

EYE ON THE MARKET • SPECIAL EDITION

Private Equity Forecast: Plenty of Dry Powder

Implications for Investors

J.P. MORGAN PRIVATE BANK



In this special issue, we cover the large amount of committed and unspent capital in private equity, i.e. “dry powder”. We start with a brief historical review of buyout and venture capital performance, and then review different measures of dry powder, the underlying reasons for the increase and its implications for private equity investors. Other related topics include a discussion on timing commitments to private equity, a review of factors driving private equity demand, and an overview of private equity fees. Bottom line: given the dramatic growth in private equity assets and high buyout multiples, the next decade of absolute and relative private equity returns will probably be lower than during the 1990’s, absent a major correction which brings down both public and private valuations.

J.P.Morgan



The growing amount of Private Equity dry powder: implications for investors

On recent price action in equity markets, I think it makes sense to consider the bigger picture we outlined in our [October Eye on the Market](#) on the end of the colossal monetary stimulus cycle, and the typical way that cycles end: with asset prices peaking before the economy or corporate profits do. Since some of you have multi-day breaks coming up and time you might be looking to kill, I wanted to share our findings on a topic that many clients and members of our Board have asked about: the large amount of committed and unspent capital in private equity. Enjoy Thanksgiving dinner: it's good for your family (see box). Then leave the room and read this piece when people start arguing about politics after dinner.

Michael Cembalest
J.P. Morgan Asset Management

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The importance of family rituals and mealtime for children

- Family rituals like Thanksgiving are associated with higher marital satisfaction, improved adolescents' sense of personal identity, children's health, academic achievement and stronger family relationships
- Dinnertime conversation boosts vocabulary even more than being read aloud to. Young children learn 1,000 rare words at the dinner table, compared to only 143 from parents reading storybooks aloud. Children who have a large vocabulary read earlier and more easily
- For school-age children, regular mealtime is an even more powerful predictor of high achievement scores than time spent in school, doing homework, playing sports or making art
- Regular family dinners lower high risk behaviors such as smoking, binge drinking, marijuana use, violence, school problems, eating disorders and depression

Sources: Journal of Family Psychology, Dec 2002; Child and Adolescent Development, Mar 2006; Journal of Marriage and Family, Mar 2001; Journal of Adolescence, Feb 2010; Canadian Family Physician, Feb 2015; Washington Post, Jan 12, 2015.



[1] Brief historical review of buyout and venture capital performance

Even after 25 years and hundreds of billions of dollars invested, describing industry-wide private equity performance relative to public equity markets is still as much art as science. There are two major decisions to make: (a) where to get performance data for a wide universe of private equity funds, and (b) how to compare it to public equity markets.

Where to get performance data. For many years, data aggregators such as Venture Economics were the primary source for academics, analysts, asset allocators and others trying to figure out how diversified private equity portfolios were performing vs the stock market. However, as explained in a 2013 paper from the University of Oxford/London, Venture Economics data had some substantial problems, such as survivorship bias (selective reporting by funds) and incomplete data:

“A detailed analysis of its aggregate and individual numbers, however, reveals severe anomalies. Over 40% of the funds in the database stopped being updated during their active lifetime. Incomplete funds are missing over 60% of their cash distributions. The result is a significant downward bias of the whole benchmark with major implications for a large fraction of the established literature on private equity”¹.

A few years ago, a new approach was devised which sources data **directly from limited partner investors** in private equity funds. Steve Kaplan at the University of Chicago, along with colleagues from Oxford and the University of Virginia, began using this “Burgiss” dataset. It is sourced from 300 state and corporate pension fund, endowment and foundation limited partner investors in 1,400 private equity funds, and contains net-of-fee cash flow data. Burgiss believes the universe represents at least 70% of all private equity funds ever raised. While there are other data aggregators, I only look at Burgiss-based data when analyzing performance of private equity as an asset class. In the rest of this note, that’s what we are going to do, by drawing on papers from Kaplan and other professors that specialize in this area.

How to compare private equity performance to public markets. Internal Rate of Return and Multiple of Invested Capital have strengths and weaknesses. Academics have converged on a concept that marries the best of both, and also provides a comparison to public equity markets: the Public Market Equivalent ratio (PME). PME has advantages over internal rate of return (which assumes that cash flows are reinvested at the IRR itself, which often isn’t the case) and over multiple of invested capital, which is not time-weighted. PME compares private equity commitments and distributions to investments in public equity markets in the same time periods. The result is a ratio of out/underperformance vs whatever public equity benchmark is used². A PME ratio of 1.20 is roughly equivalent to 3%-4% annual excess returns in IRR terms over the long term. In this piece, PME is the outperformance measure we will be using³.

¹ “Updating History”, Rudiger Stucke, Oxford, 2013

² If you want to read more about the **PME** ratio, see “Private Equity Performance: Returns, Persistence and Capital Flows”, Kaplan and Schoar, University of Chicago Business School, 2005.

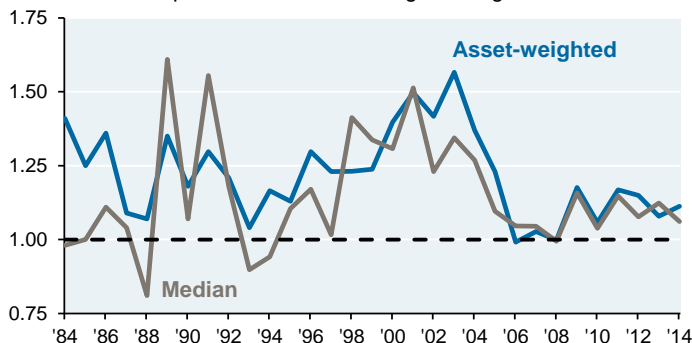
³ In addition, we always look at **net of fee** private equity performance, and look at performance by **vintage year**. A 2018 Hamilton Lane report on private equity included tables with gross of fee performance, and also used a single favorable starting date for their analysis of private equity vs a leveraged S&P benchmark, rather than looking at the issue over time. In other words, read private equity research carefully, including assumptions and fine print.



Buyout investing has been a volatile but generally rewarding ride. The 1990's vintages generated the greatest outperformance. Since then, benefits from buyout have been positive but lower, in part due to one of the highest S&P 500 returns in the post-war era (14% annualized return since Jan 2009), and more buyout funds competing for returns. As a reminder, buyout activity includes corporate divestitures, the sale of family-owned businesses, sponsor-to-sponsor deals and public-to-private transactions.

US Buyout fund performance by vintage year

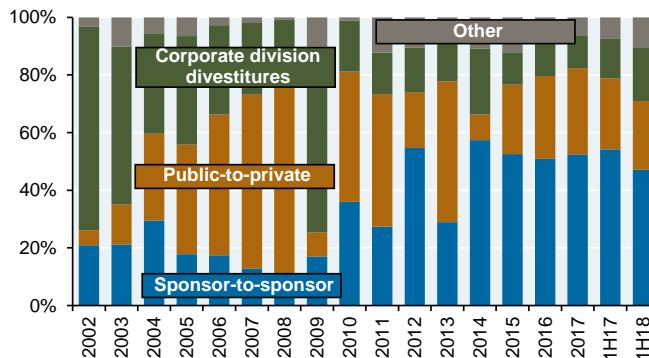
Public Market Equivalent Ratio for average manager vs S&P 500



Source: Harris, Jenkinson and Kaplan, 2016; Kaplan, 2017.

