	16.20%	9.39%	-0.94%	-10.44%	16.70%	45
2008	13.49%	10.38%	56	26.64%	18.09%	7.41%	0.70%	-16.35%	18.69%	52
2009	10.64%	9.02%	21	19.93%	14.07%	9.23%	4.79%	-3.77%	9.76%	20
2010	18.53%	18.38%	25	40.14%	27.97%	12.47%	3.90%	-4.24%	19.03%	24
2011	17.77%	16.15%	21	28.41%	21.40%	15.90%	7.22%	-3.85%	12.40%	21
2012	17.97%	16.96%	18	31.94%	20.35%	13.78%	10.65%	0.22%	13.40%	16
2013	23.89%	17.33%	23	31.95%	21.63%	14.11%	9.57%	0.71%	17.30%	19
2014	19.53%	17.60%	37	26.16%	18.04%	13.20%	8.50%	3.95%	11.36%	33
2015	18.16%	18.78%	38	31.82%	21.04%	11.75%	5.42%	-5.73%	20.96%	34
2016	16.04%	20.99%	45	39.88%	24.81%	13.64%	-3.93%	-15.52%	23.74%	35

Source: PitchBook. Data as of June 30, 2018



Venture capital

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.08x	1.00x	0.08x	1.21x	1.16x	0.05x	144
2001	1.44x	1.34x	0.10x	1.26x	1.16x	0.10x	35
2002	1.19x	1.15x	0.04x	1.19x	1.09x	0.10x	17
2003	1.33x	1.19x	0.14x	1.06x	0.96x	0.10x	19
2004	1.16x	0.92x	0.24x	1.04x	0.78x	0.26x	22
2005	1.68x	1.29x	0.39x	1.85x	1.41x	0.44x	33
2006	1.34x	1.02x	0.32x	1.22x	0.88x	0.34x	41
2007	1.89x	1.32x	0.57x	1.89x	1.26x	0.63x	46
2008	1.78x	1.16x	0.62x	1.63x	0.94x	0.68x	56
2009	1.69x	0.73x	0.96x	1.57x	0.70x	0.88x	21
2010	2.06x	1.03x	1.03x	2.09x	1.12x	0.96x	25
2011	1.87x	0.68x	1.19x	1.81x	0.48x	1.34x	21
2012	1.87x	0.49x	1.38x	1.78x	0.40x	1.39x	18
2013	1.72x	0.34x	1.37x	1.50x	0.24x	1.27x	23
2014	1.49x	0.17x	1.32x	1.37x	0.20x	1.17x	37
2015	1.30x	0.09x	1.20x	1.30x	0.10x	1.20x	38
2016	1.13x	0.04x	1.09x	1.20x	0.08x	1.12x	45

Source: PitchBook. Data as of June 30, 2018



Venture capital

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	1.80x	1.37x	1.00x	0.61x	0.27x	1.76x	1.33x	0.89x	0.53x	0.24x	144
2001	2.03x	1.53x	1.22x	0.76x	0.29x	2.01x	1.38x	1.06x	0.68x	0.26x	35
2002	1.78x	1.74x	1.18x	0.68x	0.49x	1.78x	1.61x	1.09x	0.57x	0.33x	17
2003	1.56x	1.45x	1.08x	0.61x	0.38x	1.44x	1.19x	1.06x	0.61x	0.38x	19
2004	1.72x	1.47x	1.11x	0.59x	0.39x	1.49x	1.14x	0.79x	0.42x	0.09x	22
2005	2.40x	1.71x	1.31x	1.00x	0.71x	2.06x	1.50x	0.98x	0.54x	0.41x	33
2006	2.10x	1.65x	1.10x	0.69x	0.41x	1.48x	1.21x	0.84x	0.47x	0.18x	41
2007	2.98x	2.30x	1.62x	0.98x	0.47x	2.27x	1.58x	1.16x	0.46x	0.11x	46
2008	2.81x	2.06x	1.52x	0.98x	0.34x	2.34x	1.33x	0.72x	0.31x	0.14x	56
2009	2.41x	1.86x	1.57x	1.04x	0.86x	1.26x	0.87x	0.51x	0.23x	0.19x	21
2010	3.53x	2.61x	1.76x	1.26x	0.83x	2.23x	1.50x	0.90x	0.41x	0.24x	25
2011	2.72x	2.32x	1.68x	1.37x	0.99x	0.98x	0.73x	0.54x	0.10x	0.04x	21
2012	2.70x	1.93x	1.67x	1.15x	0.93x	0.83x	0.50x	0.34x	0.05x	0.00x	18
2013	1.99x	1.75x	1.39x	1.28x	1.06x	0.59x	0.35x	0.13x	0.01x	0.00x	23
2014	1.81x	1.46x	1.33x	1.14x	1.07x	0.44x	0.22x	0.09x	0.00x	0.00x	37
2015	1.52x	1.33x	1.19x	1.07x	0.94x	0.29x	0.13x	0.00x	0.00x	0.00x	38
2016	1.35x	1.21x	1.04x	0.96x	0.89x	0.21x	0.00x	0.00x	0.00x	0.00x	45

