Working Paper 24-066

Does the Case for Private Equity Still Hold?

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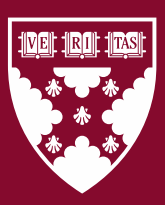

Harvard Business School

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Executive Summary

Private Equity ("PE") has received an extraordinary 10-fold increase in capital flows since the Great Financial Crisis ("GFC") by investors seeking higher nominal returns relative to those they could obtain in the public capital markets. This paper questions the fundamental assumptions underlying why investors should select PE as an asset class to be included in their composite portfolios.

The basic historical premises for including PE were:

- Superior returns relative to public markets or public market equivalents ("PMEs")
- Superior returns that would compensate the investor for the associated lack of liquidity
- Low correlations relative to the public markets and lower volatility
- Generating appropriate excess performance relative to the public markets net of fees
- Superior returns were due to:
    - Identifying appropriate target companies at "bargain" prices
    - Creating operational improvements within portfolio companies
    - Generating multiple expansion and increased value due to operational improvements
    - Restructuring the portfolio companies' balance sheets primarily by adding significant leverage
    - Exiting the investment at the appropriate inflection point

The current data raises questions about these predicate assumptions. All the actions PE firms claim add value to portfolio companies should result in superior returns relative to PMEs. The data indicate the average or median PE funds do not actually outperform their PMEs since the GFC. While the top quartile PE funds have outperformed the PMEs since the GFC, the data raises three particularly disturbing conclusions.

First, General Partner ("GP") fund performance persistence has eroded materially. Past performance is not necessarily indicative of future performance. While the top quartile GPs outperform relative to PMEs over time, they are not necessarily **the same** GPs over time. This conclusion relates to the aggregate data. There may be some individual firms who consistently perform exceptionally well or exceptionally poorly. Indeed, the most predictive information relates to those GPs who are more consistently in the bottom quartile.

The second disturbing conclusion is that if there is little persistence among the top quartile firms, then the selection of any GP is potentially a "random walk". If that is the case, then investors should expect to achieve at best only average or median PE results. There are two studies indicating that the results of successful GPs may be as much attributable to "luck" than skill, mirroring the conclusions of the venerable Eugene Fama regarding active equity managers.

The third conclusion is there has been a somewhat shocking concentration of capital flows among a small number of firms. Is this a good attribute for the industry? Given the general lack of performance persistence among PE GPs, one should ask whether (i) capital is flowing to the best firms, (ii) capital is flowing based upon the "brand" of the PE firm, or (iii) capital flows are based on investors "looking in the rear view mirror" or desiring one stop shopping?

In sum, the PE data suggest that (i) traditional methods of evaluating a given GP partnership are questionable; (ii) evaluating performance persistence post 2008 may be subject to doubt at the time the investment is made; (iii) selecting a given GP in the hopes of obtaining top quartile results may be a random walk; (iv) investment performance may possibly be as much attributable to luck rather than skill; (v) the recent median PE investments do not outperform PMEs and one is just as likely to select a median GP as a top quartile GP; and (vi) PE performance may actually underperform PMEs on a risk adjusted basis given the amount of leverage they employ generating equivalent results on a nominal basis.

These conclusions suggest that the PE industry may be ripe for disruption, much as the mutual fund industry after the introduction of ETFs and index funds. There are disruptive forces at play by investors attempting to reduce their costs, and thereby enhance their returns, by adopting alternative investment methods. Some are internalizing their investment efforts. Others may look for alternative investment products that will mirror PE results at a lower cost. Similar disruptive forces have been evidenced in other financial service industries which may affect where the very best talent wants to go.

Given the size of the private markets, investors are likely to continue to desire exposure to these segments of the capital markets. The fundamental question is not ***if*** they want exposure to private investments but ***how*** they will achieve it. In short, the PE industry may have to structurally change in order to continue to attract capital or the rationale for investing in PE may have to be revised.

Does the Case for Private Equity Still Hold?

Unfortunately, the last billionaire in private equity ("PE") has already been made. This statement will understandably disappoint the scores of Harvard Business School ("HBS"), other business school students, and others clambering to enter the industry. The PE and VC courses are among the most popular at HBS and students take them hoping to gain access to the industry. Securing a position within a PE firm is no easy task. Steve Schwarzman, CEO of Blackstone, has publicly claimed that getting into Blackstone is more competitive than getting into Harvard as they accept 0.6% of applicants[1].

It has been well documented that the PE industry has dramatically changed over the last decade. Among these changes discussed below are:

- A ten-fold increase in the assets under management ("AUM")
- A dramatic increase in the size of the mega funds
- A concentration of capital among the largest 20 PE General Partners ("GPs") firms, especially among the top five firms
- An acceleration of fund-raising cycles
- Reduced returns relative to the public markets over the past 10 years
- An economic environment in which interest rates fell or remained quite low for a sustained period; for purposes of this paper since the Great Financial Crisis ("GFC")

These industry changes and the public capital markets have had an impact on PE performance. The more recent results in the past decade call into question the basic premises as to why investors include PE within a mixed asset class portfolio.

This paper lays out the case for why the PE industry is ripe for disruption, and why this disruption is already beginning to occur. Major changes will likely occur for PE over the next several years. Some may perceive this paper as a PE indictment. That is not the case. The point is not to suggest that PE is inherently "bad". Rather, it is a call for investors to reexamine how and with whom they invest.

This is not a traditional academic paper. Academics tend to look at historical data and draw conclusions to be derived from the data explaining what happened in a historical context. The author lives on the hyphen between academia and the business world and wants to translate academic conclusions for practitioners. The purpose of this paper is not to replicate the excellent work other academics have already done but instead to extrapolate from their conclusions as to future industry ramifications. It should be emphasized these academics have not produced "pointy headed" exercises of angels dancing on the head of a pin. Their studies and conclusions are critically important.

The focus will be on PE, not venture capital ("VC") and real estate private equity as the conclusions from data for those asset classes are different. Real estate will be separately addressed in another paper.

Section 1 summarizes the historical case made for private equity. Section 2 analyzes whether the underlying assumptions associated with the case for private equity still hold true. Section 3 reviews pertinent academic research concerning PE performance. Section 4 reviews the trends in the mutual fund industry and whether its evolution portends potential changes that may occur in the PE industry. Section 5 addresses some of the incipient ideas for alternative investment approaches that may disrupt the PE industry.

Section 1: The State of the State of Private Equity

A. The Original Case for Private Equity

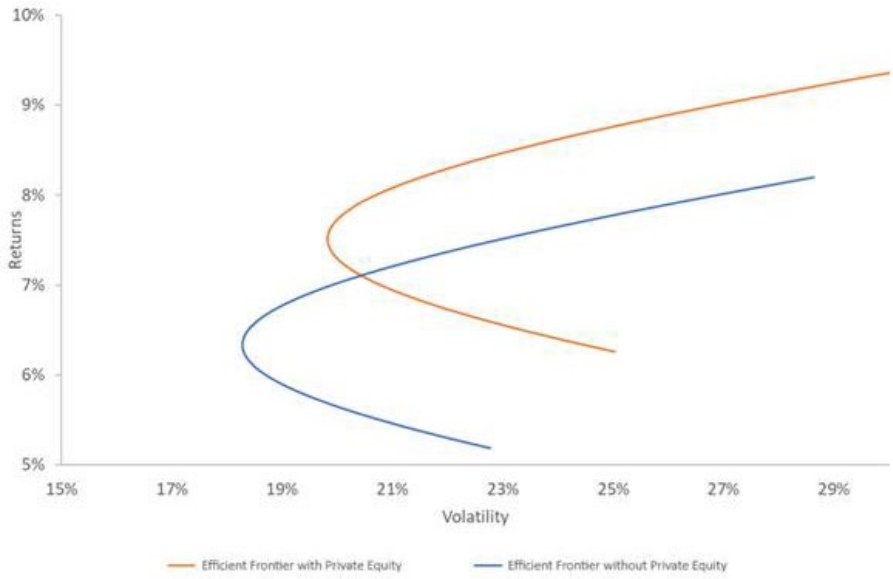
The early case for investing in private equity was made to institutional investors, most notably the Oregon and Washington state pension funds who were among the earliest PE investors. They invested in KKR's early funds in the 1980's. The State of Oregon was the author's initial client in 1988 and witnessed the early presentations of the now behemoth PE firms including KKR, Blackstone, TPG, among others. At the time, the firms' original founders made the "pitches". One of the most effective presentations was by George Roberts, co-founder of KKR, to the Oregon Investment Council. In the mid- 1990's he said to the Council, "You gave us $1 Billion. We've given you back $1 Billion. We conservatively value the remainder of your investment with us at $3 Billion. Any questions?" There were none.

There was a consistent story line associated with these presentations. These new firms would differentiate themselves from active public equity managers in that they would be directly involved in setting their portfolio companies strategies and exercise actual control over the companies by having a majority of the portfolio company's board seats. In short, their approach would add value to the company's operations and in the long run would generate outsized returns especially relative to public market alternatives.

At the time, pension funds turned to their advisors and asked for a more quantitative rationale to support the inclusion of a new asset class in their composite investment portfolios. The analysis led to the several conclusions concerning this new asset class based upon a series of assumptions about how the most inefficient PE asset class would perform, including: (i) low correlations with the traditional asset classes of public equities and public fixed income; (ii) higher potential returns than the traditional asset classes; and (iii) lower reported volatility and therefore a reduction of composite portfolio risk due to the lower reported volatility. The aggregation of these factors would help move the composite portfolio higher on the efficient frontier by increasing returns at a seemingly lower level of risk. Expected returns became codified as the "2 and 20" rule, otherwise known as a 2x MOIC (Multiple of Invested Capital) and a 20% IRR (Internal Rate of Return). The phrase 2 and 20 also refers to the fees the GPs received in terms of management fees and carried interest percentages.

Pension fund advisors created a series of efficient frontiers illustrating the impact of including PE as an asset class in a mixed asset portfolio. Not surprisingly composite portfolios became more "efficient" suggesting higher returns at a lower level of risk by including these private investments. The expected return and correlation assumptions for each asset class, which are the inputs into the "optimizer", are reflected in **Exhibit 1**. **Figure 1** illustrates how the inclusion of PE in a mixed asset portfolio improves risk adjusted performance over time.

Figure 1 Model Portfolios With and Without PE in a Mixed Asset Portfolio



Source: Authors.

See **Exhibit 1** for the underlying assumptions in constructing the Efficient Frontier in **Figure 1**.

The historic reported volatility, which has been used as a proxy for risk, is much lower in PE than in the public markets. The optimizer models used by institutions to determine their asset allocations gravitate to lower volatility asset classes with commensurate or higher returns, and uncorrelated results based on the reported returns used as inputs. An unconstrained asset allocation optimizer would allocate significant percentages to PE, real estate, and VC as they exhibited (i) lower reported correlations to traditional asset classes; (ii) lower reported volatility than the traditional asset classes; and (iii) historic returns in the 1990's and early 2000's that were higher in PE and VC.

However, sophisticated investors recognize this result is simply a function of the data inputs into the optimizer model and the private markets' volatility is understated. Consequently, the allocations to these asset classes are typically constrained. Does a rational, knowledgeable investor genuinely believe a private investment in a private company leveraged 65% is less risky than a comparable public company leveraged 30%?

It should be noted that the historical lower correlations and lower volatilities were largely attributable to the accounting methodology used in the private markets to report returns. Historically, most investments were held at cost until an "event" occurred, such as a follow-on investment or a sale, and were then marked to market at the transaction price. In short, they were held at the lower of cost or market until the event actually occurred. Investments were not marked to market each day as they are in the public markets or even on a quarterly or annual basis.

This reporting convention changed over time prompted in part by the 2008 Great Financial Crisis ("GFC") in which mortgages and real estate contributed to the heavy incurred losses. In 2009 the Financial Accounting Standards Board ("FASB") adopted guidelines of IFRS 13 and FASB ASC 820, which suggested that even private assets should be marked to market. These guidelines require PE firms to report using fair value accounting and mark their investments to market on a quarterly basis using internal valuations. PE firms continue to have audited annual financials in which their reported marked to market values are reviewed by the external accounting firm. The Securities and Exchange Commission has also recently proposed new regulations that would require audited marked to market values for their portfolios.

In marking to market PE firms frequently look to public market multiples of comparable companies as a proxy for the multiple to be used to value the private investment. Query whether this change in accounting methodology has caused the return convergence between the public and private markets as is reflected in **Figure 10** below. This reporting methodology change increases the volatility of PE investments and using public market comparables should increase the correlations with public market returns. Public market prices reflect investor psychology in a way that the private markets do not. More research needs to be done on this topic.

How would PE firms achieve these promised outsized returns relative to the public markets? The firms professed they would: (i) exercise their investment acumen by selecting appropriate target companies; (ii) negotiate the terms of the investment; (iii) restructure the target company's balance sheet typically by adding significant amounts of leverage; (iv) monitor the investment; (v) add value via operational improvements, by modifying the corporate strategy and/or by implementing cost cutting measures; and (vi) then exit the investment at an appropriate inflection point. The exits were often by taking the company public or a sale to another strategic investor. The early PE results supported the investment theses. GPs also maintained that their track records exhibited persistence and were predictive of future results.

In the 1980s and 1990s, most PE firms had a sole product line, which was their flagship fund. This paper focuses on the flagship PE funds that have attracted the bulk of investment capital. Further, given the amount of capital, the length of their track record and the academic research, the focus and conclusions are primarily on US private equity firms.

During this early time period PE was a cottage industry largely unknown outside the pension fund institutional market. Early PE funds were considered large if they exceeded $500 million. The backwater nature of the industry changed when Barbarians at the Gate (KKR's acquisition of RJR Nabisco) was published in 1989.[2]

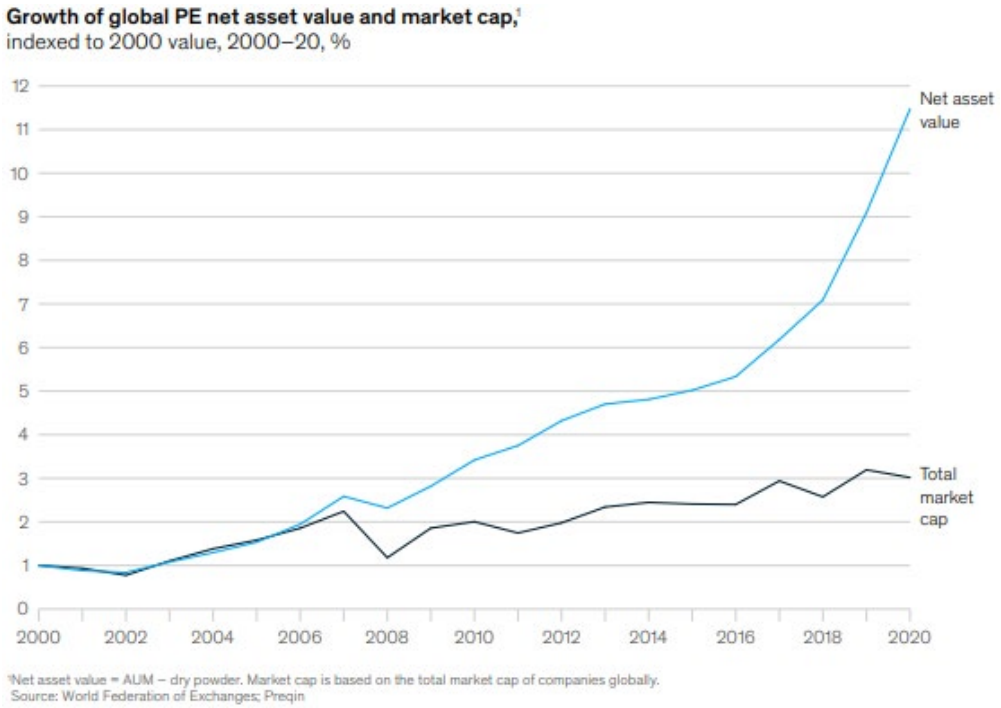
B. Current State of the Industry

Clearly, the industry has evolved dramatically over the decades. The PE industry has transformed the capital markets. The funds raised by these firms are now multibillion dollar portfolios. The largest firms have multi product lines including real estate and credit and have become global investment institutions. The aggregate size of their investment portfolios dwarfs the public markets as depicted in **Figure 2**. Most of the change has occurred in a comparatively short time period since the GFC. The industry today bears little resemblance to the PE industry pre-2010. Many of the largest PE fund managers are now public companies.[3]

The impact on the capital markets has been dramatic. The number of PE backed companies was 1,698 in 2000 and grew to 8,892 in 2020.[4] Further, the number of public companies declined from approximately 7,500 listed companies in 1998 to under 4,400 in 2018. [5] The value of these private companies grew almost exponentially when compared to an estimate of the size of the global public capital markets. Many of these private companies do not want to be bothered with the expense or "hassles" of being public companies.

Perhaps the better rationale for PE inclusion in a portfolio is to have access to these companies. But what is the most effective way one should invest to gain access to these companies is a legitimate question. Is the current PE model the best and most effective one to follow? It should be noted that the largest firms are for the most part no longer investing in the smaller, mid-market private firms via their flagship funds.

Figure 2 Growth of a Dollar of Global PE Net Asset Value and Market Cap, Indexed to 2000 Value, 2000-20, %



Source: "Private Markets Rally to New Heights," p. 23, Exhibit 15, McKinsey & Company, March 2022, https://www.mckinsey.com/~/media/mckinsey/industries/private%20equity%20and%20principal%20investors/our%20insights/mckinseys%20private%20markets%20annual%20review/2022/mckinseys-private-markets-annual-review-private-markets-rally-to-new-heights-vf.pdfm, accessed November 2023.

How did this exponential growth happen? The early PE funds generally delivered on the expectations created for these investments. Success begat success. In the last 13 years the industry has dramatically increased in terms of the proliferation of the number of both funds and firms as well as their fundraising activity. The number of funds focusing on US buyout strategies from

1996 to 2007 was 2,275, and by 2021 the number funds increased to 3,317.[6] The number of firms (fund managers) increased by 34% in the respective time periods, from 1,143 to 2,527.[7] Cumulative funds raised (starting from 1996) nearly trebled, from $1.3 trillion by the end of 2007 to $3.2 trillion by the end of 2021.[8] See **Figure 3**.