Distribution of US LBOs by type

Share of overall transaction volume

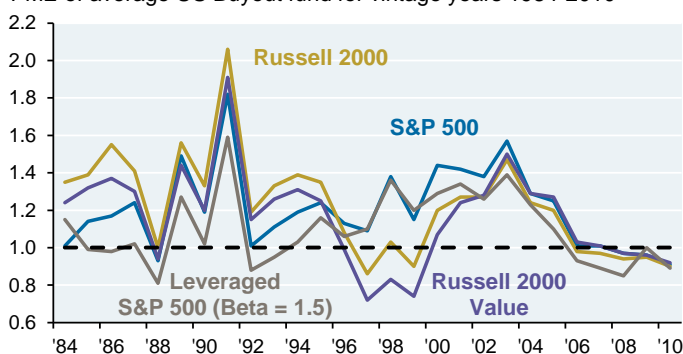


Source: S&P Global. 2018.

What about **other benchmarks** for buyout performance? Kaplan et al also compare buyout funds to the Russell 2000⁴ (an index of more highly leveraged mid- and small-cap companies), the Russell 2000 Value Index and a leveraged S&P 500 index as well. Buyout outperformance is highest vs an S&P 500 benchmark, and modestly lower vs other benchmarks. To get a sense for opportunities and risks involved with less diversified portfolios, it's also useful to examine dispersion across managers. The last chart compares **first and last quartile buyout funds** by vintage year; note how the gap has narrowed.

Buyout performance vs different benchmarks

PME of average US Buyout fund for vintage years 1984-2010



Source: Harris, Jenkinson, Kaplan. 2016.

US Buyout fund performance by quartile

Average PME by vintage year vs S&P 500



Source: Harris, Jenkinson, and Kaplan. 2016.

⁴ The **Russell 2000** can be a useful benchmark for many buyout portfolios given its lower market cap and higher leverage:

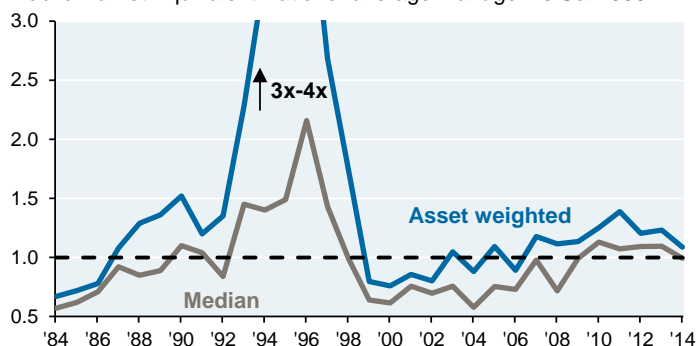
	Median market cap (US\$ bn)	% of index with Debt/EBIT ratio of:					Inf. (neg EBIT)
		Negative (net cash)	>0x, < 3x	>3x, < 6x	>6x, < 12x	> 12x	
Russell 2000	\$0.8	18%	16%	11%	10%	24%	21%
S&P 500	\$21.1	31%	32%	16%	8%	11%	2%



Venture capital funds experienced massive outperformance vs public equity markets in the late 1990's, after which sustained outperformance for the *average* manager has been rare (there are of course notable exceptions in the form of hard-to-access superstar VC managers). As per Burgiss data, the *average* VC fund has roughly tracked public markets for the last decade, irrespective of benchmark used.

US Venture Capital fund performance by vintage year

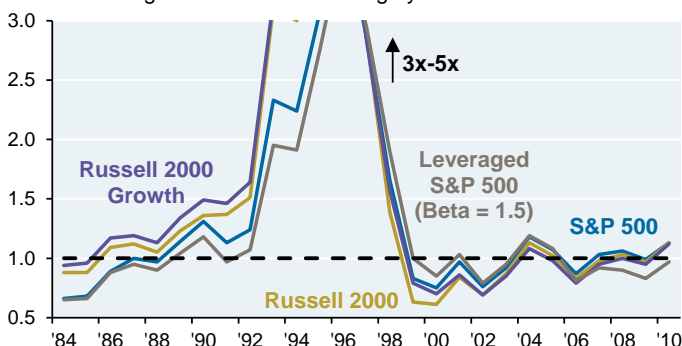
Public Market Equivalent Ratio for average manager vs S&P 500



Source: Harris, Jenkinson and Kaplan, 2016; Kaplan, 2017.

Venture capital performance vs different benchmarks

PME of average US VC fund for vintage years 1984-2010



Source: Harris, Jenkinson, Kaplan. 2016.

Picking the right manager is more important in venture than in buyout, although over the last decade, not by as much as you might have thought. In the last chart, we plot the difference between PME ratios for first and last quartile managers for buyout and venture, by vintage year. To be clear, for both venture and buyout, 2010 vintage year performance gaps between best and worst quartile managers are large. A PME gap of 1.0 can reflect MOICs of 2x vs 0.9x, or IRRs of 20% vs 0%, for best and worst quartiles.

US Venture Capital fund performance by quartile

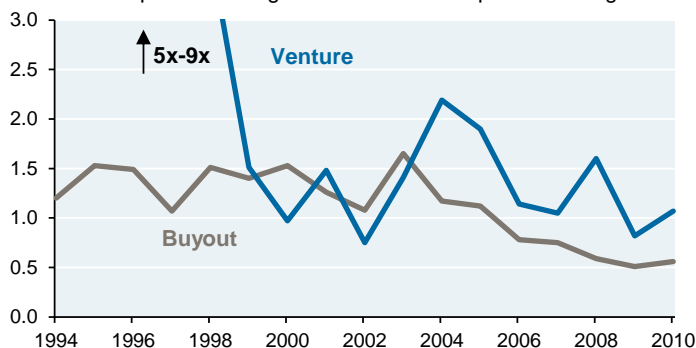
Average PME by vintage year vs S&P 500



Source: Harris, Jenkinson, and Kaplan. 2016.

The importance of picking the right manager

PME of first quartile manager less PME of last quartile manager



Source: Harris, Jenkinson, and Kaplan. 2016.