Source: PitchBook. Data as of June 30, 2018



Venture capital

PMEs by vintage

S&P 500 Index

Russell 2000 growth index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	6.22%	6.55%	0.99	6.22%	7.77%	0.91	35
2002	3.19%	7.66%	0.87	3.19%	8.99%	0.81	17
2003	4.72%	10.02%	0.89	4.72%	12.10%	0.82	19
2004	2.14%	8.51%	0.72	2.14%	9.32%	0.67	22
2005	8.68%	8.62%	1.02	8.68%	9.75%	0.95	33
2006	5.26%	8.53%	0.80	5.26%	9.05%	0.76	41
2007	12.80%	8.14%	1.06	12.80%	9.32%	1.01	46
2008	13.49%	9.33%	1.00	13.49%	10.94%	0.97	56
2009	10.64%	16.38%	0.84	10.64%	18.09%	0.83	21
2010	18.53%	13.57%	1.17	18.53%	14.54%	1.18	25
2011	17.77%	12.94%	1.15	17.77%	12.48%	1.17	21
2012	17.97%	14.14%	1.18	17.97%	14.04%	1.18	18
2013	23.89%	14.01%	1.29	23.89%	14.26%	1.28	23
2014	19.53%	11.83%	1.14	19.53%	10.15%	1.10	37
2015	18.16%	10.93%	1.06	18.16%	11.07%	1.01	38
2016	16.04%	17.99%	1.01	16.04%	24.33%	0.96	45

Source: PitchBook. Data as of June 30, 2018



Venture capital

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	-1.71%	3Q 2008	-2.69%	1Q 2012	4.14%	3Q 2015	0.36%
2Q 2005	0.48%	4Q 2008	-8.71%	2Q 2012	0.92%	4Q 2015	2.45%
3Q 2005	4.83%	1Q 2009	-3.44%	3Q 2012	-0.43%	1Q 2016	-3.20%
4Q 2005	2.84%	2Q 2009	-0.39%	4Q 2012	2.19%	2Q 2016	0.04%
1Q 2006	3.01%	3Q 2009	0.57%	1Q 2013	2.25%	3Q 2016	2.24%
2Q 2006	1.18%	4Q 2009	3.15%	2Q 2013	4.44%	4Q 2016	0.26%
3Q 2006	1.98%	1Q 2010	1.16%	3Q 2013	5.10%	1Q 2017	2.53%
4Q 2006	6.05%	2Q 2010	0.15%	4Q 2013	7.14%	2Q 2017	1.91%
1Q 2007	2.00%	3Q 2010	3.21%	1Q 2014	6.00%	3Q 2017	3.48%
2Q 2007	4.88%	4Q 2010	5.44%	2Q 2014	3.90%	4Q 2017	3.04%
3Q 2007	2.67%	1Q 2011	4.40%	3Q 2014	2.67%	1Q 2018	5.78%
4Q 2007	3.48%	2Q 2011	4.39%	4Q 2014	6.29%	2Q 2018	4.85%
1Q 2008	2.08%	3Q 2011	-0.24%	1Q 2015	4.36%		
2Q 2008	1.45%	4Q 2011	1.49%	2Q 2015	5.92%		

Source: PitchBook. Data as of June 30, 2018



Real assets



Real assets

IRRs by vintage

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
Pre-2001	11.83%	11.41%	31	23.50%	17.21%	9.27%	5.79%	2.00%	8.42%	31
2001	35.75%	34.25%	4		35.33%	30.54%	26.61%		12.97%	4
2002	23.98%	25.92%	5		36.05%	25.00%	16.60%		21.09%	5
2003	19.30%	20.02%	6		30.02%	22.01%	10.29%		11.80%	6
2004	9.61%	8.83%	9		17.00%	11.66%	0.33%		25.65%	9
2005	2.34%	2.70%	32	17.40%	5.98%	0.60%	-3.00%	-7.59%	12.79%	31
2006	-0.73%	-1.00%	38	8.76%	3.55%	-3.28%	-9.32%	-14.25%	10.79%	35
2007	3.15%	3.02%	64	12.54%	9.72%	4.90%	-1.29%	-11.50%	9.40%	61
2008	3.88%	4.39%	61	15.75%	11.22%	4.80%	-1.37%	-6.78%	8.87%	57
2009	8.10%	7.29%	33	19.34%	14.63%	9.73%	2.26%	-11.85%	12.61%	32
2010	10.67%	9.87%	36	19.38%	13.12%	10.42%	6.70%	0.62%	9.22%	32
2011	12.67%	11.18%	50	22.16%	18.02%	12.80%	4.21%	-2.93%	11.95%	49
2012	12.48%	11.95%	71	22.73%	16.45%	12.29%	9.32%	5.16%	17.79%	68
2013	13.49%	12.92%	72	20.04%	15.53%	11.93%	7.41%	2.74%	7.99%	62
2014	14.47%	15.41%	80	25.46%	17.28%	12.95%	10.38%	7.10%	9.81%	73
2015	16.76%	16.38%	99	25.70%	18.43%	12.66%	9.11%	5.91%	9.22%	81
2016	15.70%	20.95%	79	39.38%	19.38%	11.27%	0.43%	-12.53%	30.96%	68

Source: PitchBook. Data as of June 30, 2018



Real assets

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.58x	1.56x	0.02x	1.66x	1.60x	0.07x	31
2001	2.22x	2.17x	0.05x	2.28x	2.17x	0.11x	4
2002	1.63x	1.62x	0.00x	1.68x	1.67x	0.00x	5
2003	1.66x	1.64x	0.02x	1.83x	1.75x	0.08x	6
2004	1.40x	1.39x	0.01x	1.43x	1.39x	0.04x	9
2005	1.14x	1.04x	0.11x	1.17x	1.03x	0.13x	32
2006	0.96x	0.80x	0.16x	0.94x	0.76x	0.18x	38
2007	1.17x	1.07x	0.10x	1.16x	1.03x	0.14x	64
2008	1.18x	0.90x	0.27x	1.21x	0.92x	0.29x	61
2009	1.34x	1.03x	0.32x	1.33x	1.01x	0.32x	33
2010	1.42x	0.99x	0.43x	1.44x	0.89x	0.55x	36
2011	1.47x	0.84x	0.62x	1.43x	0.90x	0.53x	50
2012	1.40x	0.72x	0.68x	1.39x	0.77x	0.62x	71
2013	1.37x	0.56x	0.81x	1.35x	0.52x	0.83x	72
2014	1.29x	0.39x	0.90x	1.35x	0.37x	0.98x	80
2015	1.25x	0.30x	0.95x	1.29x	0.29x	1.00x	99
2016	1.16x	0.19x	0.98x	1.22x	0.31x	0.91x	79