Figure 3 Growth of US Buyouts Industry at the End of the Respective Period

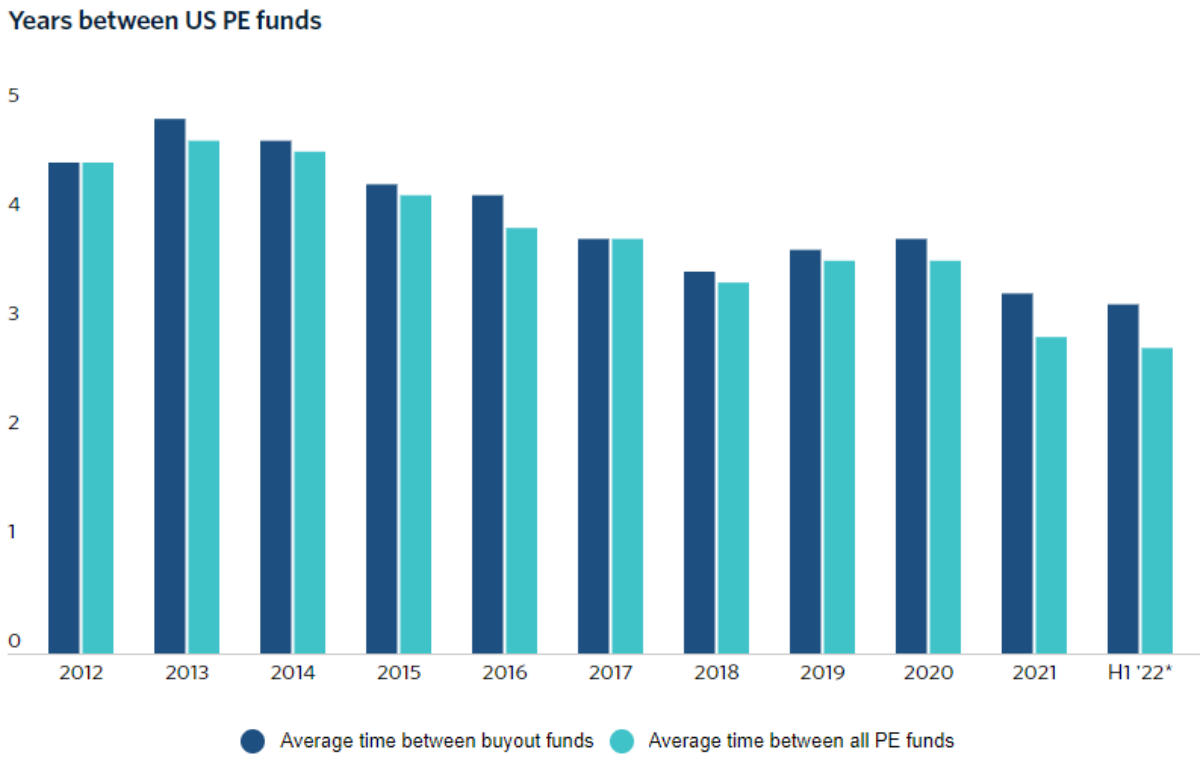
	1996-2007	2008-2021	Change
Number of fund managers	1,143	1,527	33.6%
Number of funds	2,275	3,317	45.8%
Funds raised	$1,322,203	$3,209,252	142.7%

Source: Created by authors using data from Refinitiv, accessed October 6, 2022.

The early firms' success in attracting capital was compounded by the needs of many institutional underfunded pension funds seeking higher nominal returns to reduce their unfunded liabilities. The promise of higher nominal returns was, and remains, an extremely attractive rationale for committing additional capital, especially with the decline in nominal returns in the equity and fixed income portfolios over the past several years. Many of the institutions have gradually increased their allocations to PE from the 8-10% range. Now the largest PE investor, the Canadian Pension Fund, has approximately 33% of their composite portfolio with more than $130 Billion allocated to PE.[9] Many others exceed 20%.

The largest PE firms now seek retail investors who similarly desire higher nominal returns.[10] They are either developing an internal distribution method with the assistance of external retail distributors, such as Blackstone or Partners Group, or simply buying smaller wealth management firms, such as KKR, Lightyear Capital, General Atlantic, or Oak Hill Capital.[11] In the latter instance the PE firm will sell their products through the acquired wealth management firms. The time frame between capital raises for their flagship funds has declined as shown in **Figure 4**. In short, the largest PE firms have recently been "Hoovering" up money and have cut the time-period between fundraising by approximately one-half. The industry is seeking an additional $1 Trillion of new funding.[12] Why is this happening? We address the rationale and its potential impact in Section 4.

Figure 4 Years Between US PE Funds

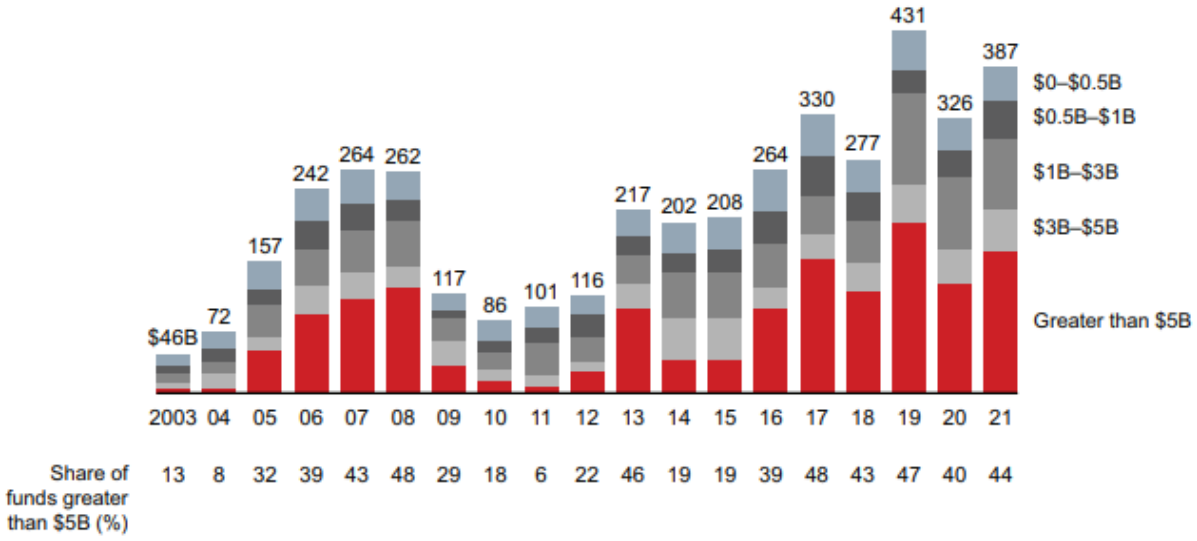


Source: "Charting US PE's performance in Q2," Pitchbook, 18 July 2022, https://pitchbook.com/news/articles/pe-breakdown-trends-charts#:~:text=The%20average%20time%20between%20PE,on%20average%20for%20buyout%20funds, accessed November 2023.

Additionally, PE firms' evolution spawned an entire ecosystem of other firms established to serve the PE firms and their investors. Investment banks received fees from transactions on both the buy and sell side when companies were acquired and later sold. Attorneys specialized in transactions, fundraising and other private market issues. Valuation firms specializing in underwriting private companies were created or new departments formed in management consulting and accounting firms to assist in transaction due diligence. An entire consulting or "gatekeeping" industry came into being to assist investors in underwriting the general partners and assessing their track records. In addition, LPs now have PE specialists whose sole responsibility is to select and monitor their PE portfolios. All these parties have a considerable vested interest in maintaining the status quo of a multibillion-dollar industry.

The industry has been transformed in multiple ways since 2000 but particularly post 2008. The assets under management have exploded ten-fold since 2003 as shown in **Figure 5** below. Other key trends show the concentration of capital among the largest firms. Funds over $5 billion have received between 43%-48% of all the capital raised in the last five years as shown in **Figure 5** below. Indeed, the top five firms account for **25% of all the capital raised** between June 2017 and June 2022 as shown in **Figure 6**.

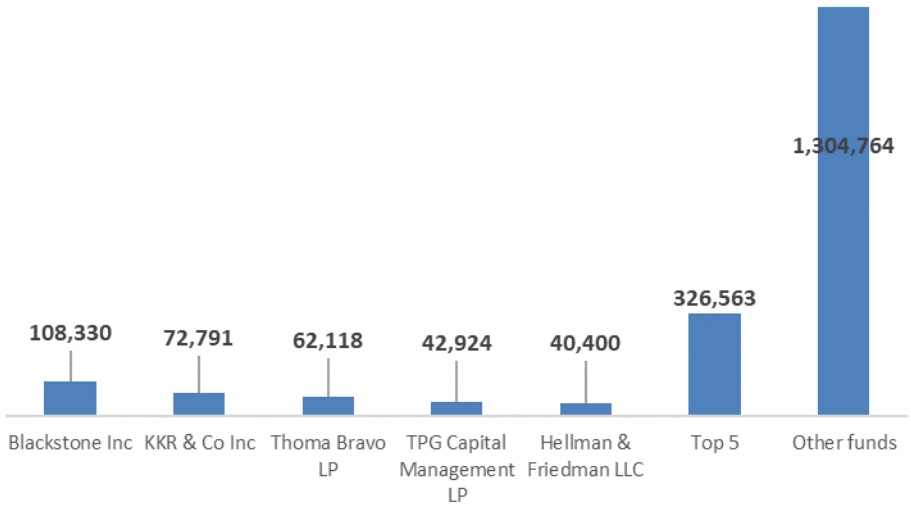
Figure 5 Global Buyout Capital Raised, by Fund Size ($B)



Notes: Buyout category includes buyout, balanced, coinvestment, and coinvestment multimanager funds; includes funds with final close and represents the year in which funds held their final close; excludes SoftBank Vision Fund
Source: Preqin

Source: "Global Private Equity Report 2022," p. 22, Figure 24, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf , accessed November 2023.

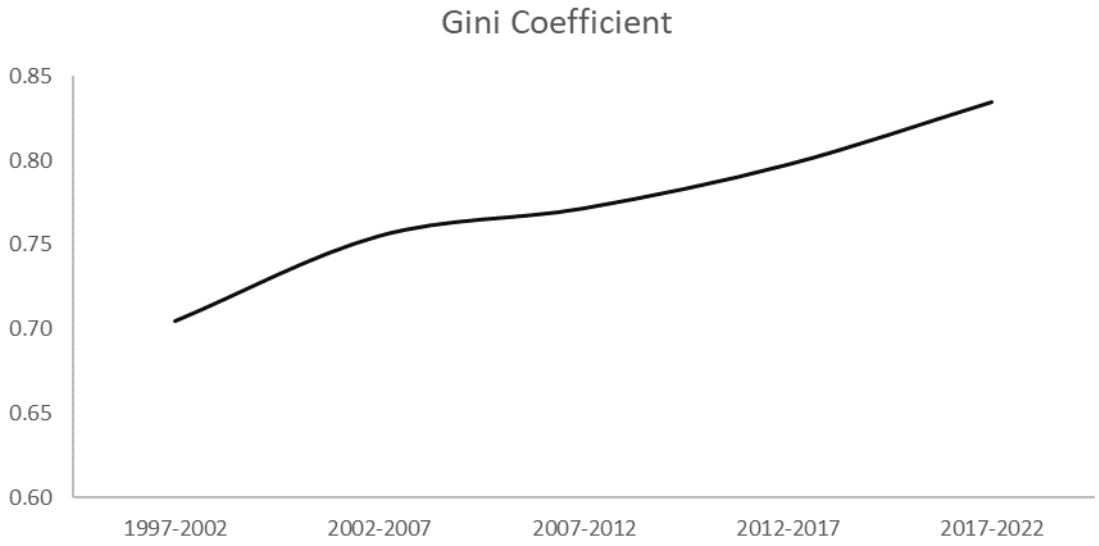
Figure 6 Concentration of PE Capital, $mm Funds Raised (Global Buyouts, June 2017 – June 2022)



Source: Created by authors using data from Refinitiv, accessed June 2022.

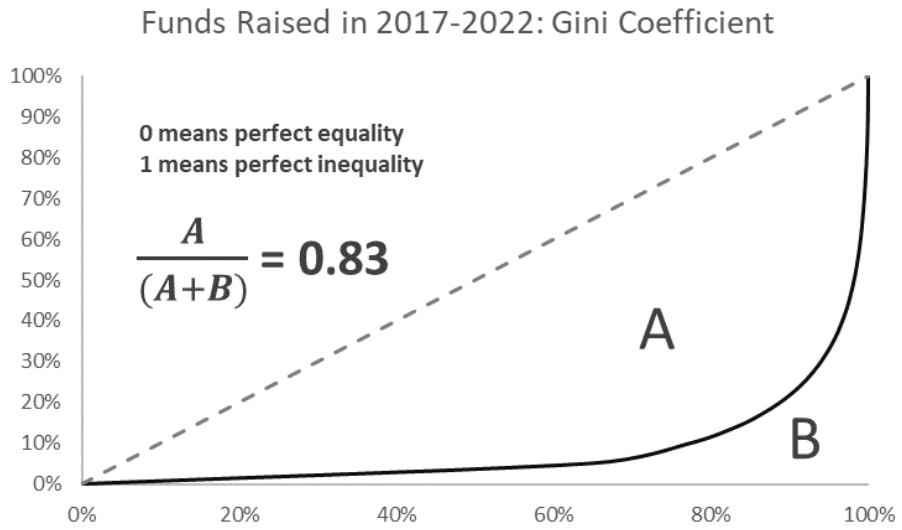
Concentration of the industry can be gauged by standard market measures such as the Herfindahl-Hirschman Index popular with antitrust regulators and the Gini coefficient, which is typically used to measure the level of inequality (see **Exhibit 4** for methodology disclosure). **Figures 7** and **8** confirm the thesis that the buyout industry has become more concentrated and unequal a with smaller number of firms capturing the largest amount of total funds raised.

Figure 7 Gini Coefficient (Global PE, All Strategies)



Source: Created by authors using data from Refinitiv and Preqin Pro.

Figure 8 Gini Coefficient for Funds Raised During 2017-2021

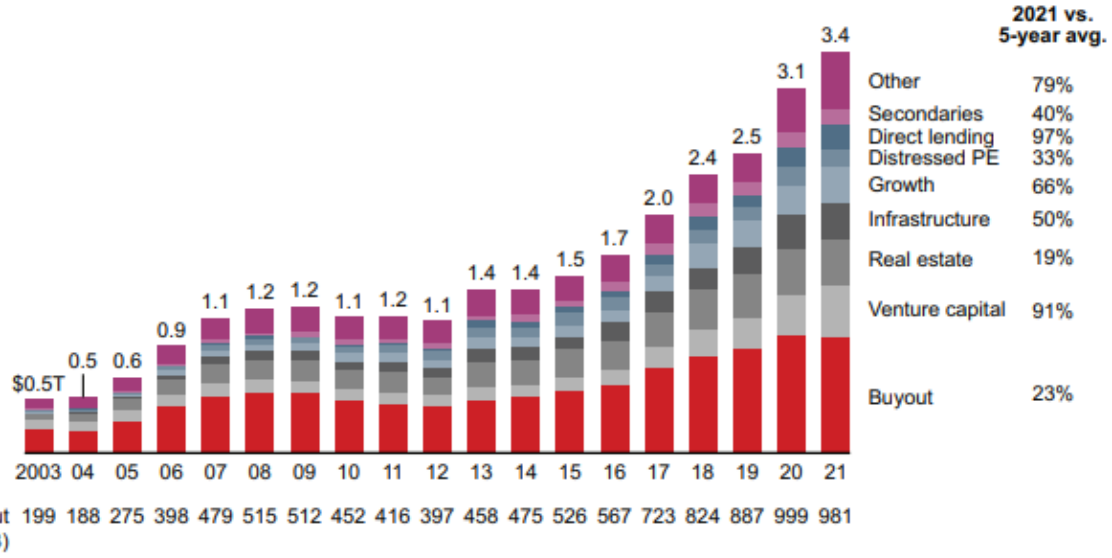


Source: Created by authors using data from Refinitiv and Preqin Pro.

Is the concentration of capital allocations beneficial to investors and the industry? The answer is yes only if the top firms consistently outperform in comparison to one another and to PMEs.

Similarly, the amount of capital to be invested or "dry powder" has grown substantially. It has been well documented that there is considerable uninvested capital in all private sectors, estimated to be over $3 Trillion sitting on the sidelines waiting to be invested. This is a potentially concerning phenomenon based on academic research as discussed below. The largest percentage of dry powder is in PE.

Figure 9 Global Private Capital by Dry Powder, by Fund Type ($T)



Notes: Other category includes fund-of-funds, natural resources, and mezzanine; buyout category includes buyout, balanced, coinvestment, and coinvestment multimanager funds; discrepancies in bar heights displaying the same value are due to rounding
Source: Preqin

Source: "Global Private Equity Report 2022," p. 9, Figure 8, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

Section 2: Does the Case for Private Equity Still Hold True? Are the Fundamental Assumptions Still Valid?

Allocations to PE firms were predicated on the key assumptions referenced above. Do they still hold true? Many of the academic analyses utilize data dating back to the early days of the industry. The performance data in the early years are very different from those of the last decade. Given the structural changes in the industry since the GFC in terms of (i) the growth of the industry; (ii) the returns; and (iii) the change of accounting practices, one can question whether the early years data distort the conclusions one should derive based on the data since the GFC. PE is now a very different industry and the industry data post 2008 lead to different conclusions. This paper focuses on the industry metrics post 2008.