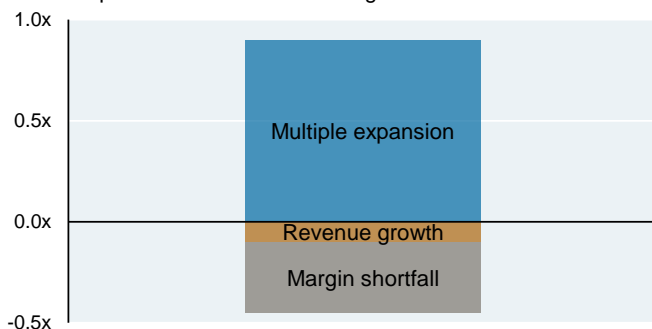


Other private equity performance observations

- While buyout funds generated excess returns vs public markets for many vintage years, these gains are not always derived from improved operating performance. Bain's 2017 private equity report noted that for 2010-2011 vintage years, "GPs had the good fortune to make up the shortfall in margin expansion through unforeseen multiple expansion" (see first chart below)
- There is not much dispersion in buyout PME's over time based on the size of the fund itself
- There is greater persistence of individual venture capital manager outperformance than in buyout
- See page 6 for estimates of the impact of GP subscription loans on limited partner returns
- Private equity is **illiquid**, and some degree of outperformance is needed to compensate investors for these risks, which can be substantial considering the discounts to net asset value in secondary markets for private equity positions (second chart). Some academics have tried to quantify the required premium, but I think it is different for each investor, and should rise with the amount of illiquidity they already have in their portfolios upon making a new private equity commitment.
- Risk-adjusted returns for illiquid investments are almost always overstated compared to the same measure for public markets, due to stale pricing of LPs NAVs. The hard part is figuring out by how much. One analysis we read used de-smoothing techniques to estimate what private equity volatility *would have* been without stale pricing. The conclusion: assume that private equity is projected to have a 10% absolute return, which results in a 20% portfolio allocation in a traditional mean-variance model. The private equity allocation falls to 14% when using the revised estimate of its volatility.

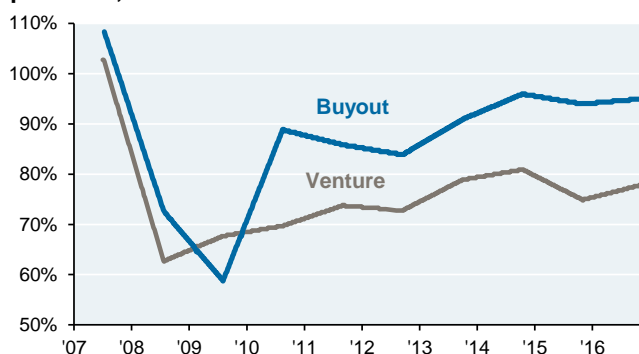
For 2010-2011 vintage years, multiple expansion made up for shortfall in margin expansion

MOIC improvement or decline vs original deal model



Source: Bain, Forbes. 2017.

Average secondary market pricing for private equity LP positions, % of net asset value



Source: Collier Capital. 2017.



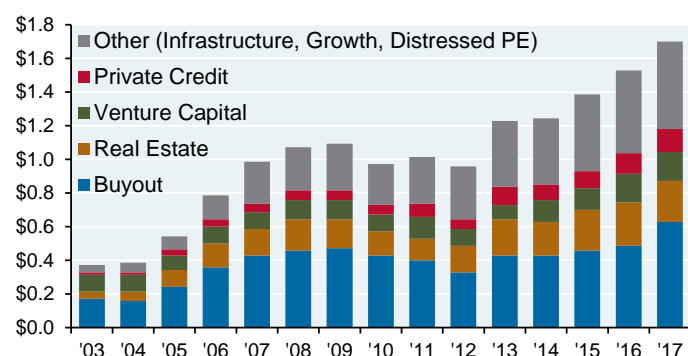
[2] Measuring private equity dry powder

Dry powder estimates range from \$500 billion to \$1.5 trillion. The higher figure includes all private equity categories shown in the first chart, while the lower figure usually refers to buyout only. Dry powder exceeds 2008/2009 levels, is unsurprisingly highest at the largest private equity managers, and results from the most recent vintage years.

- *Dry powder overstatements.* The increased use of subscription loans by managers to boost internal rates of return overstates the “real” amount of undrawn and committed capital. Many private equity managers finance investments using loans which are eventually repaid by drawing committed and unspent capital. The latest estimates indicate \$350 - \$400 billion in subscription loans outstanding (see box), which is a meaningful portion of the increase in global dry powder since 2012.
- *Dry powder understatements.* Dry powder estimates usually exclude any separate accounts whose capital is not ultimately invested in commingled LP vehicles.

Global dry powder by category

US\$, trillions



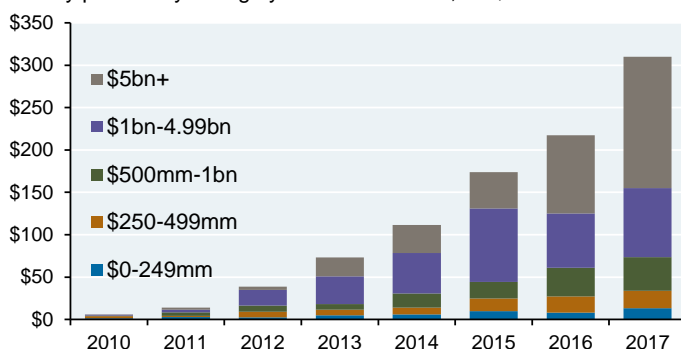
Source: Bain Global Private Equity Report. 2018.

On subscription loans

- While Cambridge Associates estimates that subscription loans can in theory boost IRRs by 3% per year, data from the Institutional Limited Partners Association points to a median IRR impact of no more than 0.45% per year
- At the 2018 Private Equity International CFO and COO Forum in NYC, 87% of poll respondents indicated that they are using or plan to use subscription loans
- ~95% of respondents felt that LPs were either positive or neutral on subscription loans; the same % indicated that they would continue to use them
- Source: Haynes and Boone LLP, Bloomberg, Barron's

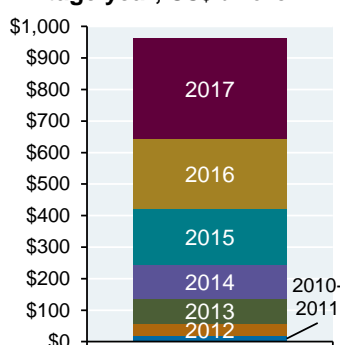
Dry powder concentrated in largest funds

PE dry powder by vintage year and fund size, US\$ billions



Source: Pitchbook. 2018.

Current dry powder by vintage year, US\$ billions



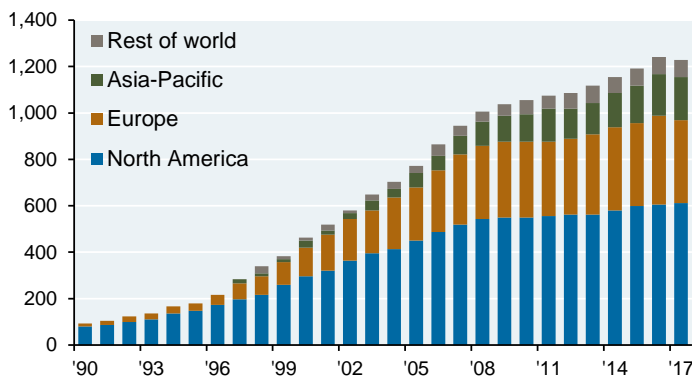
Source: Pitchbook. 2018.