Source: PitchBook. Data as of June 30, 2018



Real assets

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	2.47x	2.06x	1.49x	1.28x	1.08x	2.42x	1.92x	1.46x	1.28x	1.07x	31
2001		2.86x	2.42x	1.87x			2.48x	2.17x	1.86x		4
2002		2.07x	1.81x	1.38x			2.07x	1.81x	1.38x		5
2003		2.07x	1.67x	1.36x			2.07x	1.66x	1.36x		6
2004		1.91x	1.47x	1.02x			1.64x	1.47x	1.02x		9
2005	1.97x	1.32x	1.01x	0.75x	0.62x	1.73x	1.30x	0.99x	0.63x	0.43x	32
2006	1.64x	1.16x	0.94x	0.56x	0.40x	1.28x	0.98x	0.67x	0.50x	0.21x	38
2007	1.69x	1.43x	1.18x	0.92x	0.52x	1.60x	1.35x	1.09x	0.71x	0.29x	64
2008	1.75x	1.53x	1.22x	0.92x	0.66x	1.60x	1.29x	0.92x	0.63x	0.29x	61
2009	2.01x	1.51x	1.33x	1.14x	0.61x	1.67x	1.37x	1.08x	0.61x	0.28x	33
2010	1.80x	1.66x	1.53x	1.21x	1.03x	1.54x	1.22x	0.88x	0.62x	0.26x	36
2011	1.96x	1.73x	1.48x	1.22x	0.89x	1.63x	1.33x	0.97x	0.48x	0.19x	50
2012	1.82x	1.51x	1.40x	1.31x	1.09x	1.40x	0.99x	0.70x	0.44x	0.14x	71
2013	1.59x	1.49x	1.34x	1.18x	1.07x	1.09x	0.82x	0.32x	0.21x	0.14x	72
2014	1.53x	1.37x	1.29x	1.18x	1.11x	0.78x	0.53x	0.29x	0.11x	0.02x	80
2015	1.49x	1.35x	1.24x	1.14x	1.06x	0.69x	0.40x	0.19x	0.07x	0.01x	99
2016	1.49x	1.25x	1.12x	0.96x	0.89x	0.61x	0.25x	0.08x	0.02x	0.00x	79

Source: PitchBook. Data as of June 30, 2018



Real assets

PMEs by vintage

S&P 500 Index

Morningstar US real assets Index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	35.75%	6.55%	1.80	35.75%	6.88%	1.63	4
2002	23.98%	7.66%	1.27	23.98%	6.84%	1.24	5
2003	19.30%	10.02%	1.37	19.30%	6.51%	1.29	6
2004	9.61%	8.51%	1.16	9.61%	5.68%	1.08	9
2005	2.34%	8.62%	0.79	2.34%	5.10%	0.85	32
2006	-0.73%	8.53%	0.65	-0.73%	4.69%	0.72	38
2007	3.15%	8.14%	0.72	3.15%	4.41%	0.91	64
2008	3.88%	9.33%	0.69	3.88%	3.44%	0.99	61
2009	8.10%	16.38%	0.80	8.10%	5.49%	1.18	33
2010	10.67%	13.57%	0.89	10.67%	3.76%	1.28	36
2011	12.67%	12.94%	0.96	12.67%	2.06%	1.40	50
2012	12.48%	14.14%	0.98	12.48%	1.30%	1.35	71
2013	13.49%	14.01%	1.03	13.49%	1.13%	1.32	72
2014	14.47%	11.83%	1.03	14.47%	1.62%	1.25	80
2015	16.76%	10.93%	1.03	16.76%	1.00%	1.21	99
2016	15.70%	17.99%	1.00	15.70%	4.33%	1.13	79

Source: PitchBook. Data as of June 30, 2018



Real assets

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	1.93%	3Q 2008	-4.94%	1Q 2012	3.56%	3Q 2015	0.29%
2Q 2005	14.70%	4Q 2008	-12.58%	2Q 2012	0.06%	4Q 2015	-0.49%
3Q 2005	7.85%	1Q 2009	-14.64%	3Q 2012	3.31%	1Q 2016	1.00%
4Q 2005	12.71%	2Q 2009	-7.90%	4Q 2012	2.13%	2Q 2016	3.36%
1Q 2006	3.20%	3Q 2009	-3.80%	1Q 2013	3.15%	3Q 2016	2.97%
2Q 2006	7.65%	4Q 2009	-1.88%	2Q 2013	2.37%	4Q 2016	3.08%
3Q 2006	7.78%	1Q 2010	-3.57%	3Q 2013	2.31%	1Q 2017	3.40%
4Q 2006	19.98%	2Q 2010	0.88%	4Q 2013	4.75%	2Q 2017	2.86%
1Q 2007	0.93%	3Q 2010	4.60%	1Q 2014	2.63%	3Q 2017	3.00%
2Q 2007	1.41%	4Q 2010	9.66%	2Q 2014	4.01%	4Q 2017	1.85%
3Q 2007	2.99%	1Q 2011	4.67%	3Q 2014	2.99%	1Q 2018	3.33%
4Q 2007	6.61%	2Q 2011	4.15%	4Q 2014	-0.07%	2Q 2018	2.61%
1Q 2008	-3.97%	3Q 2011	0.61%	1Q 2015	0.45%		
2Q 2008	-2.02%	4Q 2011	2.65%	2Q 2015	3.70%		