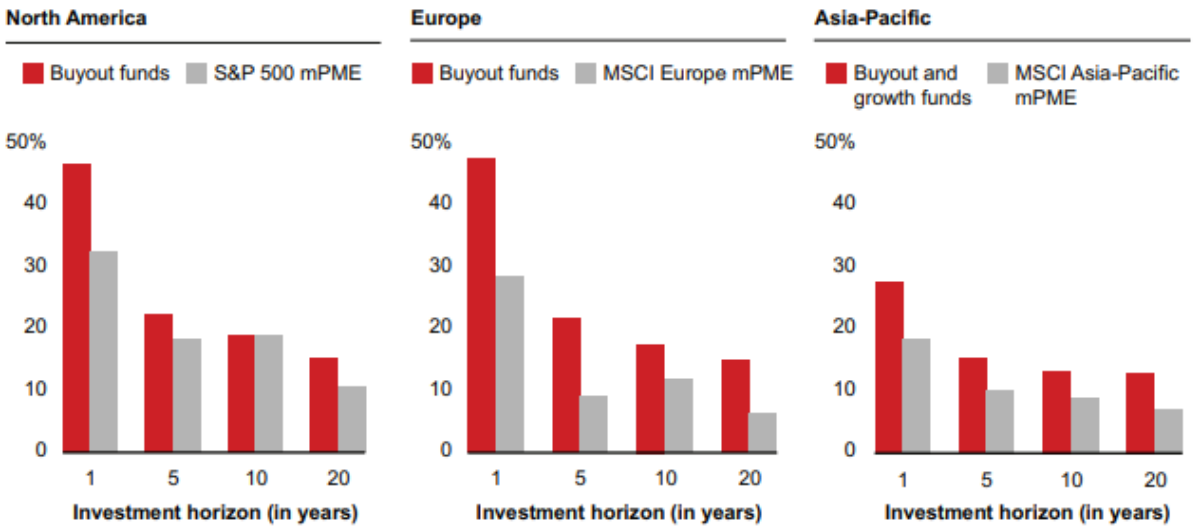
The first key assumption was that PE should generate superior results relative to public market alternatives. Part of the rationale for this assumption is the premise that long term, private

investments should provide some liquidity premium relative to public market alternatives. PE performance comparisons to the public markets have changed dramatically in the recent decade. This is likely partially attributable to the substantial industry changes noted above but more research on this topic should be done to determine whether this is accurate.

A. Nominal Return Outperformance Relative to Public Markets

Figure 10 illustrates that over the last decade the pooled IRRs of PE funds investing in North America have not outperformed a US customized benchmark created by Cambridge Associates, a leading PE consulting firm. This does not mean that in an individual year the PE firms will not outperform. This is the aggregated performance over time. The benchmark is comprised of PMEs to those typically acquired by PE firms. There does appear to be sizeable outperformance in Europe and Asia, but not in the US over the past 10 years. The amount of capital raised to be invested in the European and Asian markets has been dwarfed by the amount allocated to the US as shown in **Figure 11**.[13] While Figure 11 does not depict where the capital was actually invested, it is reasonable to assume that the preponderance of the capital was invested in North America relative to Europe and Asia Pacific. These capital flows may have had an impact on performance in the US market in the past decade relative to non-US markets in the past 10 years. The academic research concerning capital flows discussed in the next section supports this conclusion.

Figure 10 End-to-End Pooled Net IRR (as of Q3 2021) for North America, Europe, and Asia-Pacific at the end of the Trailing One Year, Five Year, Ten Year, and Twenty Year Periods at 12/31/2021



Notes: Data for US and Asia-Pacific calculated in US dollars; data for Europe calculated in euros; Europe includes developed economies only; Cambridge Associates Modified Public Market Equivalent (mPME) replicates private investment performance under public market conditions
Source: Cambridge Associates

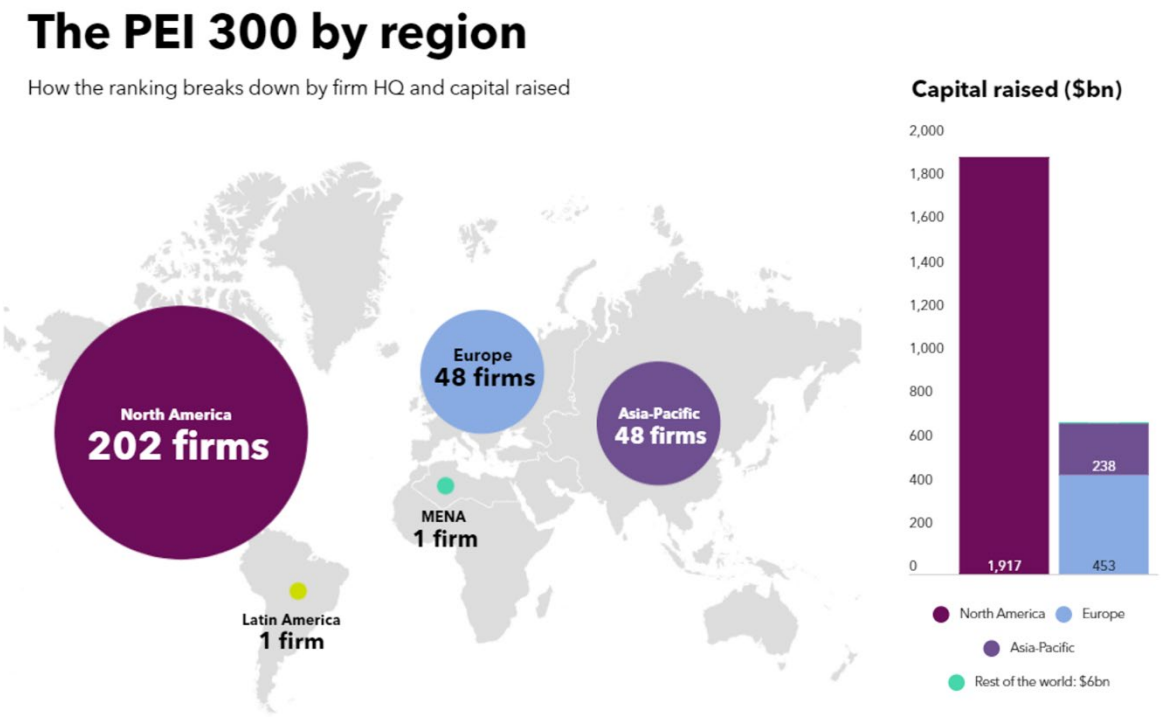
Source: "Global Private Equity Report 2022," p. 25, Figure 26, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

It is unclear whether these numbers are dollar weighted. If not, the results are **materially** distorted by including the superior results within the 20 year time period within the later 10 year time period. The funds in the early days of PE (from 2000 through 2010 had vastly lower aggregate capital commitments than those funds raised in the past 10 years. The early funds performed materially better than those in the subsequent 10 year time period. Including the results of both sets of funds in the 20 year time period makes the 20 year results artificially high if not dollar weighted. Thus, the conclusions one might draw about PE's performance relative to PMEs may be wrong.

If the 20 year time series were dollar weighted, the past 10 year dollar weighted PE results would likely be reduced, as they include the performance results of the much smaller funds for the preceding 10 years. It is not possible to estimate how many funds or how long the 20 year results are included in the shorter time period before they rolled out of the sample pool. **However, even if the results were dollar weighted, the conclusions would be the same.** During the last 10 years PE on average did not outperform the public markets in aggregate. Given the industry changes within the last decade, the 10-year comparison is the more relevant statistic than the 20 year time frame.

A few additional comments are warranted about **Figure 10**. The charts reflect pooled IRRs and not multiples on invested capital or "MOICs", which other data collectors present. IRRs can be manipulated in the early years and comparisons between one year and five year returns of private to public company performance are likely misleading. IRR comparisons in the first two to three years of a PE fund are often artificially distorted due to the use of Subscription Lines in the early years of a PE fund, which can inflate IRRs in a fund's early years.[14] The practice of using Subscription Lines to augment performance began approximately 15 years ago. The perhaps overstated one and five year results are included within and may distort the 10 year results.

Figure 11 The PEI 300 by Region



Source: "The 2022 PEI 300 in eight charts," p. 5, Private Equity International, 22 June 2022, https://www.privateequityinternational.com/download-this-years-pei-300-in-eight-charts/, accessed November 2023.

Given the industry changes within the last decade, the 10-year comparison is the more relevant statistic than the 20 year time frame. The 20-year comparison shows the industry did, in fact, outperform the PMEs over the past 20 years. This is notwithstanding the potential dilution of the past 10 years, as the results are included within the 20 year statistic. This chart suggests the PE industry did significantly better during the period of 1999 to 2009 relative to the public markets, if one extracted out the past 10 years at June 30, 2021 for those investments made in the United States.

Why are these observations important? Seventy five percent of PE capital raised has been by US based firms. While not all the capital raised has been invested in the US, the preponderance has been, as **Figure 11** above illustrates. The industry capital raised has increased 10-fold since 2003 as depicted in **Figure 5** above. **Figure 10** indicates that over the past decade the preponderance of the capital raised and invested in the US did not, on average and net of fees, outperform a comparable public market benchmark.

The resulting disappointing average performance versus PMEs may be attributable to the amount of capital invested in the US and the ensuing competition this created. If the US market has become more competitive, and possibly more efficient, this market context does not augur well for the sizeable amount of uninvested capital that may be targeting US based companies today. Academics have provided data that supports this concern.

Academic research by Steve Kaplan (one of the most respected academics specializing in PE) and his colleagues similarly found that the average PE performance in North America did not outperform the S&P 500 and other PME indices, net of fees, in the 1980's and 1990's contradicting the results depicted in **Figure 10**. Their research in this seminal piece, discussed in more detail below, analyzed the performance of 746 largely liquidated funds from 1980 to 1997. They found that: ***"Over the entire sample period (1980 to 1997), average [PE] fund returns net of fees are roughly equivalent to those of the S & P."***[15]

In subsequent updates to Kaplan's research in 2010, they noted that funds formed **before** 2005 did on average outperform the public market as measured by both the S&P and the Russell indices. However, **post 2005** until the time of their research the average PE funds did not outperform. They were equivalent.[16] These conclusions are consistent with **Figure 10** above. The average PE funds only outperformed on a gross of fees basis in a similar study conducted in roughly the same time period (Philippou).[17] This paper found underperformance when compared to a smaller cap value orientated (the types of companies PE firms then bought) PMEs on a net of fee basis. Others drew similar conclusions using different data sources.[18] The chart below, **Figure 12**, independently corroborates this conclusion.

Figure 12 S&P 500 vs Bloomberg Private Equity Index

Source: Bloomberg, accessed June 15th, 2022.

In **Figure 12**, the white line represents the performance of the Bloomberg Private Equity Index from 2012 through June 2022. The underperformance is evident.

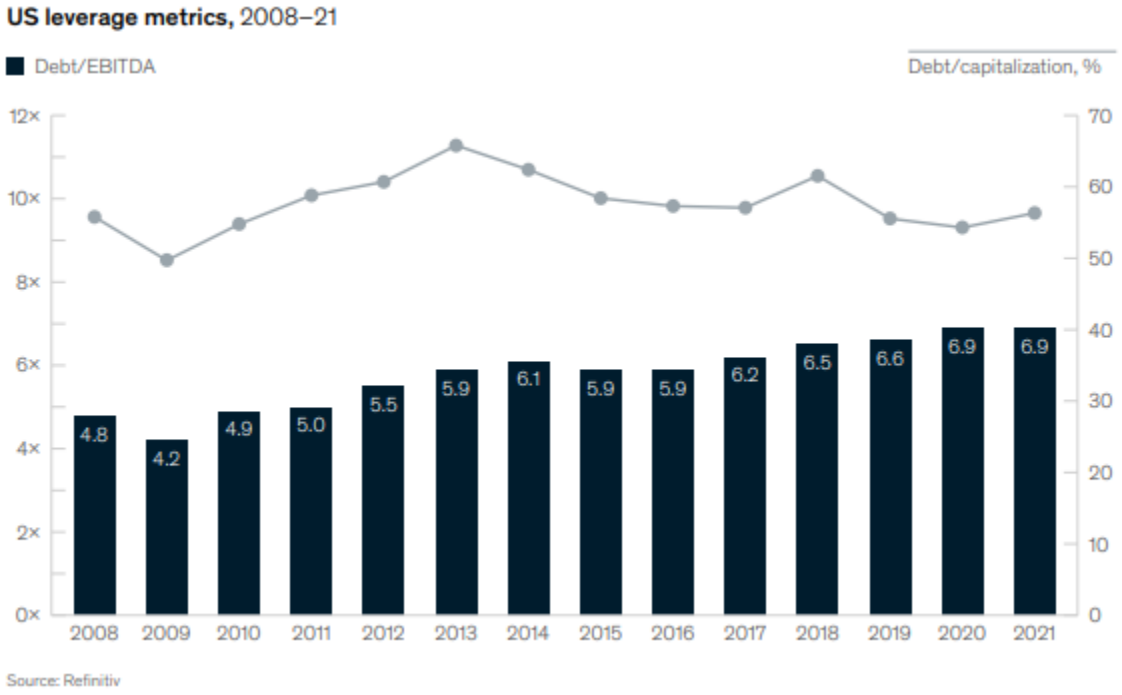
In short, data from multiple sources, examining PE performance post 2005, call into question the premise that the average PE fund will outperform a PME benchmark on a nominal and net of fees basis, much less on a risk adjusted basis due to the leverage of PE portfolio companies. **It is plausible to argue that PE has underperformed on a risk adjusted basis relative to PMEs given the amount of leverage in their portfolios, if PE only delivers equivalent results on a nominal basis.**

The leverage comparisons are addressed next and then we examine whether there are different conclusions to be drawn from the top quartile, as opposed to the average or median performance of the funds.

B. Leverage Impacts

Given the material drawdown in the public markets through 2022 and given the higher leverage ratios of PE funds (See **Figures 13** and **14** below), the probability is that average PE funds may, on average, materially underperform the PMEs on a nominal basis in the near term. The PE leverage ratio as measured by debt to EBITDA was 7x as compared to a 2x ratio for the Russell 3000. While the leverage ratio of public companies increased dramatically from 2008 to the present, based on falling interest rates, it is nowhere near the ratio of their PE counterparts.

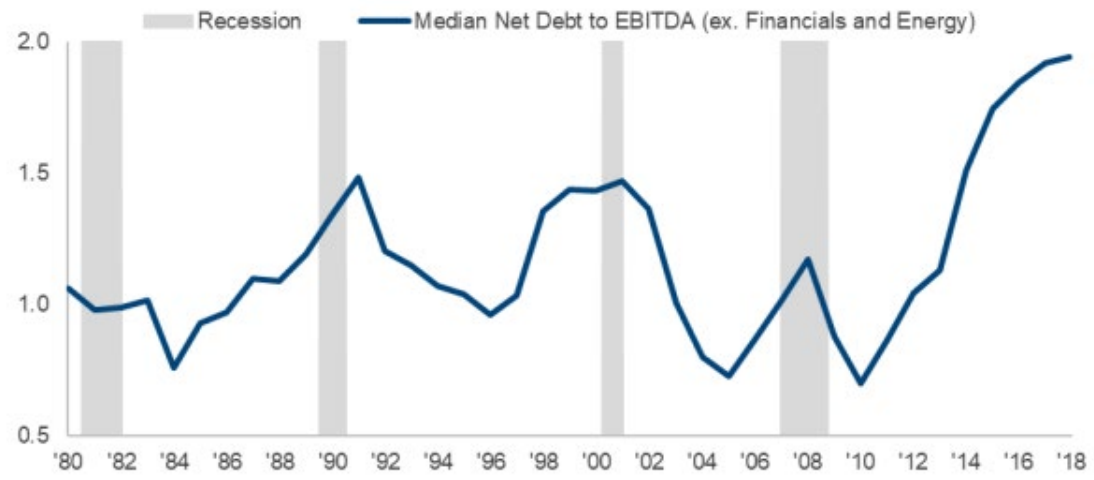
Figure 13 US Buyout Leverage Remained at Nearly Seven Times in 2021



Source: "Private Markets Rally to New Heights," p. 29, Exhibit 21, McKinsey & Company, March 2022, https://www.mckinsey.com/~/media/mckinsey/industries/private%20equity%20and%20principal%20investors/our%20insights/mckinseys%20private%20markets%20annual%20review/2022/mckinseys-private-markets-annual-review-private-markets-rally-to-new-heights-vf.pdfm, accessed November 2023.

Note: Russell 2000 Debt/EBITDA leverage YoY.

Figure 14 Net Leverage of Russell 3000 Companies (Ratio of Net Debt to EBITDA)



Source: FPA Risk is Where You're Not Looking, January 2, 2019, p. 10, https://fpa.com/docs/default-source/funds/fpa-crescent-fund/literature/risk-is-where-you're-not-looking.pdf?sfvrsn=8, Accessed May 30, 2022.

The difference in the leverage ratios between PE and PMEs and the equivalent performance of average PE funds over the past decade relative to these PMEs raises the question of whether PE firms are adding value on a risk adjusted basis. Even if they outperform, are they adding value or simply generating leveraged beta?

This is an important question, especially given the historical context since the GFC. Since the GFC the market economic environment was particularly salutary for PE given that interest rates either fell or remained quite low during this time period. In other words, investment performance may have been generated simply by "being there" with floating rate debt as opposed to some of the historically touted value enhancements PE GPs suggest they generate.

The likelihood that this historical pattern will continue prospectively seems highly unlikely given the Federal Reserve's actions in the past 18 months embarking on a continued pattern of raising rates to tame inflation. Indeed, some such as Howard Marks believe we are entering a "Sea Change" in the overall economy in which higher interest rates may be the norm.[19] In the face of rising rates, PE GPs will have to find other strategies to generate superior returns relative to PMEs.

Marks also highlighted that, "Relatively few investors today are old enough to remember a time when interest rates behaved differently. **Everyone who has come into the business since 1980 – in other words, the vast majority of today's investors – has, with relatively few exceptions, only seen interest rates that were either declining or ultra-low (or both).**" (emphasis in the original).[20] This points to the fact that the experience levels of current GPs in this market environment may be subject to question. They will no longer be able to necessarily rely on falling rates as one of the tools in their toolkit to generate returns.

However, some investors may still be attracted to the asset class notwithstanding the fact that the returns might be equivalent or slightly lower than the PMEs because the PE reported volatility is lower. Equivalent returns suggest PE results are superior on a risk adjusted basis

based upon the reported data because their Sharpe Ratios would be lower. Unfortunately, the analysis of whether this is an accurate conclusion requires further research particularly given the higher leverage levels at the transaction level in PE as shown in **Figures 13** and **14**. It would be helpful to extract out the impact of the excess leverage at the portfolio company level and then compare performance to comparable PMEs. This data has not been made readily available.

Academics have attempted to back out the impact of leverage, but these studies had to make certain key assumptions due to the lack of transparency at the portfolio company level so the leverage impacts, and thus their conclusions, are subject to question. For example, in one study the author attempted to increase the leverage of the PME benchmark to make it more comparable to leverage ratios of PE portfolio companies. [21] However, interest rates fluctuate over time and many GPs use floating rate debt, GPs pay down debt over time, or do dividend recapitalizations, so these comparisons are at best only approximate. It would be reasonable to conclude that in a falling interest rate environment and concurrent rising PME market, that the positive impact of leverage would be significant. However, the contra would be true in a rising interest rate environment and falling PME capital market context, which we experienced in 2021 through 2023.