[3] Why is dry powder rising? A look at fundraising, distributions and the pace of investment

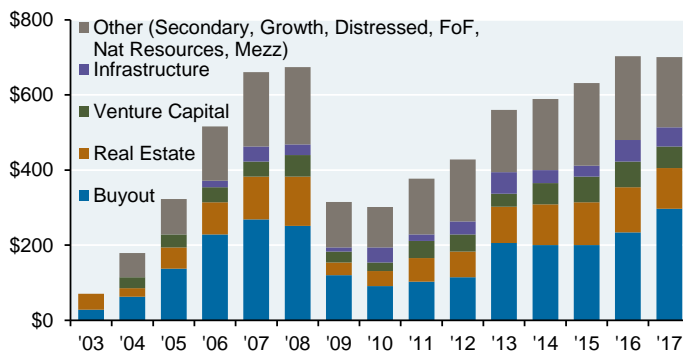
Dry powder rises when commitments outpace deployment of capital. On the former, many investors continue to allocate larger amounts to private equity. The number of buyout funds continues to grow, the last 5 years have been strong years for fundraising (particularly by the largest funds⁵), distributions have exceeded capital calls, and the level of commitments relative to stock market capitalization is at its highest level with the exception of 2007. A recent survey of institutional private equity LPs showed that only 5%-10% planned to allocate fewer dollars to private equity, or to reduce their allocations over time. The rest planned to either maintain or increase them (split roughly 50/50 between each answer).

Number of active buyout firms



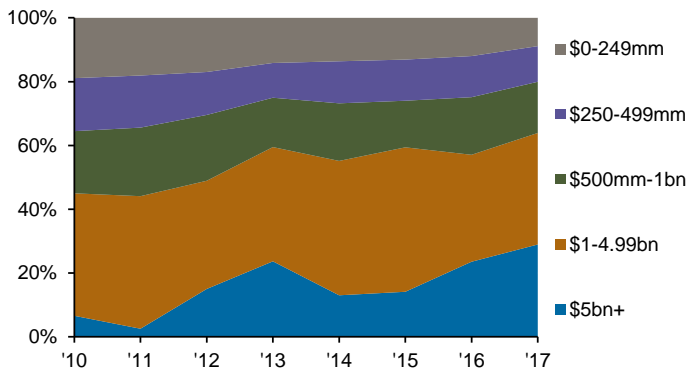
Source: Bain Global Private Equity Report. 2018.

Global private equity capital raised by year
US\$, billions



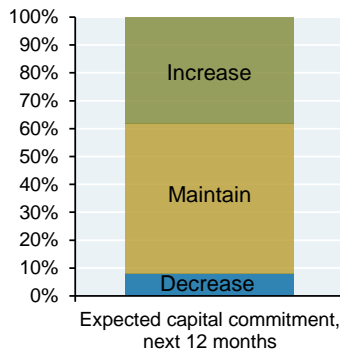
Source: Bain Global Private Equity Report. 2018.

Fundraising by size of fund and vintage year



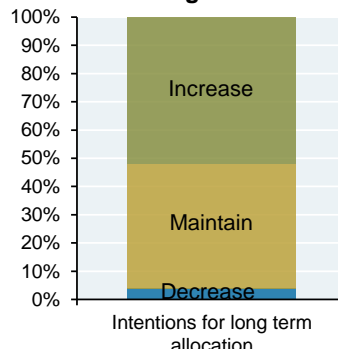
Source: McKinsey Global Private Markets Review. 2018.

Investor private equity intentions: next 12 months



Source: Preqin survey, 2017.

Investor private equity intentions: long-term



Source: Preqin survey, 2017.

⁵ The area chart above shows how the largest funds have been raising increasingly large shares of total commitments. 2017 included the \$100 bn **SoftBank** Vision Fund, which I consider a sign of aggressive investing by LPs given the limited history of its managers in deploying that much capital. SoftBank has reportedly had some early successes (Flipkart, Guardant Health), but would need to generate gains of \$23 bn per year to meet a 20% IRR target (Source: EquityZen). One of SoftBank's latest investments: \$300 mm for Wag, a dog-walking startup company.

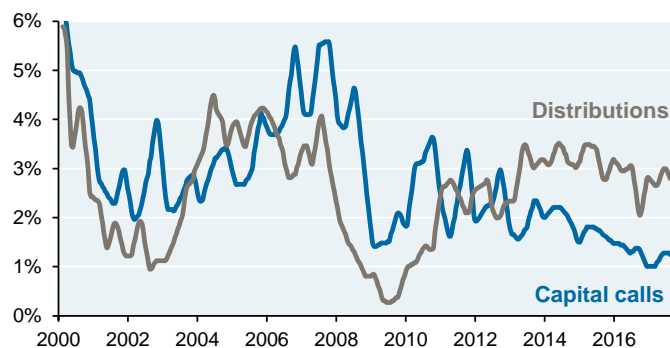


2017 fundraising highlights

- More than 2/3 of private equity funds that closed in 2017 met or exceeded their target amounts
 - ~40% took less than a year to close
- Among buyout funds, success rates were higher: 85% met or exceeded targets, and 68% closed in less than a year
- Source: Bain Global Private Equity Report, 2018

Global private equity capital calls and distributions

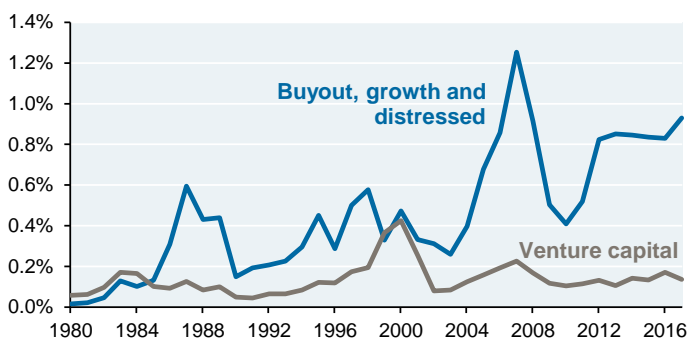
% of fund size



Source: eFront Insight. Q4 2017.

Commitments to private equity partnerships in the US

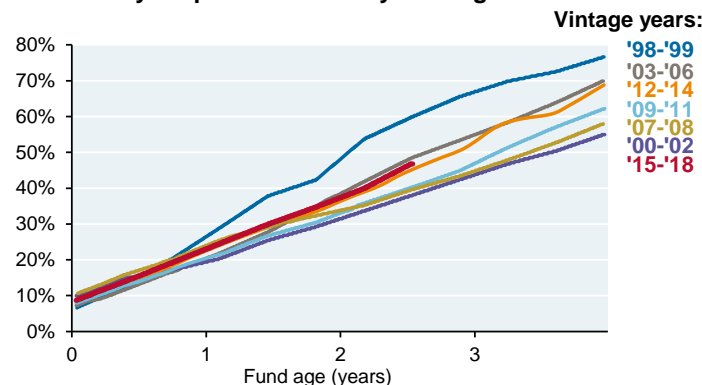
% of public stock market capitalization



Source: "Private equity, buyouts and venture capital: past, present and future", Steve Kaplan. 2017.

The pace of investing. There's conflicting information on whether capital is being called more slowly than usual. The chart above (left) shows a slower pace of capital calls relative to fund size, particularly when compared to distributions (it has unquestionably been a seller's market for private companies). Other data sources tell a different story. The chart below shows the median amount of the fund's total size that was called by year; 2015-2018 does not look slower than usual.