Source: PitchBook. Data as of June 30, 2018



Debt



Debt

IRRs by vintage

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
Pre-2001	10.08%	10.32%	10		11.92%	7.26%	3.65%		11.39%	8
2001	27.04%	27.58%	2			27.37%			0.94%	2
2002	23.03%	27.65%	3			18.53%			35.67%	3
2003	12.07%	10.46%	4		16.77%	11.15%	7.67%		11.18%	4
2004	14.60%	13.78%	3			14.06%			2.63%	3
2005	6.20%	5.96%	7		8.53%	5.30%	4.58%		6.64%	7
2006	6.05%	3.75%	13	9.19%	7.07%	4.30%	1.24%	-2.41%	6.10%	13
2007	6.67%	5.62%	22	12.96%	9.52%	6.46%	2.59%	-0.78%	8.60%	22
2008	13.43%	13.91%	14	16.54%	14.93%	13.11%	9.09%	7.59%	3.79%	14
2009	9.39%	8.56%	11	14.60%	12.53%	9.13%	5.58%	3.88%	4.49%	11
2010	11.63%	11.80%	16	17.68%	14.46%	11.46%	8.53%	7.07%	4.41%	16
2011	10.04%	10.52%	17	13.98%	11.30%	10.10%	8.59%	5.32%	4.43%	17
2012	6.90%	8.57%	27	16.00%	12.53%	9.18%	5.80%	2.66%	5.70%	27
2013	6.51%	8.21%	33	13.54%	10.91%	9.31%	7.45%	6.41%	4.69%	29
2014	9.36%	7.34%	40	16.34%	12.15%	7.98%	6.77%	-2.25%	11.29%	36
2015	12.23%	11.14%	46	17.10%	14.31%	11.66%	8.87%	7.48%	4.73%	42
2016	5.90%	5.58%	24	21.18%	13.80%	11.30%	8.80%	0.82%	13.75%	17

Source: PitchBook. Data as of June 30, 2018



Debt

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.52x	1.50x	0.02x	1.55x	1.48x	0.07x	10
2001	2.10x	2.10x	0.00x	2.30x	2.29x	0.00x	2
2002	1.71x	1.71x	0.00x	1.83x	1.83x	0.00x	3
2003	1.68x	1.67x	0.01x	1.56x	1.55x	0.01x	4
2004	1.75x	1.72x	0.03x	1.73x	1.70x	0.03x	3
2005	1.37x	1.34x	0.03x	1.31x	1.26x	0.05x	7
2006	1.42x	1.28x	0.14x	1.22x	1.15x	0.07x	13
2007	1.34x	1.23x	0.11x	1.28x	1.19x	0.09x	22
2008	1.62x	1.55x	0.07x	1.62x	1.58x	0.04x	14
2009	1.40x	1.27x	0.14x	1.34x	1.16x	0.17x	11
2010	1.50x	1.30x	0.21x	1.44x	1.24x	0.20x	16
2011	1.44x	0.98x	0.46x	1.42x	1.06x	0.36x	17
2012	1.24x	0.77x	0.47x	1.30x	0.82x	0.48x	27
2013	1.19x	0.60x	0.59x	1.24x	0.61x	0.63x	33
2014	1.21x	0.36x	0.85x	1.15x	0.39x	0.77x	40
2015	1.19x	0.25x	0.94x	1.18x	0.30x	0.89x	46
2016	1.06x	0.22x	0.84x	1.07x	0.29x	0.78x	24

Source: PitchBook. Data as of June 30, 2018



Debt

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	1.81x	1.49x	1.46x	1.08x	0.88x	1.75x	1.49x	1.43x	1.07x	0.88x	10
2001			2.37x					2.37x			2
2002			1.69x					1.69x			3
2003		1.73x	1.53x	1.39x			1.72x	1.53x	1.39x		4
2004			1.65x					1.64x			3
2005		1.50x	1.34x	1.26x			1.47x	1.33x	1.14x		7
2006	1.62x	1.38x	1.19x	1.06x	0.95x	1.53x	1.24x	1.12x	1.06x	0.92x	13
2007	1.69x	1.49x	1.32x	1.15x	0.97x	1.68x	1.40x	1.23x	1.00x	0.87x	22
2008	2.09x	1.73x	1.45x	1.37x	1.23x	2.01x	1.67x	1.45x	1.28x	1.20x	14
2009	1.56x	1.51x	1.31x	1.16x	1.13x	1.55x	1.43x	1.13x	1.09x	0.96x	11
2010	1.75x	1.57x	1.38x	1.24x	1.19x	1.61x	1.45x	1.28x	1.10x	0.81x	16
2011	1.80x	1.56x	1.34x	1.21x	1.12x	1.48x	1.28x	1.05x	0.76x	0.60x	17
2012	1.59x	1.45x	1.26x	1.12x	1.07x	1.25x	1.17x	0.85x	0.60x	0.37x	27
2013	1.44x	1.35x	1.18x	1.12x	0.95x	0.96x	0.86x	0.63x	0.38x	0.22x	33
2014	1.35x	1.25x	1.16x	1.09x	0.93x	0.65x	0.54x	0.34x	0.12x	0.03x	40
2015	1.31x	1.27x	1.18x	1.12x	1.07x	0.60x	0.35x	0.23x	0.16x	0.05x	46
2016	1.19x	1.16x	1.10x	0.98x	0.87x	0.54x	0.31x	0.21x	0.08x	0.03x	24