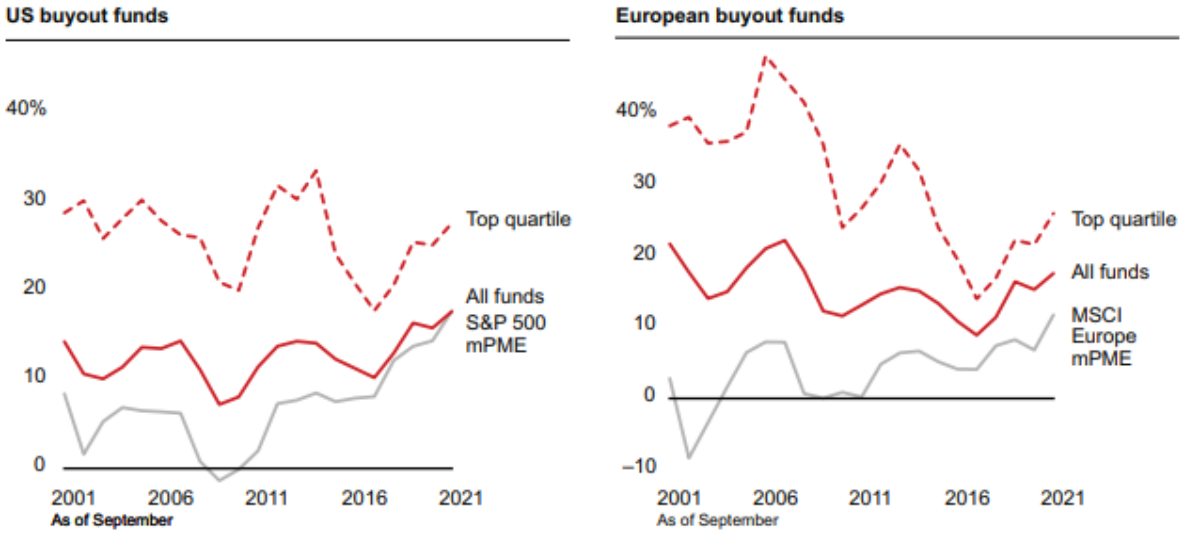
C. Average Versus Top Quartile PE Results

The fundamental question becomes whether there is a material difference between the performance of average performance versus top quartile performance of PE funds. The case for investing in the average PE funds is tenuous at best. If the top quartile firms do not consistently outperform PMEs, then the case for PE becomes largely obliterated. However, top quartile firms do appear to outperform the S&P PMEs and the MSCI PMEs (Cambridge Associates) in the US and Europe over the past 20 years at the end of 2021.

Figure 15 below illustrates the performance of the top and the aggregate average of PE quartiles against the public PME Index in the US and in Europe. One needs to focus on the more recent time period as the early time period from 2001 through 2008 with superior performance, as referenced above, distorts the results. Meaning, if we could separate out the performance of funds formed post 2008 the results might differ as the earlier better performing funds may have dropped out of the pool over the 20 year time period. The industry size exploded post 2008 and during this time period the practice of using fair value accounting was adopted as mentioned above. However, no matter what the underlying methodology was in creating this chart, it illustrates that the more recent **average** pooled PE net IRR results in the past five years have converged with the PMEs in the US.[22]

However, the **top quartile** funds did outperform the S&P 500 over the 20 year time period in the Cambridge Associates analysis. Similar results were reported by State Street over the time period of 2005 through 2021.[23] See **Figures 15** and **16**. Note again that these results may not be dollar weighted so the inclusion of the smaller, better performing funds early in the 20 year time period may distort the results. However, the early funds would likely have burned off after 2015 making the convergence of the more recent time periods more striking for the average funds.

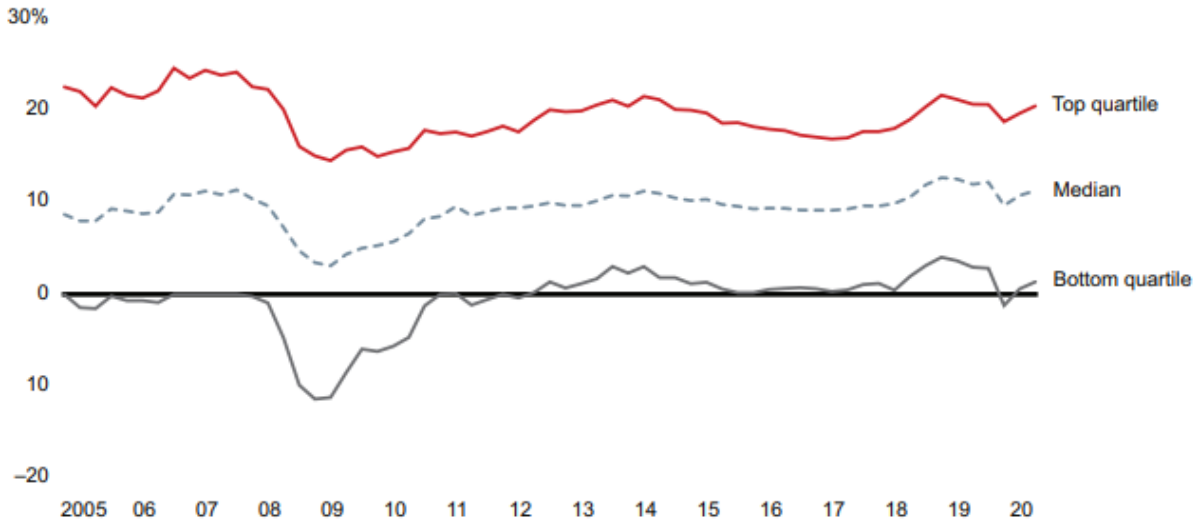
Figure 15 10-year horizon pooled net IRR for…



Notes: Data for US calculated in US dollars; data for Europe calculated in euros; Cambridge Associates Modified Public Market Equivalent (mPME) replicates private investment performance under public market conditions
Source: Cambridge Associates

Source: "Global Private Equity Report 2022," p. 26, Figure 27, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

Figure 16 10-Year Annualized IRR Global Buyouts



Sources: State Street Private Equity Index; State Street Global Markets

Source: "Global Private Equity Report 2021," p. 22, Figure 23, Bain & Company, 2021, https://www.bain.com/globalassets/noindex/2021/bain_report_2021-global-private-equity-report.pdf, accessed November 2023.

While there are some methodology differences between **Figures 15** and **16**, one would draw the same conclusions.[24] The top quartile firms outperformed the PMEs **substantially** over time in the US and Europe and the median firms did not. All one needs to do then is select those firms who will generate top quartile performance to obtain superior results relative to the PMEs. It has been one of the fundamental precepts of the PE industry that past performance **IS** predictive of future results. So, an investor might ignore the fact that the average PE firm will not outperform PMEs, indeed as historically that appears to be the case, so long as the investor can pick a prior top quartile performer.

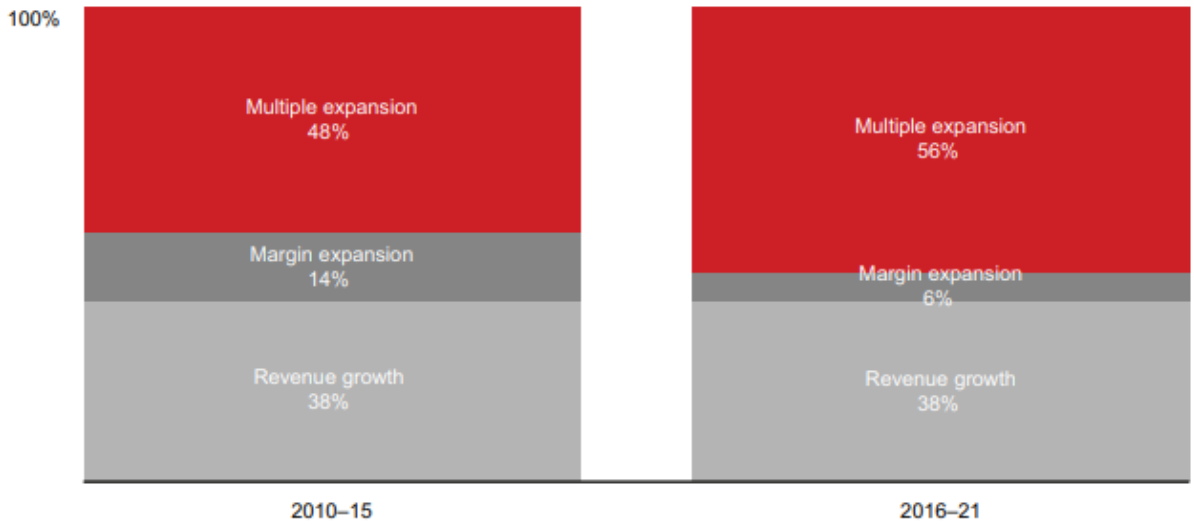
So, the critical question becomes can any investor consistently identify the top quartile firms who would hopefully outperform the PMEs going forward and capture this relative outperformance? This question is addressed in Section 3.

D. Adding Value Through Operational Improvements

An additional premise justifying PE investments is the added value the firms create via operational improvements to their portfolio companies and not just produce leveraged beta. These improvements should result in top line revenue growth, improved profit margins, and EBIDTA and Adjusted EBIDTA growth. Increases in these factors would justify increased multiples for the company, which would result in a higher valuation. Are these operational improvements actually happening?

Figures 17 and **18** below may call these assumptions into question as the impact of operational improvements as measured by margin expansion and revenue growth appear to have stalled. The primary driver of recent PE returns appears to be multiple expansion. This multiple expansion mirrors the multiple expansion that occurred in the PMEs over the respective time periods raising the question of whether the multiple expansion was actually attributable to operational improvements or capital market effects.

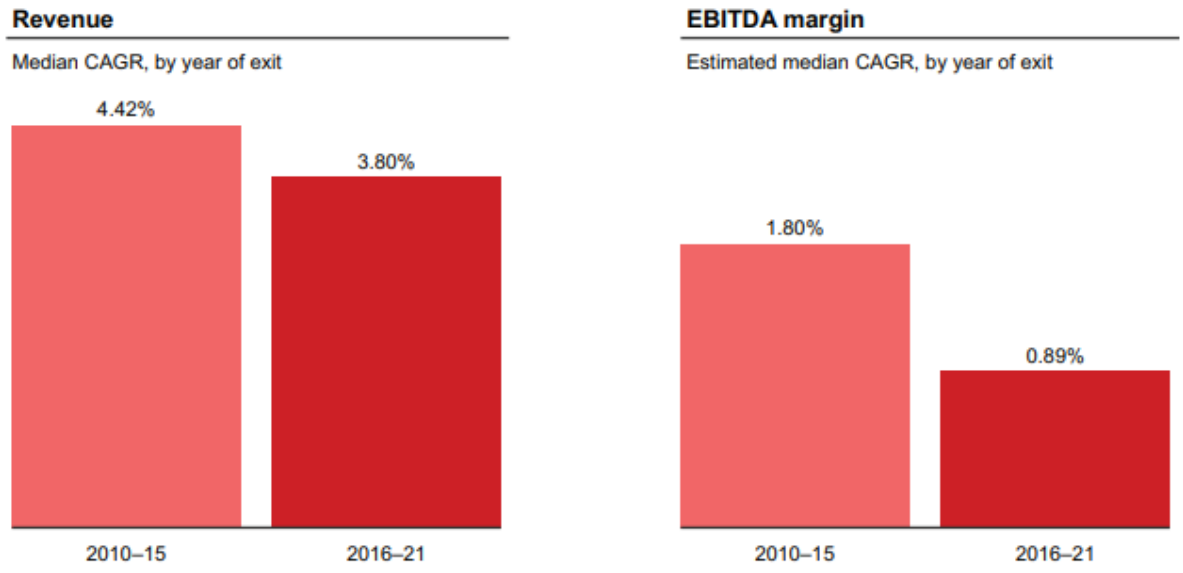
Figure 17 Median Value Creation, by Year of Exit



Notes: Includes fully realized global buyout deals with more than $50 million in invested capital; excludes deals with missing data; excludes real estate and infrastructure deals; 2021 data as of December 14, 2021
Source: CEPRES Market Intelligence

Source: "Global Private Equity Report 2022," p. 76, Figure 2, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

Figure 18 Median Value Creation by Revenue and EBIDTA Margin Growth



Notes: Includes fully realized global buyout deals with more than $50 million in invested capital; excludes real estate and infrastructure deals; 2021 data as of December 14, 2021
Sources: CEPRES Market Intelligence; Bain analysis

Source: "Global Private Equity Report 2022," p. 77, Figure 3, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

Note that Bain did not include updated charts in their Bain Global Private Equity Report 2023.

In the past six years over half of PE returns appear to be attributable to multiple expansion. Multiple expansion can be attributable to several factors. If the PE firm, in fact, drives operational improvements by accomplishing one or more of the factors enumerated above, then multiple expansion should be warranted. The trend line for revenue growth and margin improvements has declined suggesting the PE performance enhancements impacts may be waning. Given the PME performance over the past 13 years, one can question whether the multiple expansion for PE was generated as much by market beta as actual operational improvements.

Academics have struggled to analyze operational improvements as most GPs do not publish the financial results of their portfolio companies other than realized and forecasted IRRs. Some academic studies generally found some improvement in operations at the portfolio company level for buyouts that occurred in the 1980's by analyzing the results of corporate tax returns.[25]

However, more recent studies have questioned this conclusion. One academic study examined the tax returns of the portfolio companies and stated ***"… we find little evidence that LBOs in the 1990s and 2000s result in improvements in operating performance on average"***.[26] Another study reviewed the financial statements provided by the portfolio companies to mezzanine lenders and reached a similar conclusion.[27] This study was updated and reviewed the operating results of 933 transactions from 1996-2021 with data sourced from Capital IQ. The methodology reviewed the SEC public filings for companies that had issued public debt. They examined whether accelerated revenue growth, expanded profit margins and increased capital expenditures post-acquisition occurred when compared to the prior three years of operations. While admittedly a small sample, they concluded, ***"The industry mythology of savvy and efficient operators streamlining operations and directing strategy to increase growth just isn't supported by data."***[28]

Clearly, more research needs to be done to dissect how much value PE firms are adding to their portfolio companies. PE firms need to be more transparent regarding the actual performance of the portfolio companies, so investors can differentiate the factors driving performance: actual operational improvements versus market beta.

In short, even if PE firms are enhancing returns at the portfolio company level, it does not appear that these enhancements are translating into superior investor returns for their LPs based upon the more recent average industry results. Whether this fact is due to GPs (i) paying too much for their portfolio companies, thereby offsetting operational improvements; or (ii) buying inferior companies which can be operationally improved but are still unattractive; or (iii) not really adding value via operational improvements is unclear.

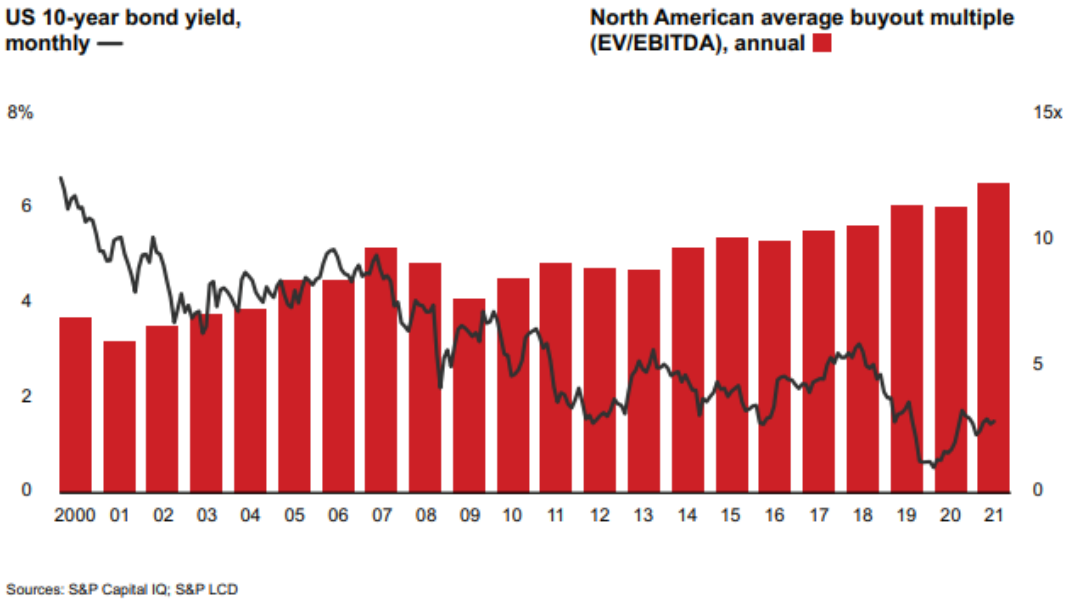
Without operational improvements and without falling interest rates, it is unclear how superior results will be generated.

E. Negotiating the Transaction

The fact that the impact of operational improvements appears to have declined over the past five years overlaps with the fact that PE firms are paying ever higher entry multiples on their

transactions driven in part by the decline in Treasury yields. In short, PE firms are on average paying more to acquire portfolio companies. As interest rates rise and multiples likely contract, PE firms will be under greater pressure to improve operations in their portfolio companies to make up for the doubtful near-term ability to rely on multiple expansion to bolster their returns. **Figure 20** shows the relationship between entry multiples on PE transactions versus PMEs. Other than the last year shown in the chart, they have generally been in the 200 bp range and increasing over time from 2008 through 2021.