Median Buyout percent called by fund age



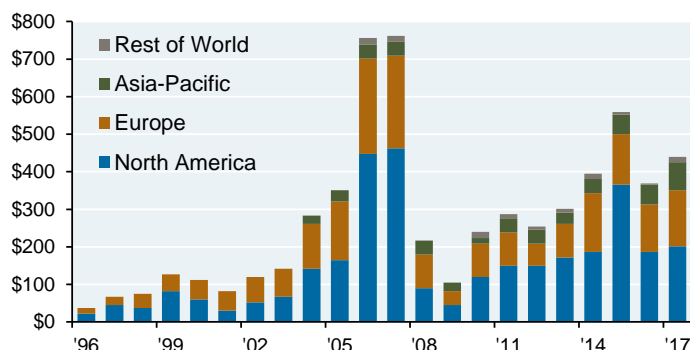
Source: Hamilton Lane. July 2018.



The more important issue might be this: whether the pace of investment is slow or not, the price paid for buyouts is rising at the same time that there is a growing pool of dry powder, and increased competition from strategic buyers. Given ample access to low-cost, covenant light debt⁶ and a lot of equity capital, private equity managers have bid up the cost of new assets: debt and acquisition multiples have risen to a new high for the cycle⁷. Other reasons for high acquisition multiples: competition from **strategic buyers** whose average deal sizes have doubled in recent years, and the declining number of US public companies for private equity investors to choose from.

Global buyout deal value

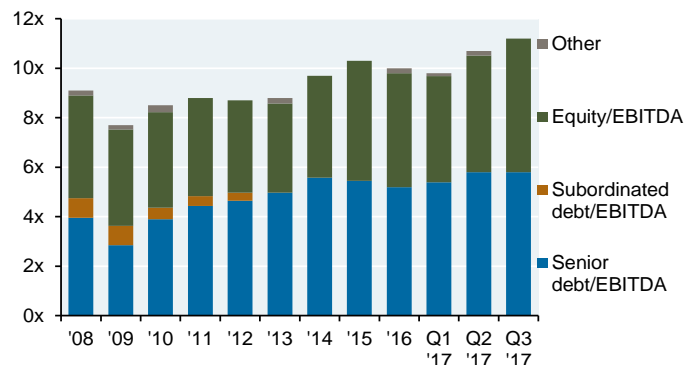
US\$, billions



Source: Bain Global Private Equity Report. 2018.

Buyout purchase price multiples

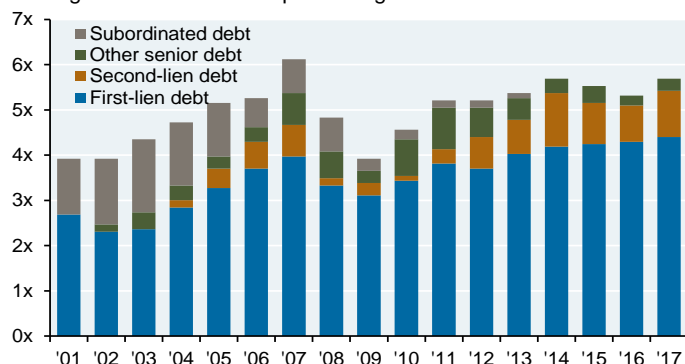
Average EBITDA purchase price multiple for US LBO transactions



Source: Bain Global Private Equity Report. 2018.

LBO leverage

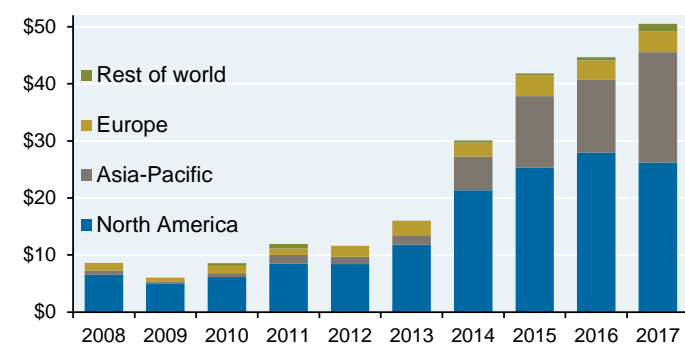
Average debt/EBITDA multiple for large US LBO deals



Source: Bain Global Private Equity Report. 2018.

Increasing competition from strategic buyers

Global corporate VC deal value, US\$ billions



Source: Bain Global Private Equity Report. 2018.

⁶ There's an "L" in **leveraged** buyout for a reason. A study by Verdad Capital found that most PE firms double the amount of leverage on a company's balance sheet from 2.5x to 5.0x.

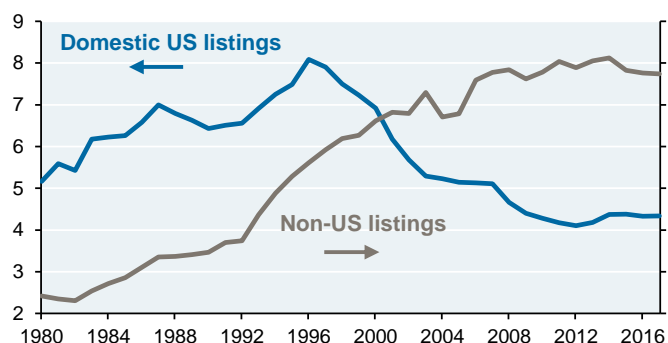
⁷ Private equity is not immune to the forces that have been driving many asset prices higher after ten years of interest rates below the rate of inflation, something which has now occurred for only the fourth time in US history. The first three episodes: the Civil War, WWI and WWII.



As mentioned above, the declining number of US public companies has contributed to higher multiples paid by private equity managers for the ones that remain. However, a growing universe of private companies does create a source of demand for capital that will eventually absorb some dry powder. Take the tech sector, for example, which now accounts for 15%-20% of US private equity activity. Tech companies waiting longer to go public translates into more capital needed to finance them while private. As such, it may no longer make sense to measure dry powder only against market cap of public companies.

The growing listing gap between the US and the world

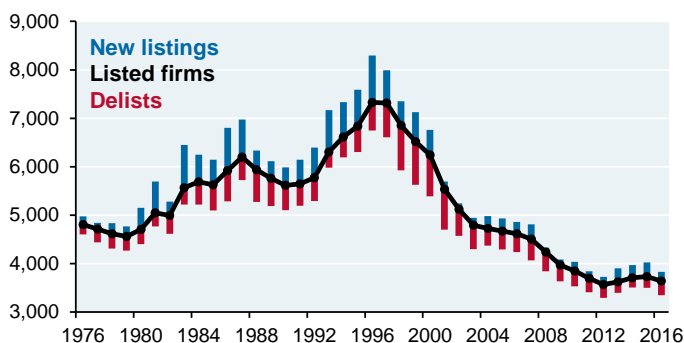
Thousands (both axes)



Source: World Federation of Exchanges. 2017.