Source: PitchBook. Data as of June 30, 2018



Debt

PMEs by vintage

S&P 500 index

Bloomberg Barclays US corporate high yield index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	27.04%	6.55%	1.60	27.04%	7.59%	1.41	2
2002	23.03%	7.66%	1.26	23.03%	8.13%	1.26	3
2003	12.07%	10.02%	1.26	12.07%	8.55%	1.16	4
2004	14.60%	8.51%	1.49	14.60%	7.39%	1.33	3
2005	6.20%	8.62%	1.17	6.20%	7.24%	0.92	7
2006	6.05%	8.53%	0.90	6.05%	7.49%	0.81	13
2007	6.67%	8.14%	0.98	6.67%	7.11%	0.85	22
2008	13.43%	9.33%	1.03	13.43%	8.09%	0.95	14
2009	9.39%	16.38%	0.84	9.39%	11.81%	0.98	11
2010	11.63%	13.57%	0.89	11.63%	7.50%	1.16	16
2011	10.04%	12.94%	0.87	10.04%	6.39%	1.13	17
2012	6.90%	14.14%	0.82	6.90%	6.45%	1.04	27
2013	6.51%	14.01%	0.87	6.51%	5.15%	1.02	33
2014	9.36%	11.83%	0.94	9.36%	4.64%	1.07	40
2015	12.23%	10.93%	0.98	12.23%	5.37%	1.08	46
2016	5.90%	17.99%	0.91	5.90%	11.11%	1.00	24

Source: PitchBook. Data as of June 30, 2018



Debt

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	6.59%	3Q 2008	-7.78%	1Q 2012	-2.31%	3Q 2015	-0.85%
2Q 2005	-3.90%	4Q 2008	-18.09%	2Q 2012	0.57%	4Q 2015	-0.26%
3Q 2005	10.15%	1Q 2009	-4.80%	3Q 2012	5.06%	1Q 2016	1.53%
4Q 2005	5.71%	2Q 2009	10.65%	4Q 2012	3.02%	2Q 2016	1.28%
1Q 2006	2.89%	3Q 2009	11.64%	1Q 2013	4.12%	3Q 2016	4.09%
2Q 2006	8.09%	4Q 2009	7.68%	2Q 2013	2.58%	4Q 2016	0.95%
3Q 2006	0.74%	1Q 2010	5.09%	3Q 2013	2.48%	1Q 2017	2.17%
4Q 2006	8.90%	2Q 2010	0.49%	4Q 2013	2.88%	2Q 2017	2.41%
1Q 2007	3.60%	3Q 2010	1.95%	1Q 2014	3.32%	3Q 2017	1.88%
2Q 2007	8.19%	4Q 2010	7.45%	2Q 2014	2.81%	4Q 2017	2.94%
3Q 2007	-0.79%	1Q 2011	3.58%	3Q 2014	3.08%	1Q 2018	1.16%
4Q 2007	0.24%	2Q 2011	2.47%	4Q 2014	0.03%	2Q 2018	3.16%
1Q 2008	-1.38%	3Q 2011	-4.25%	1Q 2015	6.04%		
2Q 2008	-0.74%	4Q 2011	9.42%	2Q 2015	-1.37%		

Source: PitchBook. Data as of June 30, 2018

Fund-of-funds

The background features a dark blue triangle on the left side, pointing towards the top right. The rest of the background is white, with several light gray lines that create a series of parallel, slightly curved paths, suggesting a sense of depth or a stylized architectural structure.



Fund-of-funds

IRRs by vintage

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
Pre-2001	5.33%	3.78%	21	11.71%	9.20%	3.97%	1.85%	-5.12%	7.65%	20
2001	13.86%	8.52%	7		12.54%	8.80%	5.92%		3.91%	6
2002	8.27%	6.60%	4		8.63%	7.55%	5.78%		2.54%	4
2003	7.68%	5.90%	6		8.30%	6.75%	4.05%		3.75%	6
2004	7.87%	7.58%	11	10.90%	8.63%	7.10%	6.38%	6.05%	2.04%	11
2005	7.08%	7.30%	19	10.42%	8.71%	6.89%	5.15%	4.34%	3.21%	18
2006	8.25%	7.61%	29	12.22%	10.55%	8.58%	6.43%	3.68%	4.29%	27
2007	9.56%	8.40%	32	14.64%	12.03%	9.83%	7.40%	3.96%	4.25%	28
2008	3.38%	11.89%	35	17.10%	14.68%	12.18%	8.91%	4.85%	4.58%	31
2009	13.59%	13.37%	19	16.61%	15.01%	13.45%	11.10%	9.46%	3.30%	19
2010	12.22%	12.22%	33	14.94%	14.17%	12.61%	9.80%	8.38%	3.96%	30
2011	12.88%	13.76%	40	18.65%	16.75%	12.91%	11.02%	8.32%	6.62%	39
2012	13.90%	14.51%	32	21.32%	16.50%	12.79%	9.53%	4.63%	5.75%	30
2013	14.42%	13.35%	49	18.98%	16.23%	12.73%	9.36%	7.55%	9.14%	43
2014	15.23%	14.02%	36	20.41%	17.40%	14.17%	9.81%	7.60%	5.45%	31
2015	16.80%	15.67%	36	30.10%	22.30%	15.22%	7.79%	2.50%	11.37%	29
2016	9.13%	5.68%	23	19.10%	15.98%	11.51%	3.42%	-0.33%	8.38%	19