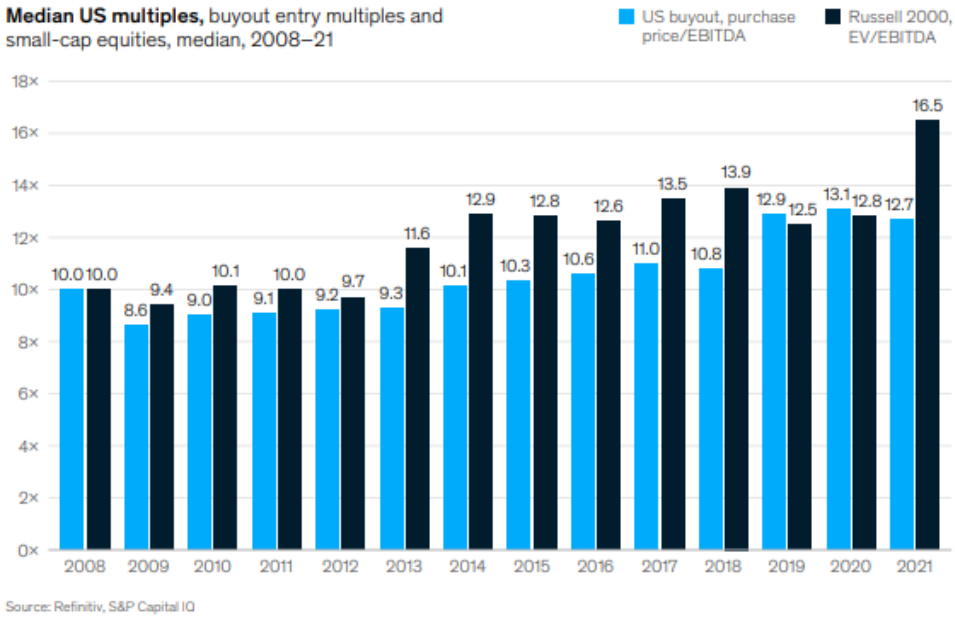
Figure 19 US Bond Yields Versus North American Annual EV/EBITDA Multiples



Source: "Global Private Equity Report 2022," p. 75, Figure 1, Bain & Company, 2022, https://www.bain.com/globalassets/noindex/2022/bain_report_global-private-equity-report-2022.pdf, accessed November 2023.

Part of the convergence of the US PE returns to the public market may be due to the fact that PE firms appear to be paying more for their portfolio companies when compared to historical prices. Entry EBIDTA multiples have grown higher over the past decade and have approached the same levels as those of comparable public companies except for 2021 as **Figure 20** illustrates. Indeed, in 2019 and 2020 PE firms actually paid higher entry multiples than the multiples of the Russell 2000.

Figure 20 Median US Multiples, Buyout Entry Multiples and Small-cap Equities, Median, 2008-2021



Source: "Private Markets Rally to New Heights," p. 28, Exhibit 20, McKinsey & Company, March 2022, https://www.mckinsey.com/~/media/mckinsey/industries/private%20equity%20and%20principal%20investors/our%20insights/mckinseys%20private%20markets%20annual%20review/2022/mckinseys-private-markets-annual-review-private-markets-rally-to-new-heights-vf.pdfm, accessed November 2023.

In the late 70's underpinning the rationale for investing in PE was the notion that GPs could exploit market inefficiencies. They could make attractive acquisitions of portfolio companies at more attractive prices than those available in the public markets. However, in today's market environment this assumption may no longer hold.

Compounding the increased entry multiple issue, making companies more expensive, is the fact that most large transactions are no longer "off market". They are brokered sales or auctions. Sellers, especially larger companies, have become quite sophisticated over time and are willing to retain expert advice in selling all or a portion of their companies. This clearly makes the acquisition market much more competitive and efficient, which should have a deleterious impact on returns. Indeed, part of the premise for potentially superior returns was predicated on the GP's ability to exploit market inefficiencies in the private markets. The academic research suggests that the VC market has produced more consistent, persistent results than large cap PE firms. Perhaps this is since VCs invest in a much smaller segment of the capital markets, which may, in fact, be more inefficient than the market segment in which large cap PE firms direct their attention.

Section 3: What Does Academic Research Suggest?

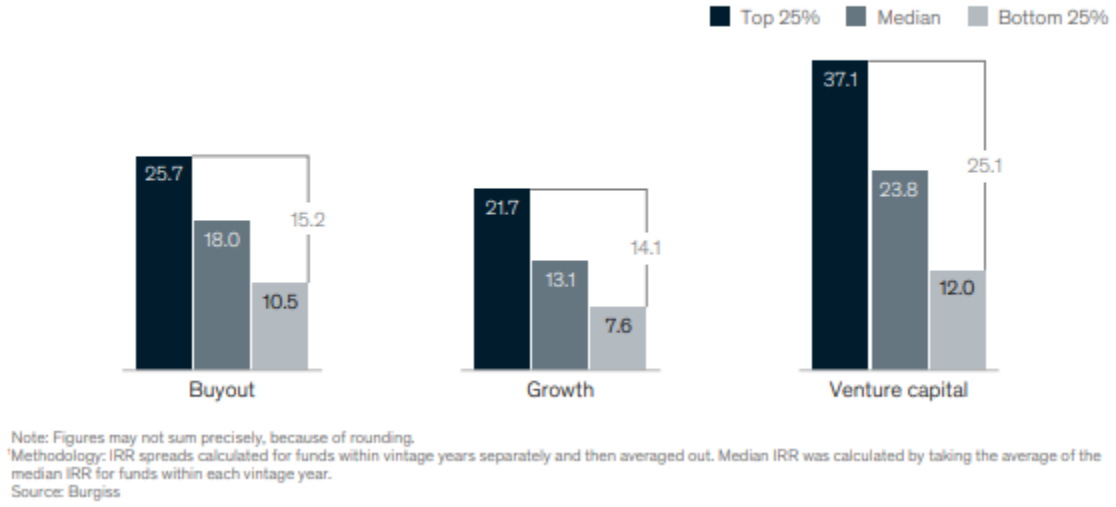
Academics have long struggled to better understand and interpret PE industry returns due in large part to poor data quality. It has taken years to aggregate sufficient data at the partnership level to be able to draw definitive conclusions as returns are only reported quarterly. Complicating matters is the fact that the data is poorly disclosed with regards to portfolio company performance other than IRR calculations both realized and unrealized. Audited financial statements are typically presented at the PE partnership level, not at the portfolio company level. Cash flows tracked by some monitoring firms again represent contributions and distributions primarily made only at the partnership level.

Since the GFC, data sources have improved materially, and academics have been pouring over the partnership level data leading to some startling conclusions. The primary questions they have addressed include: Is there persistence in returns that would serve as the basis for future investment decisions? Does a GP raising sequentially larger and larger partnerships have a negative impact on their performance? How do capital flows into the PE industry impact performance?

A. Persistence of Returns

One of the fundamental PE precepts is that a firm's track record is important and needs to be dissected. Investors have believed that unlike the public markets, past performance of PE funds **is** indicative of future results. The investment thesis is that one must ascertain the top quartile performing firms as it has been believed they are more likely to produce top quartile results in their subsequent funds. Given the dispersion in returns between the highest versus lowest quartiles, as illustrated in **Figure 21** below, return driven investors have had a laser focus on a firm's track record in the hopes of obtaining future top quartile results.

Figure 21 Dispersion of IRR Returns Across PE, Growth Equity and VC (globally)



Source: "Private Markets Rally to New Heights," p. 25, Exhibit 17, McKinsey & Company, March 2022, https://www.mckinsey.com/~/media/mckinsey/industries/private%20equity%20and%20principal%20investors/our%20insights/mckinseys%20private%20markets%20annual%20review/2022/mckinseys-private-markets-annual-review-private-markets-rally-to-new-heights-vf.pdfm, accessed November 2023.

In a seminal piece, Private Equity Performance: Returns, Persistence (2005)[29], Kaplan and Schoar analyzed the returns of PE and VC firms. The authors found persistence in the PE returns and even stronger evidence of persistence among VC firms. Similar studies, some using different databases, reached similar conclusions again for firms raising funds in the pre-2010 time.[30] These early studies were primarily focused on the results from US based funds.

In Performance Persistence in PE Funds, Chun (2012), using data for funds raised pre 2000 found that there was persistence between the first fund and the follow on fund, but that persistence was short lived. Performance dropped materially in subsequent funds thereafter. Indeed, he stated "**…that it is more difficult for funds in the top performing portfolios to sustain their performance.**" [31] He found, as others have, that the strongest persistence is among the poorer performing funds. His most disconcerting conclusion comparatively early in the industry analysis was that the data "**…raises doubts as to whether private equity partnerships have proprietary skills enabling them to maintain consistent performance."** [32] Further, he stated**, " …the results do not support buyout funds have differential or proprietary skills."**[33]

It should be noted that different databases (Burgiss, Preqin, PitchBook, Cambridge Associates being the primary sources) use different methodologies in presenting their results. While one might quibble as to which data source is superior, and whether one should analyze IRR only, IRR, MOIC, Multiple on Committed Capital ("MOCC"), cash flows, PMEs or all of them, the salient point is that while the data is imperfect, the early and subsequent studies directionally

reached similar conclusions over approximately comparable time periods. It is also important to note that the conclusions below relate to the aggregate conclusions based on the data samples. There may be performance outliers meaning there may indeed be some firms who exhibit performance persistence on the positive side and more conclusively on the negative side.

The early conclusions regarding persistence in PE and VC performance for the pre 2010 time period were important because the industry generally adopted the belief that analyzing a PE firm's track record was a critical component of an LP's due diligence for the subsequent fund. The belief in persistence became engrained among the LP community. The Kaplan and Schoar conclusions became the basis of the relentless pursuit of top quartile performing PE and VC firms. The entire gatekeeping industry was largely predicated on the assumption that their databases would enable them to identify the top quartile GPs and avoid those GPs who were "persistently" in the fourth quartile. All of this occurred notwithstanding the fact that a few academics early on raised some cautionary flags.

Similarly, in the analysis of LP performance, academics found there was return persistence of some LPs in the pre-2008 era, especially those following the so-called Yale investment model, which led to their outperformance relative to peers and benchmarks.[34] However, their outperformance evaporated in the post GFC era.[35]

Harris, Kaplan, and colleagues ("Harris et.al.") did an additional study in 2014[36] and updated their work in 2020 evaluating the performance of buyout partnerships from 1982 through 2014 and importantly reached different conclusions.[37] The authors noted material changes in the industry in terms of the size of the market and segregated the results between the performance results of PE partnerships pre-2001 and post-2000. Their conclusions are potentially profound.

In their latest paper the authors examined the data several ways. They looked at the cash flows, IRR and MOIC performance of over 2,220 PE and VC funds at the end of June 2019 for the vintages from 1984 to 2014. They excluded subsequent vintages as they believed they were still in their investment period. They grouped the partnerships by vintage years and performance quartiles and deciles. They also compared their performance to PMEs as well and ran regression analyses on both the PE and VC funds. The authors also adopted a novel strategy analyzing the GP's preceding funds' performance. They examined the information investors would have had at the time the GP was raising its next fund. In essence, this was the performance information and quartile rankings the investor would have had at the time when they were making the investment decision to invest in the next fund.

The results for VC and PE were different. The authors continued to find persistence among VC firm performance even in the post 2000 time period. This conclusion held even when using various analytic methodologies. They found:

> "Our results on VC funds have two implications. First, the persistence in VC suggests that the industry rule of thumb is to invest with GPs that have previously performed well and to avoid those that have not remains consistent with our results. The stronger performance persistence for VC as compared to buyout suggests that GP skills and networks for successful VC investing are harder to replicate than is true in buyout."[38]

In the case of VC, 44.6% of GPs that had been in the top quartile for the prior fund were in the top quartile subsequently, and 26.9% of those prior top quartile funds were subsequently in the second quartile.[39]

The PE firm results were mixed. When the authors looked at the results at the end of June 2019, they confirmed some persistence using quartile rankings for both the pre and post 2000 and 2001 funds, respectively, when looking at performance after the fact at June 2019. The persistence level among the top quartile funds for the next fund for pre-2001 funds was stronger than post-2000 funds at 41% and 33%, respectively. But, stated differently, two-thirds of the post 2000 funds in the top quartile were not subsequently in the top quartile for their subsequent funds.

However, the authors concluded that ***"For our overall sample, as well as for both pre-2001 and post 2000 funds, fund performance is persistent. The conventional wisdom would appear to hold."***[40] They also noted buyout performance persistence was described as "modest" when using PME regressions. [41] Indeed, the PME regression analyses and the persistence they found was driven by the funds in the **4th quartile**, not the top quartile, analogous to Chun's findings.[42] **Surprisingly, the persistence conclusions are driven more by the worst performing, not best performing funds.**

The predictive quality of using the top quartile rankings **fell** for the post-2000 funds. The predictive power of the 4th quartile results increased for funds in this time period, which is somewhat counterintuitive. 1984-2019 is a long time period; why are the poorer performing funds in the database still in existence? While the authors noted a large attrition rate in the 4th quartile, there were still sufficient firms in the quartile with results from prior funds to be able to draw these conclusions. The data suggests the most predictive information for the investor to know is which firms to avoid.

When Harris et. al. examined the predictive indication of quartile rankings looking at the available information at the time of the LP's investment, they found vastly different results. There was some persistence for the pre-2001 funds in that they found 37% of the top quartile in those vintage years produced top quartile results in the subsequent fund. For the post-2000 funds the persistence fell to 24% and they concluded ***"performance persistence based on fund quartiles disappears."***[43] Their conclusion was that ***"The conventional wisdom [for PE], therefore, does not appear to hold for buyout funds"*** [44] when looking at the available information at the time of the fund raise. ***"There is still no evidence of reliable outperformance by the top previous performers."*** [45] They also found **first time funds were just as likely to be in the top quartile as more seasoned investors contradicting the conventional wisdom of avoiding them until the firm has proven itself**.

These conclusions held regardless of which performance metric (IRR, MOIC, PMEs or regression analyses) was used. They found using PMEs as a metric was slightly more predictive than using quartile rankings.

The most recent 2023 study by Pitchbook confirms these conclusions. They analyzed multiple asset classes (PE, VC, Real Estate and Fund of Funds). They found **"At a high level we found no to weak performance persistence across asset classes…...Persistence was nonexistent for PE and fund of funds".**[46]

Using their updated database, Preqin found comparable results in using quartile rankings of the 1st through 4th quartiles at December 31, 2021.[47] Preqin used similar analytic methodologies as Harris et. al. They also bifurcated the results pre and post the GFC and also examined the results utilizing the information investors would have at the time of the GP fundraising. In their analysis they found that North American focused funds persistence declined post the GFC. Only 23% of top quartile firms in their database were in the top quartile in their next fund. Only 46% of the top quartile firms were subsequently above the median.[48]

Preqin concluded, **"[Results] show that relying on past performance would not necessarily increase the odds of a top quartile rank in the future for North America-focused funds".** [49] They found similar results in Europe. Preqin also found similar results concerning the bottom quartile funds as Harris et. al. and Chun papers.

Preqin stated, "These findings tell us that conventional investment wisdom has not always led to expected outcomes. ..…The fact that performance persistence is neat and intuitively sensible means that any research that conflicts with this conventional wisdom is usually met with skepticism."[50]

We examined the Preqin database of the "Flagship Funds" of the firms within the Preqin database from 2008 through 2018 vintage years. We excluded the non-Flagship funds of the firms, or their ancillary products. In the Harris et. al. updated study, they found that the GP core funds performed better than their later *"**secondary style funds …launched later**."*[51] We excluded funds from 2019 through 2022 as they were still in their investment phases. The time period was selected due to the industry structural transformation as shown in **Figures 3** through 6 in the preceding section. We also segregated the returns associated with the largest 20 mega firms of portfolios over $1 Billion and those associated with 20 largest funds under $1 Billion.[52]

Again, we focused on the so-called "Flagship Funds" of PE firms, not their ancillary products. The results are illustrated in Panels A through V in **Exhibit 2**. These exhibits contain the raw data and identify the 954 funds and 444 firms in each quartile by vintage year measured by both IRR and MOIC.

Through 2021 the capital fund raising process had condensed to less than two years and less than a year in some instances, as shown in **Figure 4**. So, over the past decade one would expect each GP would have approximately three or four funds. Consequently, no firm could be in the top quartile in each vintage year, but one can draw conclusions as to how their more recent three funds performed in a rising market context.

Figures 22 and **23** depict the performance results of the top 20 firms in terms of size for funds over and under $1 billion, respectively. These firms were selected as they have raised the most capital in their respective categories. As illustrated above, there is a significant concentration of capital among the very largest firms. **The question this raises is whether the money is flowing to the best firms?**

The results of all these studies illustrate there is little persistence of the large (funds over $1 Billion) firms being consistently in the top quartile with a few exceptions. It appears that those firms operating in the technology sector and KKR over the past 10 years exhibited greater persistent performance. See **Figure 24**.

Interesting is the fact that of the top 20 large firms in terms of Assets under Management (AUM), only six firms, or 30%, appeared in the top quartile more than once during the time period measured. Note that the top five firms, as **Figure 5** illustrates, raised 25% of all the buyout capital in the last five years. The top 20 firms have raised nearly 40% of the committed capital in the past 10 years. The top 20 quartile rankings of the 20 largest firms are depicted in **Figure 22**.

Of the top 5 capital raising firms shown in **Figure 6**, KKR, Thoma Bravo and Hellman & Friedman had funds in the top quartile more than once. Their capital allocations appear, with the benefit of hindsight, to be appropriate. Of the top 20 firms in terms of raising capital over the past 10 years, only 30%, or 6 firms, of the top quartile funds had top quartile performance more than once. Two of these six firms specialized in the technology sector over the past 10 years. Was their outperformance during this time period driven by sector selection, or market beta, or portfolio company selection and operational improvements? Given the material technology sector drawdown in 2022, it remains to be seen if Thoma Bravo, Silver Lake and Vista Equity Partners will continue to remain in the top quartile.

Note that some of the top 20 in raised AUM did not appear even once in the top quartile. Some appeared once in the top quartile but not in second quartile for their other flagship funds. Others, such as CVC, which recently announced the largest PE fund ever raised[53], has only one fund in the second quartile and three in the third quartiles. Carlyle has more funds in the third and fourth quartiles than in the first quartile.