Additions and subtractions to listed companies

Number of listed firms

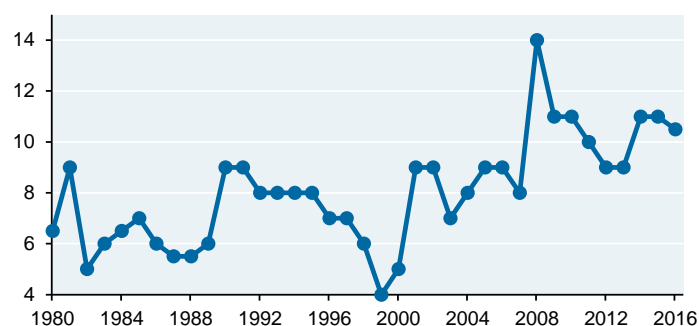


Source: "The U.S. Listing Gap," Journal of Financial Economics, Doidge, Karolyi and Stulz, Credit Suisse. 2017.

Why is tech private equity activity rising? Improving tech company fundamentals have broadened the investible universe for private equity firms. Ten to fifteen years ago, many tech companies would have been considered too volatile for many private equity strategies. As shown in the last chart, the revenue volatility of the median S&P tech company has declined since then, and is actually *below* the same measure for the overall market.

Tech companies waiting longer to go public

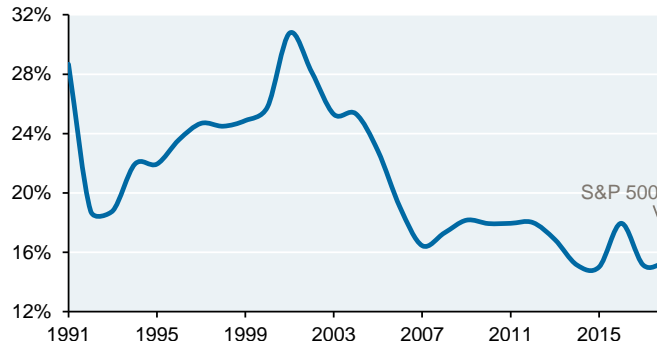
Median age of technology companies at IPO, years



Source: "Initial Public Offerings: Median Age of IPOs Through 2016," Jay Ritter, University of Florida. 2017.

Tech sales growth more stable

Volatility of quarterly sales growth (5 yrs), median company



Source: Bloomberg, JPMAM. Q3 2018. Universe = S&P 500 tech sector.

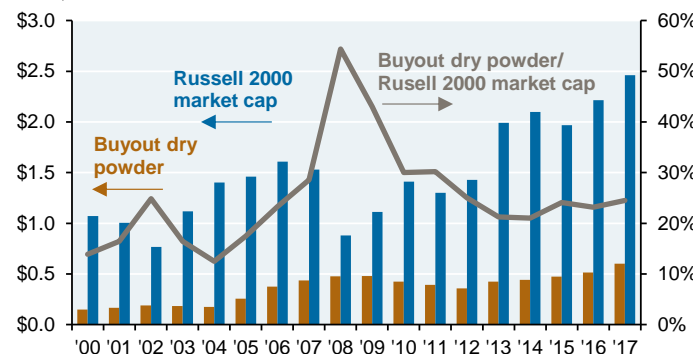


[4] Is the amount of dry powder a problem for private equity investors?

When measured against the market capitalization of the Russell 2000 (i.e., small- and mid-cap companies that many private equity managers typically invest in), dry powder does not look as ominous as it does when measured in absolute dollars. Dry powder relative to the pace of investment also looks stable, based on two different approaches shown below. According to McKinsey, dry powder is also stable as a percentage of private equity assets under management, and as a percentage of in-year fundraising.

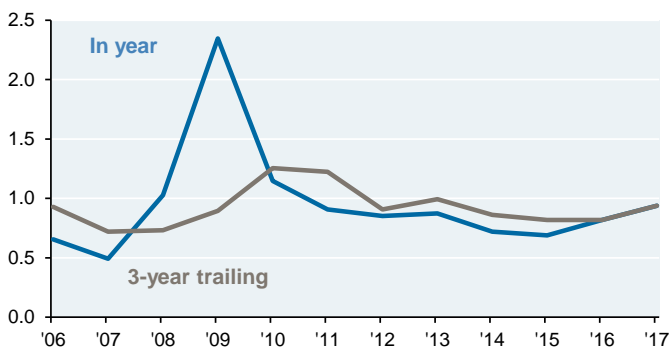
Dry powder to market cap

US\$, trillions



Source: Preqin. 2017.

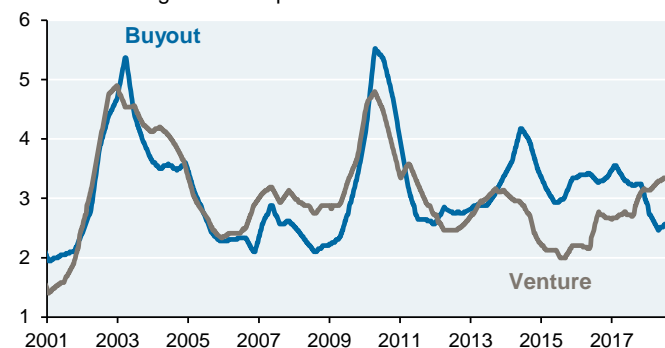
An inventory approach: dry powder as % of annual investment, Years of private equity inventory on hand, turns



Source: McKinsey Global Private Markets Review. 2018.

Time to deploy capital overhang

Years at trailing 12-month pace



Source: Hamilton Lane. July 2018.



Even so, given the dramatic growth in private equity assets and high buyout multiples, the next decade of absolute and relative private equity returns will probably be lower than during the 1990's, absent a major correction which brings down both public and private valuations.

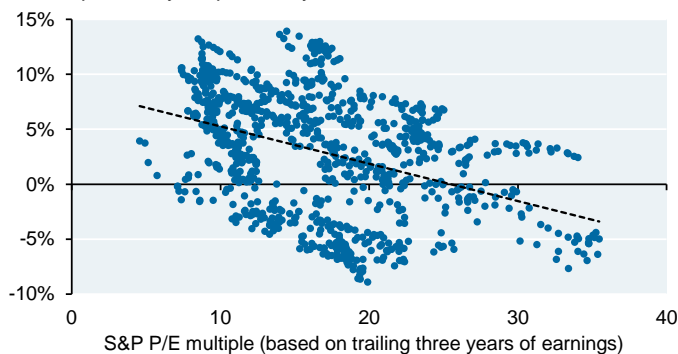
On above-trend valuations. History shows that pre-existing conditions of high P/E multiples tend to be followed by a decade of lower returns, and I see no reason why private equity would be much different. While the universe of investible assets for PE firms is rising (due to the expanding universe of private companies needing capital, the ability of mega PE-funds to target a new universe of large public companies and the improved revenue stability of technology companies), fundraising appears to be rising even faster than that. Rising buyout acquisition multiples shown earlier are one consequence of this trend.