Source: PitchBook. Data as of June 30, 2018



Fund-of-funds

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.32x	1.29x	0.03x	1.24x	1.21x	0.03x	21
2001	1.69x	1.64x	0.05x	1.51x	1.39x	0.12x	7
2002	1.48x	1.38x	0.11x	1.37x	1.26x	0.11x	4
2003	1.59x	1.42x	0.17x	1.42x	1.27x	0.15x	6
2004	1.51x	1.32x	0.20x	1.54x	1.27x	0.27x	11
2005	1.49x	1.23x	0.26x	1.49x	1.20x	0.29x	19
2006	1.58x	1.14x	0.44x	1.54x	1.11x	0.43x	29
2007	1.63x	1.11x	0.52x	1.53x	1.07x	0.46x	32
2008	1.17x	0.65x	0.53x	1.68x	0.80x	0.87x	35
2009	1.70x	0.80x	0.90x	1.69x	0.85x	0.84x	19
2010	1.59x	0.72x	0.87x	1.59x	0.63x	0.96x	33
2011	1.49x	0.51x	0.98x	1.55x	0.50x	1.05x	40
2012	1.49x	0.29x	1.19x	1.51x	0.32x	1.19x	32
2013	1.33x	0.37x	0.96x	1.33x	0.23x	1.10x	49
2014	1.31x	0.23x	1.08x	1.30x	0.21x	1.08x	36
2015	1.23x	0.12x	1.11x	1.24x	0.14x	1.10x	36
2016	1.10x	0.08x	1.02x	1.07x	0.10x	0.97x	23

Source: PitchBook. Data as of June 30, 2018



Fund-of-funds

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	1.72x	1.56x	1.24x	1.09x	0.74x	1.68x	1.56x	1.22x	0.98x	0.73x	21
2001		1.73x	1.62x	1.41x			1.65x	1.53x	1.29x		7
2002		1.51x	1.43x	1.29x			1.41x	1.38x	1.24x		4
2003		1.60x	1.53x	1.33x			1.41x	1.36x	1.19x		6
2004	1.67x	1.57x	1.50x	1.44x	1.40x	1.54x	1.39x	1.27x	1.18x	0.98x	11
2005	1.72x	1.59x	1.49x	1.35x	1.26x	1.43x	1.31x	1.20x	1.07x	0.99x	19
2006	1.90x	1.76x	1.52x	1.43x	1.17x	1.28x	1.23x	1.14x	1.05x	0.90x	29
2007	1.95x	1.75x	1.53x	1.34x	1.02x	1.38x	1.22x	1.08x	0.93x	0.69x	32
2008	2.18x	1.90x	1.61x	1.47x	1.19x	1.13x	1.00x	0.85x	0.58x	0.45x	35
2009	2.05x	1.77x	1.63x	1.53x	1.47x	1.16x	1.05x	0.78x	0.69x	0.63x	19
2010	1.88x	1.73x	1.55x	1.44x	1.32x	0.97x	0.81x	0.60x	0.41x	0.30x	33
2011	1.99x	1.60x	1.50x	1.37x	1.18x	0.90x	0.61x	0.46x	0.32x	0.22x	40
2012	1.94x	1.57x	1.41x	1.27x	1.14x	0.73x	0.37x	0.21x	0.14x	0.05x	32
2013	1.51x	1.43x	1.31x	1.21x	1.14x	0.48x	0.26x	0.15x	0.06x	0.01x	49
2014	1.46x	1.37x	1.27x	1.15x	1.09x	0.40x	0.24x	0.12x	0.06x	0.00x	36
2015	1.42x	1.28x	1.21x	1.10x	1.00x	0.26x	0.19x	0.08x	0.02x	0.00x	36
2016	1.23x	1.17x	1.10x	1.02x	0.96x	0.19x	0.08x	0.01x	0.00x	0.00x	23

Source: PitchBook. Data as of June 30, 2018



Fund-of-funds

PMEs by vintage

S&P 500 index

Russell 3000 index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	13.86%	6.55%	1.20	13.86%	6.94%	1.18	7
2002	8.27%	7.66%	1.07	8.27%	8.01%	1.05	4
2003	7.68%	10.02%	1.04	7.68%	10.37%	1.03	6
2004	7.87%	8.51%	1.01	7.87%	8.72%	1.00	11
2005	7.08%	8.62%	0.93	7.08%	8.81%	0.92	19
2006	8.25%	8.53%	0.88	8.25%	8.57%	0.87	29
2007	9.56%	8.14%	0.89	9.56%	8.19%	0.88	32
2008	3.38%	9.33%	0.61	3.38%	9.48%	0.61	35
2009	13.59%	16.38%	0.97	13.59%	16.59%	0.97	19
2010	12.22%	13.57%	0.94	12.22%	13.58%	0.95	33
2011	12.88%	12.94%	0.97	12.88%	12.75%	0.97	40
2012	13.90%	14.14%	1.03	13.90%	14.02%	1.03	32
2013	14.42%	14.01%	1.03	14.42%	13.83%	1.03	49
2014	15.23%	11.83%	1.04	15.23%	11.38%	1.04	36
2015	16.80%	10.93%	1.04	16.80%	10.69%	1.04	36
2016	9.13%	17.99%	0.93	9.13%	18.57%	0.93	23