Figure 22 Top 20 PE Fundraisers and Funds above $1bn, Preqin Quartile Performance, at December 31, 2021

Fund Manager Name	Funds raised last 10 years, $mm	number of years top quartile	number of years 2nd quartile	number of years 3rd quartile	number of years 4th quartile
Blackstone Inc	140,361	1	0	2	0
KKR & Co Inc	118,116	1	3	0	0
Thoma Bravo LP	76,792	3	1	1	0
CVC Capital Partners SICAV FIS SA	67,507	0	1	3	0
Carlyle Group Inc	64,068	1	1	3	4
Ares Management LLC	63,192	0	0	1	1
TPG Capital Management LP	61,932	0	2	1	0
Apollo Asset Management Inc	53,551	0	1	1	0
Hellman & Friedman LLC	51,300	2	0	0	0
EQT Partners AB	48,652	2	2	1	1
Advent International Corp	45,475	1	1	1	1
Silver Lake Partners LP	45,300	2	0	0	1
Vista Equity Partners Management	41,611	1	3	1	0
Permira Advisers LLP	32,975	1	1	0	0
Leonard Green & Partners LP	28,688	0	1	0	0
Clearlake Capital Group LP	28,376	0	0	0	0
Clayton Dubilier & Rice LLC	28,000	2	1	0	0
Apax Partners LLP	27,517	2	0	1	0
Cinven Group Ltd	25,885	0	0	0	0
Oaktree Capital Management LP	24,527	1	0	1	0
Total Top 20	**1,073,822**				
Total worldwide	**2,776,256**				

Source: Created by authors using data from Refinitiv and Preqin.

Figure 23 Top 20 PE mid-market fundraisers and Funds below $1 Billion Preqin Quartile Performance, as of December 31, 2021

Fund Manager Name	funds raised last 10 years, $mm	number of years top quartile	number of years 2nd quartile	number of years 3rd quartile	number of years 4th quartile
Alpha Group	999	0	0	1	0
ICV Partners LLC	985	0	0	0	1
Warren Equity Partners LLC	983	0	0	0	0
Dignari Capital Partners HK Ltd	977	0	0	0	0
Lee Equity Partners LLC	970	0	1	1	0
Nonantum Capital Partners LLC	960	0	0	0	0
ECM Equity Capital Management C	958	0	0	0	1
Great Point Partners LLC	953	0	1	0	1
Crossharbor Capital Partners LLC	937	0	0	0	0
Diversis Capital LLC	930	0	0	0	0
Longreach Group Inc	925	0	0	0	0
Trinity Hunt Partners GP LLC	923	1	1	0	0
Birch Hill Equity Partners Managen	920	0	0	1	0
Fortissimo Captial Fund Israel LP	915	1	2	0	0
King Street Capital Management LF	911	0	0	0	0
Abris Capital Partners Sp z o o	896	0	0	0	0
Martis Capital Management LLC	895	0	0	0	0
Banc Funds Company LLC	893	0	0	0	0
Halifax Group LLC	893	0	0	1	0
ProA Capital de Inversiones SGEIC	892	0	2	1	0
Total Top 20	**18,715**				
Total worldwide	**2,776,256**				

Source: Created by authors using data from Refinitiv and Preqin.

With regards to the next category of firms and funds, in the under $1 Billion sized funds, the data for the 20 top fundraisers with funds below $1 Billion, shown in **Figure 23**, appears worse than for the largest firms in that they are even more inconsistent. **Figure 23** illustrates a few key observations. Only two firms (10%) in this category had one fund in the top quartile with a subsequent fund in the second quartile.

In this segment, there are many more funds than the mega funds (665 mega-funds versus 2008 mid-market funds or 293 mega-fund GPs and 1,191 mid-market GPs, according to Refinitiv database). This segment of the market is also far less concentrated than the mega fund category. The top 20 mid-market firms (with less than $1 billion capital raised cumulatively during the last 10 years) represent only 0.6% of the total capital raised in the buyout space ($18.7bn of total $2.78 Trillion).

Why is the question of concentration important? Capital should flow to those firms that have exhibited performance persistence over time. Of the top five firms that have raised 25% of the recent capital allocations, three had more consistent performance based upon the reported data. This suggests capital to these firms had been allocated rationally. Query whether this conclusion will hold after the technology sector inevitable write-downs.

Overall, the largest 20 fundraisers in the mega category had inconsistent results. Only 30% had more than one fund in the top quartile. Stated differently, 70% of the mega funds were not in the top quartile more than once. Only 9 of the 20 had more than two funds in the top two quartiles or 45%. This is hardly overwhelming evidence of persistence. This group of GPs raised

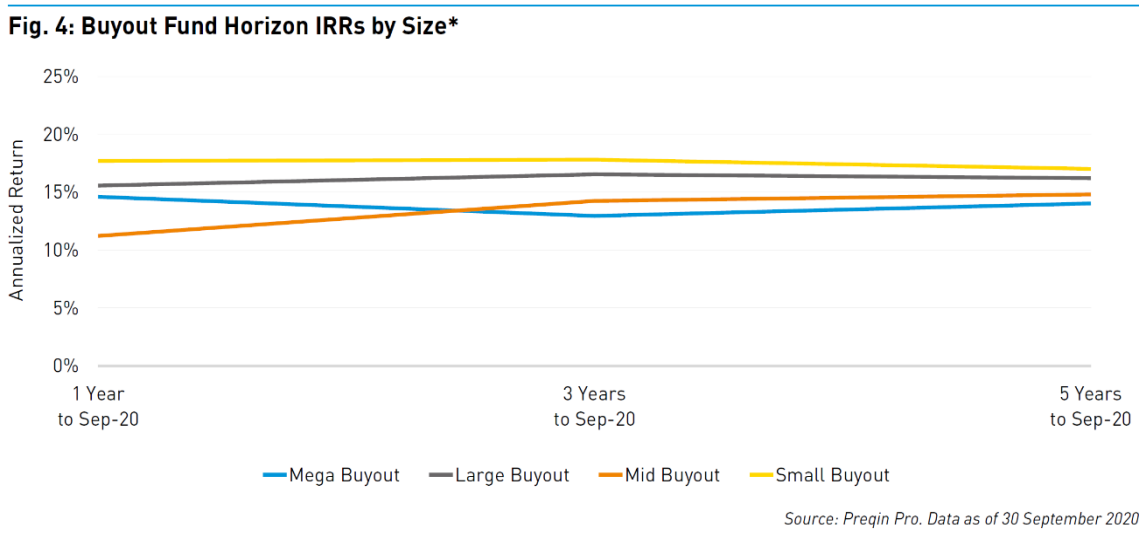
39% of the capital over the past 10 years. Investors appear to be chasing past returns with those firms in the mega fund category.

In the second category of funds under $1 Billion, only 10% of the top 20 fund raisers had even one fund in the top quartile. Fortississimo Capital and Trinity Hunt Partners had funds in both the top and second quartiles. **Figures 22** and **23** and the concentration figures suggest that capital may not have flowed to the correct firms.

Further, in terms of performance, capital appears to be flowing to the wrong subsector of PE. Small buyout funds consistently outperformed large cap buyout funds over the recent time period as **Figure 24** illustrates. It appears that the capital flows were inconsistent with the objective of obtaining the highest nominal returns. While the smaller funds as a group outperformed, the question becomes can one select the individual firms that will be in the top quartile in this subsector?

This analysis also raises the question of whether the same firms will remain in each of the respective categories. It has been documented that the more successful funds subsequently raise increasingly larger funds, discussed below, which tend to underperform the prior fund. A more successful investment strategy should focus on smaller buyout firms and those who have remained in this subsector. It also reaffirms the Kaplan conclusion that first time funds should be considered as they tend to raise smaller buyout funds and have as much of a probability of success as their larger counterparts. LPs may also have greater leverage in negotiating terms with first time funds further enhancing the probability of receiving higher returns.

Figure 24 Buyout Fund Horizon IRRs by Size (on a net-to-LP basis)



Source: "Private Capital Performance Update: Q3 2020," p.3, Figure 4, 30 September 2020, https://docs.preqin.com/reports/Preqin-Private-Capital-Performance-Update-Q3-2020.pdf, accessed November 2023.

In their paper on private equity performance, Kaplan and Schoar analyzed the relationship between past performance and the flow of capital into subsequent funds.[54] They found that capital flows into PE are positively and significantly related to past performance and that during boom times, capital flows disproportionately to funds with lower performance instead of flowing to the best GPs.[55] In other words, the better the GP did in a prior fund, the more the GP can subsequently raise. The conclusion academia generally reached was that size does matter. Having significantly more capital to invest was negatively correlated to performance from an early fund to a later fund.[56] This concept became an industry accepted thesis.

The researchers offered two suggestions as to why the best performing funds might prefer staying smaller: (i) it is possible that the number of good deals in the economy is limited at each point in time; and (ii) better funds might face constraints, if GP human capital is not easily scalable, and new, qualified individual GPs are scarce.[57] In another paper, Brown, Fei and Robinson (Brown *et al*), were able to analyze performance at the transaction level using the Burgiss database. They found that larger transactions had lower returns, but exhibited less volatility, than smaller transactions.[58]

This PE behavior contrasts with the VC industry. The most successful VCs in terms of performance have not attempted to raise the largest possible sequential funds, with some notable exceptions. While they have increased their fund size, they have limited access to new LPs. Indeed, the most successful VCs in Silicon Valley have closed their funds to new investors. Scarcity of capital does impose a measure of investment discipline. Perhaps this investment discipline coupled with operating in a smaller, more inefficient market segment accounts for VC return persistence.

However, the conclusion that raising increasingly larger funds is deleterious for later performance due to the increased size of the subsequent fund has been challenged in a recent peer reviewed paper by Andrea Rossi.[59] He, like others, did find a ***"negative and significant relationship between fund growth and fund performance"***.[60] Rossi notes that many investors have been disappointed when they invest in a top quartile fund only to experience poorer performance in subsequent funds. The industry has attributed this trend to the subsequent increase in fund size. Rossi, however, hypothesized a different reason for the decline not related to fund growth. "I show that a substantial portion of the spread [decline in return from one fund to the next] in realized returns between funds whose follow-ons grow the most and funds whose follow-ons grow the least is attributable to noise or, in other words, luck."[61]

This suggests that the higher returns of the preceding fund were possibly more attributable to "luck" rather than skill. So, the subsequent, larger fund would be based on "luck" not superior investment acumen. Thus, he concludes that since there is no reason why "luck" will necessarily continue, the follow on funds will likely revert to the industry mean or have poorer returns than the prior fund. This is a potentially damming conclusion.

Most of the investor "disappointment" in his words is ***"due to luck in past winners reverting to zero rather than to the effects of fund growth"***. In short, firms raising successively larger funds based on their past performance, and whether this will negatively impact future performance, is not the right question. The better question is whether the prior fund generated superior results as a consequence of luck versus skill. This conclusion parallels the public equity

markets in which public equity money managers have had[62] significant difficulty outperforming their relevant indices.

Rossi's analysis suggests poorer subsequent performance due to its larger size is a classic example of correlation not causation result.

Brown *et al* reached similar conclusions when they performed an attribution analysis at the transaction level. They found that only 4% of the results were attributable to the GP's skill and over 90% of the results were attributable to "luck". They found more of an impact from the GP's portfolio construction.

The illustration of the recent success of the technology orientated funds being in the top quartile more consistently in the past 10 years may be consistent with Rossi's analysis. Sector selection by the GP may have had as much of an impact on their results as their ability to select individual companies. Brown *et al* found that more specialized funds in terms of sector and geographies had better performance than the more diversified portfolios. The conclusion one might draw from this analysis is that investors would be better served by focusing on sector selection first based on then existing market opportunities, and then finding the best specialists in that sector, as opposed to chasing returns of the past successful investment strategies.

Given the more recent performance (from 2008 to 2018) of PE firms, the assumption that analyzing past performance at the time of the investment decision will be predictive of future results is tenuous based on academic studies and the Preqin data when examining performance of the larger firms in both the mega fund and smaller fund subsectors. Investors have not consistently selected the top quartile firms based on to whom the capital has been allocated. The ramifications of this conclusion are discussed below. Capital has flowed to firms based more on early performance (in the 1980s and 1990s) or the "brand" name of the firm versus more recent performance over the past decade. Investor intransigence in terms of continuing commitments to firms not generating top quartile performance is discussed below.

B. Impact of Capital Flows

Notwithstanding Rossi's controversial conclusions, suggesting that "luck" not scale accounts for declining performance, there have been additional academic studies on the impact of capital flows on investment performance in the public markets[63]. In their research on the mutual funds industry, Berk and Green addressed the question why financial intermediaries are so highly rewarded despite the seeming uncertainty about whether their activities add value. Their econometric model confirmed the idea that active management did not outperform passive benchmarks, and the explanation they offered was based on the idea that **"*investors competitively supply funds to managers and there are decreasing returns for managers in deploying their superior ability; managers increase the size of their funds, and their own compensation, to the point at which at which expected returns to investors are competitive going forward*[64]"**. In plain words, excess capital flows to a firm decreases their performance as they scale having a negative impact on their future performance.

The example of Fidelity's Flagship Magellan Fund provides an interesting example of performance declines due to growth. The Magellan Fund was initially run by Peter Lynch, one of the paragons of the mutual fund industry. It became a victim of its own success. The fund had extraordinary success when the portfolio size was quite small. The fund was initially only

available to Fidelity principals from 1963 until 1981 when it opened to the public. Based on its spectacular track record, Lynch's portfolio grew from $20 million to $52 Billion. Under Lynch's guidance the Magellan Fund became one of the most successful actively managed mutual funds, usually outperforming its benchmark.

Lynch retired in 1990 and the Magellan Fund had a series of subsequent portfolio managers. However, Fidelity continued to grow Magellan's AUM and the outperformance declined with the fund lagging the S&P. Its performance declined to the point that the Magellan Fund was closed to new investors in 1997 due to the belief it had become too large to outperform. Indeed, the Magellan Fund largely underperformed the S&P for the 20 year period from 2000 through 2020. It was not reopened until 2008. The fund shrank in size from ~$100 billion in 2000 to $23.6 billion in July 2022 (including a major capital distribution while the fund was closed). The performance of the smaller portfolio of late has improved. Notwithstanding the downsizing, the Magellan Fund performance relative to the S&P was 13.05% vs 13.08% over the past trailing 10 years at August 31, 2022.[65] In short, its returns were essentially comparable to the public benchmark.

Figure 20 above indicates that PE entry multiples increased over time overlapping the increase in capital flows into PE as well as the increase in multiples of public PMEs. The industry has raised unprecedented amounts of capital in recent years which does not augur well for the future performance generally for the PE industry.

The preponderance of PE capital has been concentrated with a comparatively small number of firms with inconsistent performance. Perhaps these PE funds are beginning to mirror the issues associated with Magellan's portfolio managers at Fidelity and the other large mutual funds as illustrated in **Figure 25** below. One can legitimately ask whether the mega fund GP sponsors have gotten too large and whether the market in which they operate has become too efficient. Should the focus instead be on smaller funds that as a category have performed better and to which less capital has flowed? They are closer in size to some of the successful VC firms who have demonstrated more persistent performance.

The PE industry may be ripe for disruption. The evolution of other financial services companies who have faced disruptive forces may provide some insights as to the challenges the PE industry may face. The mutual fund industry and its trends over the past 15 years are especially relevant.

Section 4: Disruptive Potentials for PE

A. Mutual Fund Trends

Why do mutual funds have any bearing on the PE industry? There are several reasons. Structurally, the large PE GPs have essentially become mutual funds focusing on the private markets as opposed to the public markets. Like the large mutual fund managers, large PF firms have a "smorgasbord" of investment products ranging from their original flagship funds to numerous specialized products in a variety of asset classes. They have become "one stop" shopping platforms for private investing. As an example, Blackstone offers their flagship PE fund, Real Estate, Credit, Tactical Opportunities, Infrastructure, Hedge Funds, Secondaries, Life Sciences, Growth Equity, and registered products for retail investors.[66] The evolution of the mutual fund industry could provide guidance as to what may happen to the PE industry. Large

public mutual funds companies essentially have the same multi-product structure. Rarely has any mutual fund become the industry leader in each sector in which they had an investment strategy raising the question of whether one stop shopping works.

There have been multiple academic papers beginning with Eugene Fama documenting the difficulty active managers have in consistently outperforming their respective benchmarks.[67] The Efficient Market Hypothesis (EMH) coined by Fama in the 1960-1970s states that public markets are efficient, if current publicly traded security prices reflect all relevant information including past market data (such as stock prices and trading volume) as well as all publicly available and private information[68]. Therefore, if EMH holds, few active equity investors consistently "beat" the market, i.e., generate excess returns above their benchmark with a commensurate level of market risk over the long term.

The very term "random walk" in security selection suggested that ***"a blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts."***[69] In other words, investment manager results may be as much a function of luck versus skill. This conclusion results from stock price movements that are unpredictable and public markets that are too efficient, as well as the costs of trading. These conclusions are consistent with Rossi's about PE mentioned before.

EMH is a convenient theoretical framework that helps analyze how useful different investment toolkits could be under different market circumstances when trying to outperform a passive management approach. These toolkits include technical analysis, fundamental analysis, portfolio management techniques, and identifying various market anomalies.

These are the same acquisition tools used in PE. Historically, the argument has been that the private markets are inefficient so that market anomalies can be identified and exploited. The GP might try to achieve excess returns by gaining a competitive edge in analyzing various forms of information that can be costly or not readily available to other market participants. Such an approach requires extensive use of fundamental analysis that encompasses assessing the intrinsic value of assets using different valuation tools, using accounting data, incorporating management forecasts, and analyzing various macroeconomic assumptions. In short, if the PE firm is acquiring a private company, they can trade on inside information with management's cooperation. If the target is a public company, the PE firm must sign "stand off" agreements in which they cannot trade the company's securities in exchange for receiving inside information utilized to acquire the company.

The primary difference between the public and private market money managers is in the management of their portfolio companies post-acquisition. PE GPs typically take control over their portfolio companies and exert considerable influence over the company's strategy, and management's execution of that strategy, which public money managers do not do. One might ask how effective PE GPs have been in adding value via operational improvements based on the discussion above.

The markets in which PE GPs operate have changed so radically over the past decade that previous assumptions regarding their inefficiencies are subject to question. Information concerning potential acquisition targets is far more readily available. Couple this fact with the increased competition for transactions, the ability to exploit private market inefficiencies may be declining particularly at the larger cap size of the market. The ability for large cap PE GPs to

consistently outperform the average PE market performance may mirror the results of public active equity managers who historically do not consistently outperform their benchmarks net of fees. Fama's conclusions may now bear on large cap PE firms.

Historical data on the mutual fund industry showcases that the largest actively managed mutual funds have trailed the S&P and have not outperformed the index as **Figure 25** illustrates. The largest flagship mutual funds have outperformed the S&P Index only episodically.

Figure 25 Performance of Largest Actively Managed Mutual Funds vs. S&P 500

Source: Bloomberg, accessed November 2023.