On asset growth and implications for future returns. We can draw some parallels to other parts of the alternative investment universe. As shown below, **hedge fund** asset growth since the mid 1990's coincided with declining hedge fund returns. Yes, there were other factors involved, such as the secular decline in interest rates and inflation, two bear markets in equities, a financial crisis and an unprecedented level of central bank intervention that drove sector and stock dispersions to all-time lows. Nevertheless, there's an unmistakable trend over the long term in which rising competition for investment ideas by a growing number of hedge funds was eventually followed by lower investor returns.

All things considered, absent a major correction (i.e., 2001-2002, 2008), I believe future absolute diversified private equity portfolio returns will be lower than in the 1990's, and its outperformance vs public equities will be positive, but at the lower end of the historical range shown on pages 3-4.

Higher S&P multiples generally followed by lower returns

Subsequent 10-year price-only return, 1930 - 2017



Source: Shiller, JPMAM. 2018.

Hedge funds: assets under management and returns

US\$ trillions

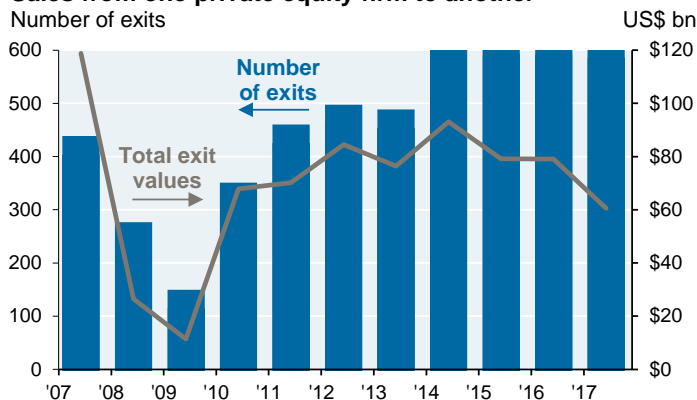


Source: Hedge Fund Research. Q2 2018.

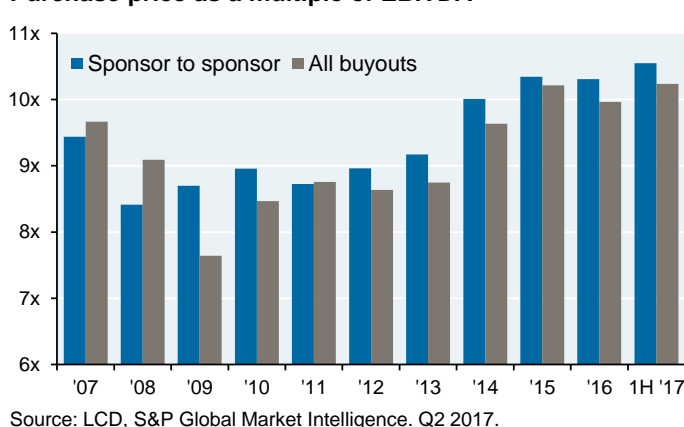


Furthermore, more dry powder might put pressure on GPs to invest before commitment periods expire. As pressure to invest rises, the impetus for **secondary buyouts** may rise as well (i.e., purchasing a deal from another private equity investor). Secondary buyouts generally entail slightly higher purchase multiples and leverage. As per academic literature to date, performance on secondary buyouts is often lower than on traditional PE investments⁸.

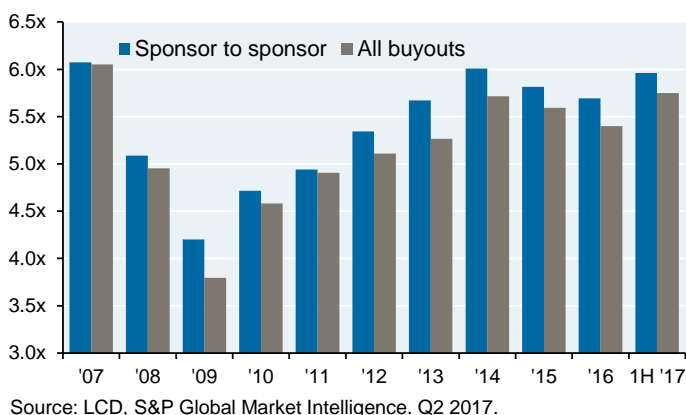
Sales from one private equity firm to another



Purchase price as a multiple of EBITDA



Average debt/EBITDA ratio of buyouts



⁸ Several academic papers have analyzed performance of **secondary buyouts (SBOs)**. Their main conclusions:

- Funds under pressure tend to engage more in SBOs, and SBO deals made under pressure tend to underperform. On buyers, "under pressure" refers to assets acquired near the end of the inv. period in funds with substantial capital left to invest. Sellers "under pressure" refer to funds near the end of their lives with few exits to date
- Companies that have been subject to multiple rounds of changing ownership across PE firms typically do not experience multiple rounds of improved operating performance; in other words, the first round of operating improvements is often the best one
- In one sample analysis, PME ratios for SBOs were less than 1.00, with worse performance for SBOs executed in the latter half of a firm's investment period
- Sources: "Fund managers under pressure: Rationale and Determinants of Secondary Buyouts", Journal of Financial Economics, 2014; "Secondary Buyouts: Operating Performance and Investment Determinants", Financial Management, 2015; and "On secondary buyouts", Journal of Financial Economics, 2015.



[5] Should I try and time commitments to private equity?

Historically, timing investments in private equity has only generated modest absolute benefits, and even smaller relative ones. A group of finance professors analysed vintage years 1987 to 2013 with the goal of seeing whether investor LPs would have benefited from timing commitments to private equity. They constructed two approaches: a counter-cyclical strategy (which allocated more to buyout when fundraising conditions were difficult and capital was scarce), and a pro-cyclical strategy (making greater commitments when fundraising conditions were overheated).

Surprisingly, absolute market timing benefits of a counter-cyclical strategy were modest (IRR, MOIC), and relative benefits to public markets (PME) were even smaller. The authors analyzed actual capital *deployment* for pro-cyclical and counter-cyclical strategies, and found that they were similar. Essentially, judgment applied by managers on when to call and invest capital neutralized many LP market timing decisions. One implication: potentially negative consequences of LP commitments during frothy periods were somewhat mitigated by manager decisions to call capital more slowly.

Private equity commitment strategies Buyout funds, vintage years 1987-2013			
	MOIC	IRR	PME
Base case	1.80	16.5%	1.15
<i>Investing based on fundraising dollars</i>			
Pro-cyclical	1.74	14.3%	1.10
Counter-cyclical	1.89	18.9%	1.20
<i>Investing based on fundraising dollars relative to market cap</i>			
Pro-cyclical	1.68	14.9%	1.12
Counter-cyclical	1.91	18.1%	1.16

Source: "Can investors time their exposure to private equity?" Brown (Flagler), Harris (UVA), Jenkinson (Oxford), Kaplan (U Chicago), Robinson (Duke); November 2018.