Source: PitchBook. Data as of June 30, 2018



Fund-of-funds

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	1.33%	3Q 2008	-6.72%	1Q 2012	4.74%	3Q 2015	2.12%
2Q 2005	6.00%	4Q 2008	-9.17%	2Q 2012	1.25%	4Q 2015	0.39%
3Q 2005	4.87%	1Q 2009	-2.70%	3Q 2012	0.55%	1Q 2016	1.60%
4Q 2005	6.33%	2Q 2009	-4.39%	4Q 2012	1.64%	2Q 2016	1.11%
1Q 2006	4.13%	3Q 2009	4.36%	1Q 2013	1.25%	3Q 2016	3.55%
2Q 2006	5.87%	4Q 2009	2.14%	2Q 2013	3.48%	4Q 2016	0.52%
3Q 2006	3.95%	1Q 2010	4.46%	3Q 2013	3.27%	1Q 2017	3.68%
4Q 2006	8.61%	2Q 2010	0.41%	4Q 2013	4.16%	2Q 2017	3.47%
1Q 2007	-0.50%	3Q 2010	-4.39%	1Q 2014	2.55%	3Q 2017	3.29%
2Q 2007	10.30%	4Q 2010	4.32%	2Q 2014	6.30%	4Q 2017	2.47%
3Q 2007	2.89%	1Q 2011	3.81%	3Q 2014	1.31%	1Q 2018	5.28%
4Q 2007	3.04%	2Q 2011	5.51%	4Q 2014	2.81%	2Q 2018	3.12%
1Q 2008	8.81%	3Q 2011	-2.21%	1Q 2015	3.35%		
2Q 2008	-2.99%	4Q 2011	-0.33%	2Q 2015	5.81%		

Source: PitchBook. Data as of June 30, 2018

Secondaries

The background features a dark blue triangle on the left side, which tapers towards the top right. To the right of this triangle, there are several parallel, light gray lines that create a sense of depth and perspective, resembling a stylized architectural or structural design.



Secondaries

IRRs by vintage

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
Pre-2001	11.99%	12.18%	11	25.00%	18.08%	13.16%	6.45%	4.10%	20.40%	11
2001	14.18%	14.80%	2			15.85%			5.21%	2
2002	15.50%	17.25%	3			18.84%			4.53%	3
2003	37.89%	37.89%	1			35.07%				1
2004	12.48%	10.36%	6		23.30%	11.71%	5.79%		14.37%	5
2005	6.28%	5.17%	8		6.70%	6.46%	4.80%		5.10%	8
2006	6.13%	6.91%	9		6.83%	5.33%	4.45%		3.45%	7
2007	6.15%	6.76%	10	10.99%	9.55%	8.36%	4.92%	-1.31%	5.32%	10
2008	11.33%	11.08%	13	14.41%	12.74%	10.90%	8.54%	5.58%	7.40%	12
2009	11.81%	12.81%	8		15.50%	14.05%	11.02%		7.79%	8
2010	13.75%	12.70%	7		16.68%	14.40%	8.92%		5.67%	7
2011	15.90%	14.30%	10	19.52%	18.15%	14.52%	9.93%	8.35%	4.69%	10
2012	13.70%	14.98%	11	22.30%	19.36%	17.96%	14.28%	13.60%	4.85%	11
2013	10.90%	12.05%	13	22.46%	19.72%	15.12%	11.00%	8.77%	14.98%	13
2014	22.76%	17.44%	11	28.99%	26.75%	20.60%	18.90%	16.09%	5.67%	10
2015	26.37%	28.59%	9		31.57%	24.80%	15.58%		11.32%	9
2016	32.52%	22.37%	15	51.91%	36.98%	31.01%	19.90%	10.42%	25.10%	14

Source: PitchBook. Data as of June 30, 2018



Secondaries

Multiples by vintage

Pooled multiples

Equal-weighted pooled multiples

Vintage year	TVPI	DPI	RVPI	TVPI	DPI	RVPI	Number of funds
Pre-2001	1.47x	1.47x	0.00x	1.43x	1.43x	0.00x	11
2001	1.52x	1.49x	0.02x	1.51x	1.49x	0.02x	2
2002	1.50x	1.48x	0.01x	1.52x	1.51x	0.01x	3
2003	1.83x	1.83x	0.00x	1.83x	1.83x	0.00x	1
2004	1.47x	1.39x	0.08x	1.39x	1.32x	0.07x	6
2005	1.34x	1.23x	0.11x	1.26x	1.14x	0.12x	8
2006	1.35x	1.17x	0.17x	1.41x	1.22x	0.19x	9
2007	1.28x	1.12x	0.16x	1.33x	1.15x	0.18x	10
2008	1.54x	1.27x	0.27x	1.55x	1.21x	0.34x	13
2009	1.51x	1.24x	0.27x	1.57x	1.24x	0.33x	8
2010	1.54x	1.25x	0.30x	1.48x	1.10x	0.37x	7
2011	1.57x	1.13x	0.44x	1.53x	0.85x	0.68x	10
2012	1.47x	0.86x	0.61x	1.43x	0.75x	0.68x	11
2013	1.32x	0.44x	0.88x	1.34x	0.51x	0.83x	13
2014	1.39x	0.49x	0.90x	1.34x	0.34x	1.00x	11
2015	1.31x	0.28x	1.03x	1.39x	0.51x	0.87x	9
2016	1.23x	0.11x	1.12x	1.20x	0.14x	1.07x	15