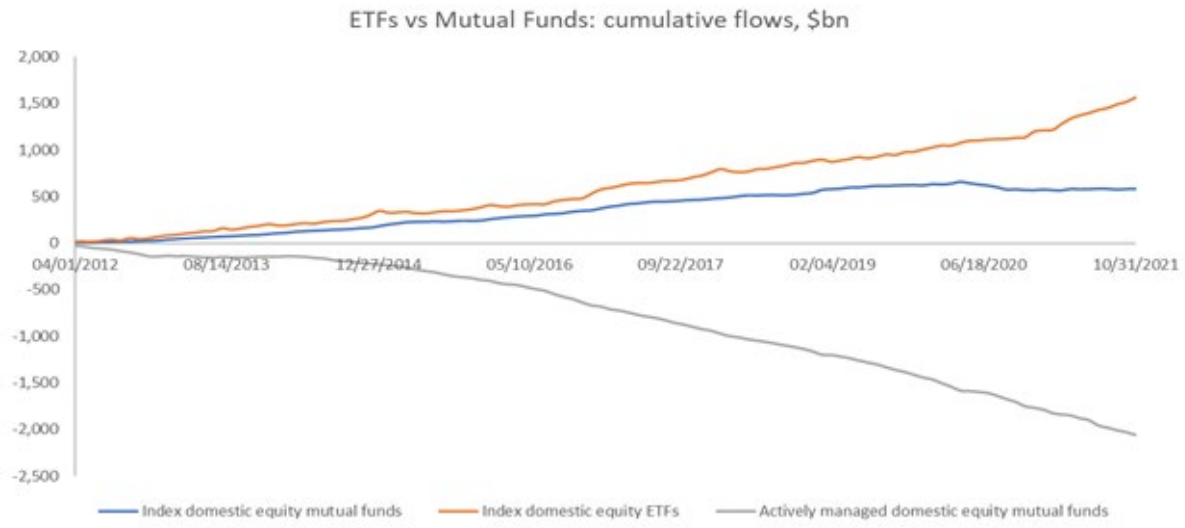
Note: S&P is shown in white, Fidelity Magellan Fund in blue, Vanguard Prime Cap Fund in red, and American Funds Core Fund Class A in purple.

It took decades for the public market to realize and to accept this information. In recent years the investment community has begun to vote with their money and shift into passive products as illustrated in **Figures 26** and **27**.[70]

Figure 26 Net New Cash Flow of Mutual Funds in the US from 2000 to 2020, by Fund Management Type (in billion US dollars)

Source: "Net new cash flow of mutual funds in the United States from 2000 to 2022, by fund management type," Statista, May 2023, https://www.statista.com/statistics/1263876/active-passive-mutual-funds-net-new-cash-flow-usa/, accessed November 2023.

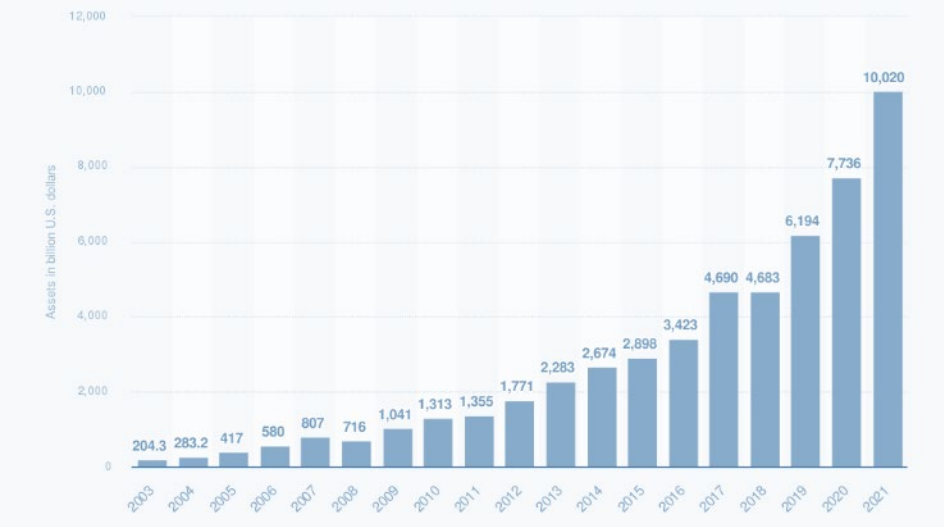
Figure 27 ETFs vs. Mutual Funds: cumulative flows, $bn



Source: Adapted by authors, from "2022 Investment Company Fact Book," Fig. 3.16, p. 62. Investment Company Institute, 2022, https://www.ici.org/system/files/2022-05/2022_factbook.pdf, accessed November 2023.

The mutual fund industry has become materially disrupted over the past 10 years because of active equity managers' difficulty in achieving and sustaining alpha. Other products offering passive replicating alternatives in the form of Index Funds and ETFs were developed. These products offer near benchmark returns at a fraction of the cost of active management. **Figure 28** illustrates the growth of the passive ETF investment strategies.

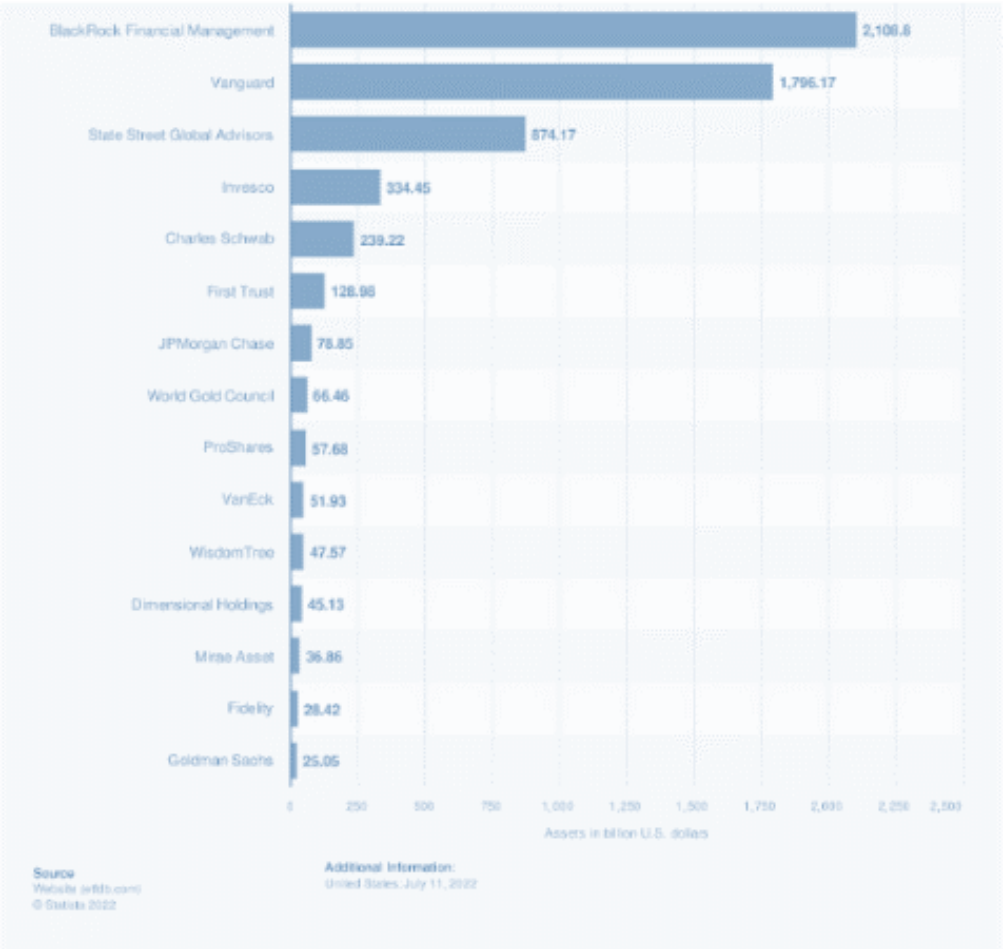
Figure 28 Development of Assets of Global ETFs from 2003 to 2021 (in billion US dollars)



Source: "Development of assets of global exchange traded funds (ETFs) from 2003 to 2022," Statista, February 2023, https://www.statista.com/statistics/224579/worldwide-etf-assets-under-management-since-1997/, accessed November 2023.

Mutual fund companies reacted by adapting and offering both active and passive management services: actively managed vehicles have historically considerably exceeded passively managed vehicles although passive management has recently demonstrated substantial growth. In 2018, passively managed assets comprised a fifth of global AUM with the top three managers (iShares, Vanguard, and State Street) accounting for 70% of the passively managed industry assets. According to the CFA Institute, there are two main catalysts for passive management development: first, more clients are attracted by lower fees compared to those in actively managed products; and second, greater challenges in generating alpha by active managers.

Figure 29 Largest ETF providers in the US, by AUM, as of July 2022



Source: "Largest providers of ETFs in the United States as of September 2023, by assets under management," Statista, September 2023, https://www-statista-com.ezp-prod1.hul.harvard.edu/statistics/269928/assets-under-management-of-the-largest-etf-providers-in-the-us/, accessed November 2023.

Figure 30 Largest ETF Providers Globally, by AUM

ETP Provider	Assets (US$ billions)	Market Share (%)
iShares	1,583	37
Vanguard	803	19
State Street Global Advisors	596	14
PowerShares	132	3
Nomura	100	2

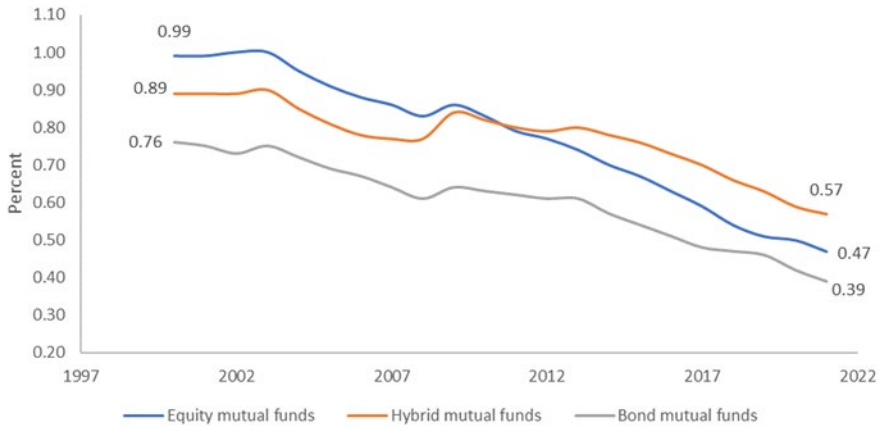
Source: ETFGI.

Source: "The Asset Management Industry," Fixed Income, Derivatives, Alternative Investments, Portfolio Management, vol. 5, CFA Institute, 2022, p. 522.

This concentration of assets mirrors what has happened in the PE industry notwithstanding the performance of some of the larger PE firms. Smaller PE firms will struggle to raise capital relative to the "brand" name firms, as has happened in the past few years comparable to what happened in the mutual fund industry. Capital has been disproportionally allocated to the larger PE firms at the expense of the smaller PE firms. So how are they likely to compete?

The public active equity managers' reaction to the potential disruption from ETFs and Index funds was clear. If you cannot compete on the basis of performance, the way to enhance performance is to reduce fees; in other words, compete on the basis of price. To stave off the capital outflows active equity managers began to offer their own passive products and began to compete on price by reducing their management fees on their active products. **Figure 31** below illustrates the expense ratios, of which the management fee is the largest component, trend for active public equity managers. In short it has been a race to the bottom. The mutual fund industry has become commoditized. So will the PE industry. Only the most consistent active equity managers have not yet sought to compete based on price.

Figure 31 Expense Ratios Incurred by Mutual Fund Investors

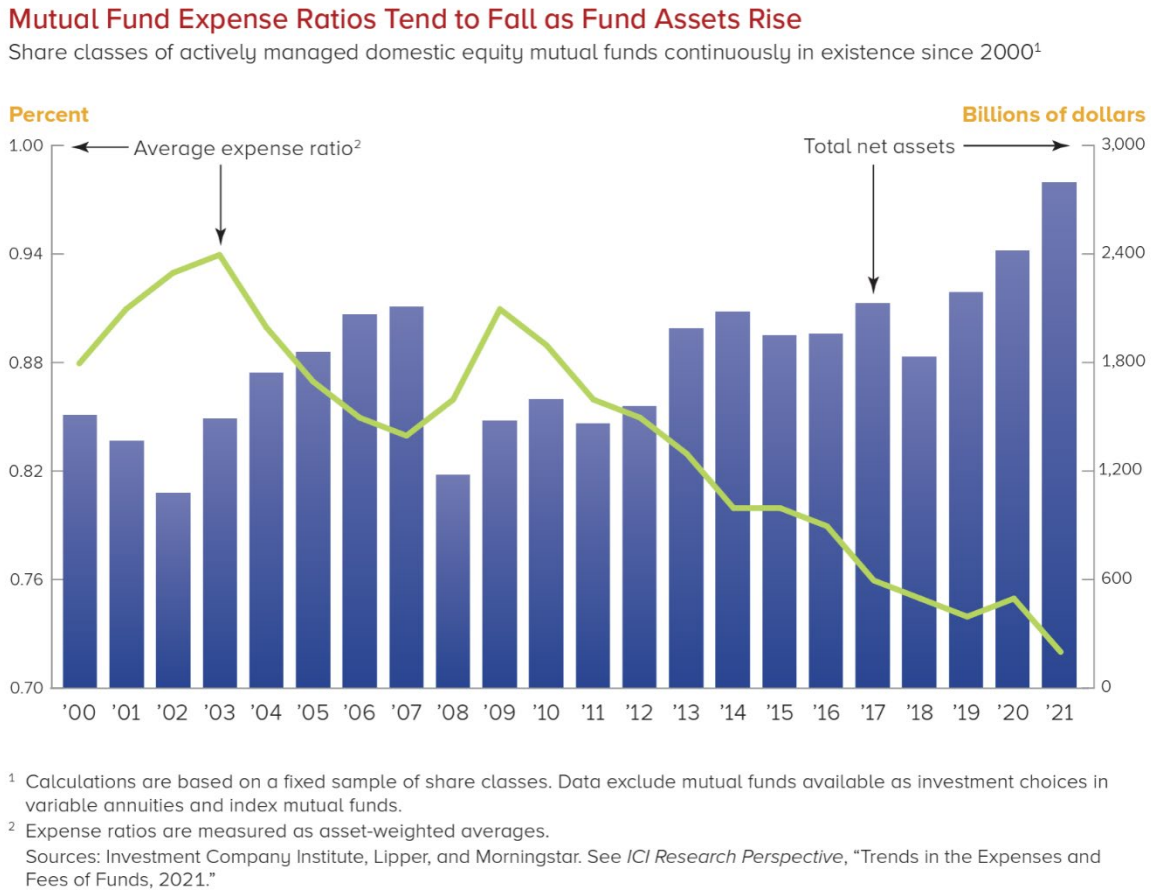


Source: Created by authors using data from "2022 Investment Company Fact Book," Fig. 6.1, p. 100, Investment Company Institute, 2022, https://www.ici.org/system/files/2022-05/2022_factbook.pdf, accessed November 2023.

Note: See ICI Research Perspective, "Trends in the Expenses and Fees of Funds, 2021."

Figure 32 illustrates that the expense ratios declined precipitously notwithstanding the fact that AUM grew. Since asset management fees are fixed as a percentage of AUM, one would have expected the line to parallel the growth of the industry. The decline illustrates the impact of the reduced fees associated with the competition from passive management.

Figure 32 Mutual Fund Expense Ratios



Source: "2022 Investment Company Fact Book," Fig. 6.2, p. 101, Investment Company Institute, 2022, https://www.ici.org/system/files/2022-05/2022_factbook.pdf, accessed November 2023.

Why did this structural change take so long given the fact that Fama et. al. identified the issues about the lack of alpha in active management decades before? There are two primary reasons, the first of which is the lack of products until the late 1990s that were widely accepted. John Vogel of Vanguard is credited with establishing the first indexed mutual fund in 1976, although it was not initially well received. He did not publish his classic Common Sense on Mutual Funds until 1999.[71]

The second reason why it took so long is attributable to human inertia and delays in modifying long held opinions. Although most researchers agree that public markets tend to be efficient, they have also identified various market anomalies (time-series, cross-sectional, and some others) that can be explained by various theories stemming from behavioral economics popularized by Kahneman and Tversky in the 1970-1980s.

Their ideas focus on understanding human beings' decision-making processes and the degree of their rationality. A key concept of behavioral economics is that people often deviate from

rational behavior, exhibit various cognitive errors and emotional biases (representativeness, herding, overconfidence, naïve diversification, etc.), and tend not to use all available information when making decisions. In the investment arena, they often resort to herd thinking and buy into bubbles and sell into crises.[72]

Kahneman's in his *tour de force* Thinking Fast and Slow,[73] showed a group of active investment managers that they had not produced any consistent alpha over time and even when confronted with the data, they could not believe it, nor more importantly, incorporate it. In short, the inertia associated with holding a strongly held belief makes it exceedingly difficult to change that belief.

Kahneman showed the firm that they were rewarding luck not skill and that:

> "The illusion of skill is not only an individual aberration; it is deeply engrained in the culture of the industry. Facts that challenge such basic assumptions – and thereby threaten people's livelihood and self-esteem -are simply not absorbed….the illusions of validity and skill are supported by a powerful professional culture. ….Given the professional culture of the financial community, it is not surprising that large numbers of individuals in that world believe themselves to be among the chosen few who can do what they believe others cannot."[74]

This quote could have been written about the PE industry.

In sum, the PE data suggest that (i) traditional methods of evaluating a given GP partnership are questionable; (ii) evaluating performance persistence post 2008 may be subject to doubt at the time the investment is made; (iii) selecting a given GP in the hopes of obtaining top quartile results may be a random walk; (iv) investment performance may possibly be as much attributable to luck rather than skill; (v) the recent median PE investments do not outperform PMEs and one is just as likely to select a median GP as a top quartile GP; and (vi) PE performance may actually underperform PMEs on a risk adjusted basis given the amount of leverage they employ generating equivalent results on a nominal basis.

The conclusions, should they become widely accepted, have the potential to materially disrupt the PE industry in terms of how capital is allocated. However, given the entrenched interests not only of the PE firms and those firms who support them in maintaining the status quo it may take years for these conclusions to be accepted by LPs and will most certainly be strongly resisted by the entrenched interests. Eventually, though, the data should prevail.