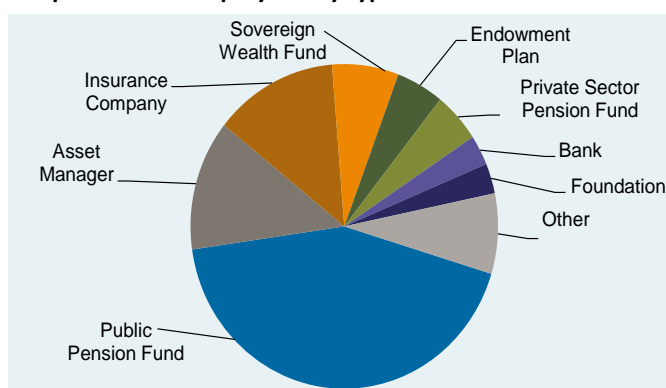
If you were to try and time exposure to private equity, **the lowest relative returns appear to have been generated in vintage years raised 3 years before a market peak**, since most of the capital would have been invested beforehand. Returns for funds raised one year before the peak were higher, since more of the capital was invested after the correction.



[6] Other factors driving private equity demand

Outperformance tends to attract buyers, but in the case of private equity, there are other factors driving demand higher as well. As shown in the pie chart, US public pensions are by far the largest source of capital for the private equity industry. One reason for this: underfunding of pension and retiree healthcare obligations that prompt some plans to aim for the highest possible returns. The table on the right shows a summary of the most distressed state plans: pension funding ratios, what percentage of government revenues would have to be diverted to meet all pension and retiree healthcare payments in the future, and the quasi-permanent increase in state tax collections that would be required in the process [please see our 2018 Eye on the Market “ARC and the Covenants” report for more details]. Given these dynamics, some plans may be trying to “earn their way out” via allocations to assets with the highest expected returns. This is not just a US phenomenon. A study from Harvard and NBER cited a \$1.8 trillion shift into alternative investments by pensions of the largest economies from 2008 to 2017.

Top 100 Private Equity LPs by type



Source: Preqin. February 2017.

State	Pension funding ratio (reported)	% of gov't revenues req. to meet future obligations	Req'd increase in tax collections
IL	38%	51%	25%
NJ	36%	38%	22%
HI	55%	37%	16%
CT	41%	35%	12%
KY	34%	28%	16%
MA	60%	25%	10%
MD	69%	20%	7%
PA	55%	17%	10%
DE	82%	17%	7%
WV	79%	16%	2%
CA	68%	15%	6%

Source: J.P. Morgan Asset Management, State Annual Financial Reports, Moody's. FY 2017.

Another source of increased demand: a growing pool of eligible individual private equity buyers. It's difficult to get exact numbers, but there are increasing numbers of individuals allocating to private equity through banks and asset managers over time. “Accredited investors” are those allowed to invest in securities not registered with the SEC, such as hedge funds, buyout and venture capital. In 1982, Regulation D Rule 501 defined an accredited investor as an individual with income of > \$200K, or with a net worth > \$1mm. These income and net worth minimums are **not adjusted each year to account for inflation**, which results in a growing pool of accredited individual investors every year.

[7] On private equity fees

Private equity fees fall into three categories. They are described below, with estimates of fees earned since 2008 by private equity companies with public filings (Carlyle, KKR, Blackstone, Apollo):

[1] **Carried interest**, paid if returns exceed a specified threshold level; \$20 billion

Academic research generally supports the notion that there is meaningful alignment of interests between PE managers and limited partners. A 2013 study of 20 years of private equity history found no evidence that higher fee levels resulted in lower net-of-fee performance. If anything, the authors found that *higher* fee levels were associated with superior performance. One agency conflict they did spot: GPs tend to accelerate realizations right after the LP's preferred return has been paid in what is known as the "waterfall quarter". This approach sacrifices LP upside in exchange for certainty of GPs earning a catch-up return.

[2] **Management fees**, typically earned based on committed capital; \$13 billion

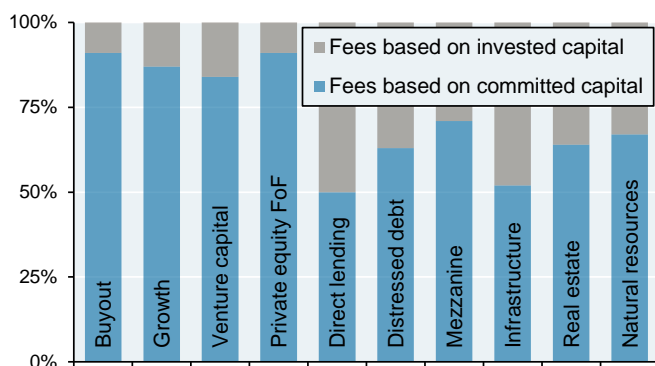
As shown below, over 90% of buyout managers charge fees on committed (rather than invested) capital. Within other categories of private equity, larger numbers of managers charge on invested capital instead.

[3] **Net monitoring and transaction fees** ("company fees"); \$3 billion

This segment generates controversy since these fees are paid by companies whose boards the GP controls. In the past, the SEC has fined some managers for inadequate disclosure. Fees charged to portfolio companies are not specified in Limited Partnership Agreements (LPA); they are laid out in Management Services Agreements, signed by GPs after documents are finalized. The LPA does state the % of each type of portfolio company fee that is rebated against management fees paid by LPs. From 2011-2014, 80%-85% of such fees were rebated to LPs; this reflects three common rebate levels of 50%, 80% and 100%.

Authors of a 2016 study found that the market "works" (although it took many years to do so, and required greater involvement by the SEC). The authors found evidence that "less skilled LPs" were the ones backing GPs charging higher levels of "company" fees; and that once news about these fees became widespread, these LPs reduced capital allocations to such managers. Skill levels were defined by the LP's prior history in selecting managers with superior performance.

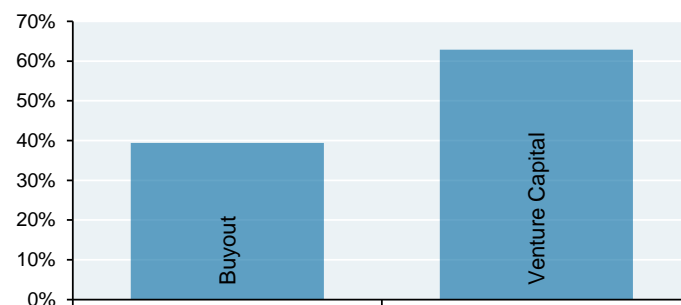
Private equity management fee approach by manager type



Source: Preqin. 2017.

Managers cluster realizations around waterfall quarter

Excess realizations in manager's waterfall quarter compared to realizations in the average quarter; % of original committed capital



Source: "Do Private Equity fund managers earn their fees?", Robinson (Duke) and Sensoy (Vanderbilt). 2013.



[8] Acknowledgements, sources and acronyms

I greatly appreciate the comments provided by Steve Kaplan at the University of Chicago and Berk Sensoy at Vanderbilt University on draft versions of this paper. Any errors or omissions are my own.

Acronyms

AUM Assets under management; **EBIT** earnings before interest and taxes; **EBITDA** earnings before interest, taxes, depreciation and amortization; **GP** general partner; **IRR** internal rate of return; **LBO** leveraged buyout; **LP** limited partner; **MOIC** multiple of invested capital; **NAV** net asset value; **PE** private equity; **PME** public market equivalent; **SBO** secondary buyout; **VC** venture capital

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