Source: PitchBook. Data as of June 30, 2018



Secondaries

Multiples by vintage

TVPI

DPI

Vintage year	Top decile	Top quartile	Median TVPI	Bottom quartile	Bottom decile	Top decile	Top quartile	Median DPI	Bottom quartile	Bottom decile	Number of funds
Pre-2001	1.74x	1.50x	1.41x	1.27x	1.20x	1.74x	1.50x	1.40x	1.26x	1.20x	11
2001			1.51x					1.49x			2
2002			1.53x					1.53x			3
2003			1.83x					1.83x			1
2004		1.58x	1.51x	1.36x			1.45x	1.45x	1.27x		6
2005		1.38x	1.33x	1.26x			1.30x	1.22x	1.12x		8
2006		1.43x	1.28x	1.24x			1.30x	1.11x	1.08x		9
2007	1.73x	1.46x	1.41x	1.21x	0.88x	1.35x	1.31x	1.26x	0.96x	0.82x	10
2008	1.72x	1.58x	1.50x	1.36x	1.16x	1.52x	1.40x	1.34x	0.87x	0.84x	13
2009		1.68x	1.53x	1.38x			1.40x	1.26x	1.16x		8
2010		1.63x	1.59x	1.37x			1.35x	1.17x	0.92x		7
2011	1.72x	1.65x	1.58x	1.35x	1.30x	1.20x	1.14x	0.80x	0.70x	0.54x	10
2012	1.56x	1.52x	1.44x	1.34x	1.30x	1.05x	1.00x	0.78x	0.70x	0.35x	11
2013	1.58x	1.51x	1.41x	1.19x	1.11x	0.72x	0.59x	0.48x	0.43x	0.33x	13
2014	1.50x	1.46x	1.34x	1.32x	1.28x	0.65x	0.47x	0.30x	0.22x	0.06x	11
2015		1.41x	1.34x	1.25x			0.54x	0.40x	0.14x		9
2016	1.42x	1.29x	1.26x	1.09x	1.06x	0.25x	0.23x	0.08x	0.01x	0.00x	15

Source: PitchBook. Data as of June 30, 2018



Secondaries

PMEs by vintage

S&P 500 index

Russell 3000 index

Vintage year	PitchBook Benchmark return (%)	Index return (%)	KS-PME	PitchBook Benchmark return (%)	Index return (%)	KS-PME	Number of funds
2001	14.18%	6.55%	1.18	14.18%	6.94%	1.16	2
2002	15.50%	7.66%	1.22	15.50%	8.01%	1.20	3
2003	37.89%	10.02%	1.57	37.89%	10.37%	1.55	1
2004	12.48%	8.51%	1.17	12.48%	8.72%	1.16	6
2005	6.28%	8.62%	0.94	6.28%	8.81%	0.93	8
2006	6.13%	8.53%	0.91	6.13%	8.57%	0.90	9
2007	6.15%	8.14%	0.83	6.15%	8.19%	0.82	10
2008	11.33%	9.33%	0.90	11.33%	9.48%	0.90	13
2009	11.81%	16.38%	0.91	11.81%	16.59%	0.90	8
2010	13.75%	13.57%	0.99	13.75%	13.58%	1.00	7
2011	15.90%	12.94%	1.04	15.90%	12.75%	1.04	10
2012	13.70%	14.14%	0.99	13.70%	14.02%	0.99	11
2013	10.90%	14.01%	0.96	10.90%	13.83%	0.97	13
2014	22.76%	11.83%	1.15	22.76%	11.38%	1.15	11
2015	26.37%	10.93%	1.14	26.37%	10.69%	1.14	9
2016	32.52%	17.99%	1.12	32.52%	18.57%	1.12	15

Source: PitchBook. Data as of June 30, 2018



secondaries

Quarterly return

Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)	Quarter end	1-quarter benchmark return (%)
1Q 2005	6.25%	3Q 2008	-0.84%	1Q 2012	3.66%	3Q 2015	1.60%
2Q 2005	4.44%	4Q 2008	-5.08%	2Q 2012	3.07%	4Q 2015	0.13%
3Q 2005	4.47%	1Q 2009	-10.13%	3Q 2012	5.20%	1Q 2016	-0.24%
4Q 2005	1.92%	2Q 2009	-4.08%	4Q 2012	2.39%	2Q 2016	2.64%
1Q 2006	9.17%	3Q 2009	-0.32%	1Q 2013	-0.26%	3Q 2016	1.14%
2Q 2006	4.56%	4Q 2009	1.03%	2Q 2013	0.76%	4Q 2016	2.56%
3Q 2006	4.11%	1Q 2010	1.13%	3Q 2013	2.28%	1Q 2017	3.85%
4Q 2006	7.04%	2Q 2010	6.23%	4Q 2013	4.32%	2Q 2017	4.07%
1Q 2007	3.34%	3Q 2010	6.12%	1Q 2014	3.81%	3Q 2017	3.17%
2Q 2007	10.74%	4Q 2010	6.33%	2Q 2014	3.65%	4Q 2017	4.06%
3Q 2007	8.68%	1Q 2011	8.11%	3Q 2014	3.82%	1Q 2018	2.48%
4Q 2007	4.42%	2Q 2011	3.99%	4Q 2014	2.88%	2Q 2018	4.96%
1Q 2008	1.85%	3Q 2011	6.62%	1Q 2015	2.92%		
2Q 2008	-2.52%	4Q 2011	-3.52%	2Q 2015	7.03%		

Source: PitchBook. Data as of June 30, 2018

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