B. Other Disruptive Potentials for PE

There is no question that disruptive forces have radically changed the mutual fund industry that may be paralleled in PE. As it became apparent that active equity managers on average did not outperform their benchmarks on a sustained basis, investors sought alternative methods to invest on a more cost effective basis. What are potential disruptive forces in PE that could structurally change the industry?

These disruptive factors may include:

- PE firms converting from entrepreneurial incentives (carried interests) to asset gatherers (management fee orientated)
- Lower return expectations
- Increased competition from clients
- Alternative investment executions or products
- Industry consolidation and the hollowing out of the "middle"
- Structural changes to PE organizations
- Commodization of the PE industry

Need to Grow AUM and Change of Incentives

The dynamics of the PE industry have changed profoundly since the 1980's and 1990's. In the early years of the industry the GP's primary economic motivation was the carried interest they might earn. GPs then invested substantial amounts of their own capital alongside the LPs. Their collective interests were aligned.

The early successful market entrants are now large public companies. As public entities their primary motivation is to increase AUM and increase their base management fees. This is directly analogous to the mutual fund industry. The value of public PE firms is primarily driven by their AUM growth, and the derivative management fees that are easily quantifiable, as opposed to the value of carried interests that are generally viewed by the capital markets as non-recurring income. In short, public GPs have become asset gatherers and their incentive is to grow AUM as much as possible. While carried interests are still important there is a profound shift in the incentives of these GPs from the early days of the industry.

Indeed, the consequences of these incentives were identified 17 years ago by Howard Marks in one of his famous Memos, entitled "The New Paradigm". He stated,

"…**[Large] amounts of money are demanding access to the alternative markets… For this reason, investors may attach more importance to the ability to put large sums to work than to be able to attain historic returns and risk premiums, clear high due diligence hurdles, or structure fee arrangements that channel managers' energies for the benefit of clients.** (emphasis in the original)."[75] Marks identified the new paradigm as:

- **"First, raise a lot of money.**
- **Second try for a rate of return that clients will find acceptable.**
- **Third, don't take enough risk to possibly preclude an encore.**
- **Fourth, invest as prudently as possible, so that another fund can be raised while the markets are accommodating." (**emphasis in the original)[76]

Marks turned out to be prophetic. The trends he identified and the attitudes towards investors' attitudes towards risk and return have largely come to pass.

Their sheer current size requires these firms to continually invest as they keep raising capital or lose their commitments after the investment period. This business model takes away flexibility on the GP's part to put their "foot on the brake" when the market cycle hits a peak.

The recent behavior of GPs supports the conclusion of the shift to asset gathering. GPs have reduced the time period between fund raises shown in **Figure 4**. Indeed, it was announced in July 2022 that Blackstone intended to raise its next $30 Billion real estate opportunity fund this year even before its prior $30 Billion real estate opportunity fund, BREP X, had closed.[77] Blackstone announced it had passed the $1 Trillion mark in terms of AUM in its most recent earnings call.[78]

GPs have a new emphasis on the retail sector in an effort to tap into a new market, thereby augmenting their base fees. This trend results from the declining importance of defined benefit plans and the rise of defined contribution plans going forward. Again, this is to support the continued growth of their AUM. This investor category generally is less sophisticated than their institutional counterparts and more subject to marketing influences.

This business model shift incentivizes GPs to invest as quickly as possible so they can then raise the next fund to capture additional management fees. Most of the Limited Partnership agreements require the committed capital to be substantially committed (~70%) to investments before the next fund can be raised. **The fact that GPs are then continuously in the market forces them to become dollar cost averagers as opposed to opportunistic investors**. Dollar cost averagers generally do not exceed the market returns.

Additionally, to lock in fee streams, there is a new emphasis on creating long dated funds and engaging in secondary transactions in which the GP asks existing LPs to approve the transfer of all or a portion of an existing partnership into a new partnership for another 10 year term. According to PEI ***"…buying, holding and selling within five years is largely a thing of the past."***[79] GP attempts to raise capital to acquire or seek approval from LPs to rollover their commitments increased by 113% between 2020 and 2021.[80] Clearly, the intent on the part of the GPs is to lock in the management fees for a longer term as that is the primary driver of how the public markets value these companies.

Perhaps GPs see the clouds on the horizon for their future performance from the various factors identified above, which have also been identified in the press, including rising interest rates, and falling company entry multiples, as well as the fact that larger funds have underperformed prior funds.[81] Future performance issues may present challenges for future fundraising given the drawdown in the public capital markets in 2022. So, raising as much capital as possible today may protect them in the future.

The industry changes coupled with recent market changes have the potential to change GP incentives. At the inception of the industry the primary motivation of GPs was to maximize performance because the preponderance of their compensation was derived from the carried interest. Now, with multiple funds and new long-duration funds, the value of the management fee is as, if not more, valuable. These fees are "risk free" in that they are locked in for essentially 10 years. Given the importance of this category of fees the GP is highly motivated to ensure their continuity.

Does the shift to become asset gatherers matter? Incentive changes within GPs that they themselves have created may become a disruptive force as there is a potential for an impact on

future returns. It has been previously documented that increasing the size of subsequent funds has had a negative impact on performance. In the mutual fund industry as funds scaled, they had difficulty maintaining their alpha. **Scale was the enemy of returns.** Indeed, in 1997 Fidelity's flagship Magellan Fund closed to new investors due to the decline in performance as the fund had become too large. The shift to index funds was mirrored in the large public pension fund community when they realized that in aggregate their performance did not continually outperform a passive benchmark.

Further, the emphasis on increasing AUM, which is the same incentive for traditional mutual funds, may be at odds with PE firm's LPs in an actual partnership. From their perspective, the LPs want the highest possible returns and top quartile performance, not necessarily the returns associated with a dollar cost averaging approach. LPs are not interested in the GPs increasing their AUM, especially if it has the potential to negatively impact performance. They are not interested in the firm's stock price; they are interested in the performance of the fund in which they are invested. For LPs bigger isn't better; better is better. But when a material component of the firm's value is attributable to AUM, this incentive may be at odds with the LPs. Query whether the incentive today is to be just "good enough," as Marks suggested, to raise the next fund at a lower risk level as opposed to truly attempting to achieve the highest possible returns and assuming commensurate risks with those they historically took to maximize their carried interests.

The public shareholder interests are potentially at odds with the private LPs in that they are interested in the continued increase in AUM, which should help the stock price, as well as the potential to make distributions in the form of dividends. Managing these conflicts has the potential to disrupt the industry should the private LPs come to believe the conflicts are not being managed in their best interests.

C. PE Performance Attributes Changing

Historically, GPs promised their investors "2x and 20%" referenced above. Return expectations generally have declined in the past decade for PE. Investors today do not expect to receive a PE 20% return. Indeed, in **Exhibit 1** the asset allocation assumption for PE is 12%, which is materially lower. The recent net returns for the average global buyout funds approximated 12-13%.

As stated above, PE should generate excess returns against PMEs to compensate for the lack of liquidity and the higher leverage ratios. During the past decade the average pooled fund IRRs in the US, where the preponderance of capital has been invested, converged with the US public markets. Return expectations appear to be declining and the correlations with the PMEs may have increased making the case for PE less compelling. If this hypothesis is correct, then PE is beginning to behave more like the public markets suggesting certain segments of the private markets may have become more efficient. This appears to be particularly the case for the very large cap PE funds as the data above (concerning the median results) may be skewed by the market cap of these funds.

Intuitively this makes sense. The larger funds have moved into a larger market cap segment versus VC. The data suggests that the VC firms continue to have performance persistence perhaps in large part because they operate in a more inefficient market segment. The EMH

theory suggests that when the markets are efficient, active management strategies cannot consistently outperform passive holdings of a diversified market portfolio over time.

In the past decade the amount of market information in the private sector has increased dramatically. Research firms publish reams of data concerning the multiples of all companies in each sector. Larger PE firms have been investing larger transactions, in part because of the larger amount of capital they must deploy, and that sector of the market is far more transparent than VC and very small companies. Further, as mentioned earlier, many of these larger transactions are essentially auctions, because sellers have become more sophisticated, and buyers are subject to the "winner's curse" of paying the highest price. Fama's EMF conclusions may apply to PE, which would also support Rossi's conclusions.

Given the preponderance of capital raised and invested in the US, investors should closely monitor these trends. If the private markets have profoundly changed by becoming so large and more efficient thereby changing the fundamental assumptions driving the asset allocation models, this fact could disrupt the PE industry.

D. Potential Disruptions from Alternative Methods of Investing

When investors received 20% returns, they were somewhat indifferent to PE fund costs. When the median net returns are in the 12-13% range, the returns and costs associated with PE investments come into focus more clearly.

As returns come down and if alpha declines, the dilution associated with costs, primarily management fees and carried interests, becomes an investor concern. The simplest way to increase returns is to reduce fees. **Figures 31** and **32** illustrate what happened in the mutual fund industry. Investors gravitated towards lower cost alternatives. A number of PE investors now seek to replicate PE returns on a more cost effective basis.

It has been documented that the costs of investing in PE are considerable. It has been estimated that the return dilution from gross to net returns at a 20% return level is 600-700 basis points, suggesting net returns are then in the 13%-14% range.[82] These numbers do not include the costs of internal management and external hired consultants to monitor their investments. In fact, net returns for PE reported by numerous sources suggest that average net global returns are in the 10% range as shown in **Figure 16** above.

Should PE returns converge with the public markets over a longer time period, and if the other predicate assumptions concerning the rationale for investing in PE diminish, investors will seek alternatives as they did in the mutual fund industry. The primary pressure will be on PE fees.

Many large institutions have attempted to reduce PE costs by investing directly. Initially, they attempted to maximize the amount of their co-investments in which they would invest in an individual transaction alongside the PE fund. These investments were typically made on a no-fee, no carry basis. Such investments allowed the LP to reduce the overall PE investment costs by averaging down the aggregate fees they paid thereby increasing their net returns.

Why would GPs do this as they lose the associated fees with the co-investments? There are two primary reasons. First, if the GP wanted to acquire a particularly large transaction, it allowed the GP to avoid undue concentration in their fund. Second, GPs are acutely aware that investors

are very fee sensitive. This practice allows them to curry favor with the largest GPs by offering, in essence, a fee cut without having to advertise that fact to their smaller clients. This practice has historically been largely nontransparent, prompting the Securities and Exchange Commission to require GPs to disclose to all their LPs what these arrangements are on a going forward basis.

Many large LPs have gone beyond co-investments to reduce their costs. The fact that PE is so expensive has caused several large investors, such as the Canadian pension funds, Singapore's GIC and Temasek, to create their own internal PE teams on the theory that with a 600 basis point spread, they could invest themselves more effectively than investing in a PE fund managed by an external GP. They now have large internal investment teams.

Many large family offices are following suit. The rise of family offices has been an important development in the last decade. Many are consolidating and creating their own internal investment teams including individuals capable of making direct PE investments. UBS, one of the largest wealth managers in the world, surveyed 221 of the world's largest single family offices representing $493 Billion in assets about their investment activities.[83] They found these firms had increased their allocation to PE by 5% to 21% from 2019 to 2021 of their total portfolios. Forty-two percent were investing in both funds and directly. However, 21% were only investing directly and this percentage is anticipated to rise significantly. The rationale is how bad do they have to be, if they have a 600 basis point margin for error? In short, former PE LP clients, both large sovereigns and family offices, have become competitors and could materially disrupt the industry.

As potential competitors these organizations have a significant advantage over traditional PE firms in that their cost of capital is materially lower. These direct investors can target 17% gross returns and still be better off on a net basis than investing in a PE fund in which the net return would be 14% should the PE firm produce a 20% gross return. This 300 basis point delta theoretically allows the family offices and large institutional investors to be able to pay more than the PE firm and still achieve a better net return, due to their lower cost of capital. It remains to be seen whether companies will prefer to align themselves with this new category of investors as opposed to the traditional PE firms, again potentially disrupting the PE industry.

A few other alternatives are beginning to percolate in the investment community. There have been recent articles about the attempts to "democratize PE". For example, Hamilton Lane offers a product in which retail investors can invest.[84] These products are both for accredited investors and small investors who can invest in tokenized amounts as small as $10,000. Others, mentioned above, are similarly exploring other products at a reduced entry ticket to offer to the public. But to be clear, these are not "disruptive" products. These are fund of funds, and the retail investor will bear the higher costs due to higher distribution costs and consequently even lower returns relative to the institutional market.

The truly disruptive products are taking different forms. Some companies are executing with leveraged PMEs[85], others using Equity Index Option products[86]. The major issue with some of these products is the fact they have proposed to use REPO financing as their leverage source. In the 2022 drawdown of the public markets and the corresponding interest rate increases, the inevitable margin calls would have been difficult for a firm to cover unless the LPs were amenable to adding additional capital to the program to cover them. However, there should eventually be a practical solution to leveraging PMEs that product sponsors could arrange with the expanding private credit lender market. GPs should be able to duration match their debt

secured by the portfolio companies in which they invest. Others are using hedged leverage positions to structure their portfolios.[87] In the latter instance, the proposed fees are zero management fees and 15% over a designated benchmark.

Alternatively, on-line platforms have been created in venture capital, such as AngelsList and Funders Club, and real estate, such as Cadre and Alteinvest. These platforms offer investors an opportunity to invest directly into specific companies or individual buildings. They are, for now, available to accredited investors and institutions to potentially democratize investments in these asset classes. They also offer these investment opportunities at a fraction of the cost of traditional venture capital and real estate.

Even Vanguard is rumored to be exploring a synthetic product in lieu of the more traditional fund of funds product it has with HarbourVest. Should Vanguard be able to create such a product, it could be highly disruptive to the PE industry. These products will be offered at a drastically reduced cost to conventional PE. Further, as the market contracts due to the denominator effect referenced above, and capital commitments concentrate with fewer firms, GPs will have to choose how to attract capital. The mutual fund industry response was to reduce fees dramatically.

E. Structural Industry Changes in other Financial Services Industries and Consolidation

Other financial service industries such as law, accounting, private wealth management, and even investment banking have already exhibited trends that are relevant to the PE industry. These industries have been profoundly affected by disruptive alternatives in their organizational structures. These changes have impacted their ability to attract and retain talent.

All these firms followed similar evolutionary tracks in terms of their corporate organizational structures. At their inception these firms originated as true partnerships. They had comparatively flat organizational structures with a few partners and a few associates beneath them. When the firm had up to 100 employees, the founders still knew all the individuals with whom they worked. Over time the successful firms grew substantially and became large corporations, not traditional partnerships, and operated as such with all the ensuant corporate bureaucracies. Their organizational structures evolved into a pyramid. At the top of the pyramid the C Suite management/Executive Committee controlled all aspects of the firm. Over the past 40 years small law and accounting firms grew and merged until there were comparatively few very large firms that evolved into global organizations. Smaller firms chose to remain more specialized boutiques, or general mid-sized regional firms, or merged with others to become larger firms. They had to determine how to compete. Smaller PE firms are likely to follow a similar transition.

The impact of the structural evolution of PE firms when compared to other financial service companies is a topic for another paper. The patterns are very similar and do not necessarily bode well for PE. If incoming talent views going to a large cap PE firm as the equivalent of signing on with an investment bank, which appears to be the case among many business school students, it may impact large PE firms' ability to attract and more importantly retain the best talent. This is a consequence of the "institutionalization" of the PE industry which emphasizes scale, fees, margins and efficiencies when compared to more boutique firms.

The very best talent may prefer to gravitate to other organizations or create their own companies as their means to wealth creation. How the PE firms have grown and how they are

now institutionally configured has the potential to be disruptive. Even one of the original founders of Terra Firma, Guy Hands, has questioned the "institutionalization" of the PE industry as potentially negatively affecting the future "dealmakers" to execute like those who were the industry pioneers.[88]

Conclusion

So, What Does All of the Above Mean for PE?

There are certain key assumptions investors made for investing in PE. If one queried any PE investor, 100% would state they only want to invest in top quartile funds.[89] They assumed that the top quartile funds would outperform the public market alternatives over time. They assumed that examining the PE firms' track records was a critical exercise to determine which firms would be in the top quartile going forward. The key assumption was that there was persistence in performance and past top quartile performance would predict future outperformance. Lastly, top quartile performance was attributed to the investment skills of the GP and their ability to add value to their portfolio companies.

These assumptions have been called into question by recent research. The PE data suggest that traditional methods of evaluating a given GP partnership are questionable. While it is technically true that the top quartile firms outperform the public markets over time as illustrated in **Figure 12** above, the fact is that the **top quartile firms** generating that performance **are not** necessarily the **same** firms over time. The academic research by Harris et.al. suggests that if one examines the track records of PE firms at the time the investor is making the investment decision, the performance information they have at that time is essentially irrelevant in selecting a future top quartile fund. **Harris et.al. conclusions suggest that the selection of any PE firm by any investor based on the information they have at the time of the commitment may be a random walk.** The data from multiple sources illustrates that performance persistence has waned materially post 2008.

All one needs to do is review panels A through V to see a lack of consistent performance across the board, with a few exceptions. Query whether sector selection or market beta is the primary driver of superior performance as much as portfolio company selection. So perhaps the requirement of all public offering documents to state ***"Past performance does not guarantee future results"*** should apply to PE.

If the selection of any PE firm based on past performance is a poor basis on which to make an investment decision to select any firm, at the time they make the investment, the investor should assume that the probability of top quartile performance is substantially less likely than the probability of average or median performance. Will this conclusion be acceptable to investors?

If picking a given GP is a random walk, how should LPs react? Pick smaller firms? Select first time funds and negotiate the pricing? Reject firms that continue to successively raise larger and larger funds? Larger funds perform less well, based on the data, than the prior funds regardless of whether this fact is due to the size of the subsequent fund or the "luck" of the GP in the prior fund. Rossi's conclusions, if further substantiated, could disrupt the conventional wisdom concerning the factors driving PE performance in the same way as Eugene Fama's

conclusions did concerning the value of active equity management in his pioneering work in the 1960's and 1979's.[90] More research is required to answer these questions.

If one assumes that the investor will more likely receive over time the average performance of all PE funds, then the comparison to public markets becomes important. In the US, as shown in **Figure 12**, the aggregated pooled PE funds IRR performance in the past decade has converged with the public market notwithstanding the higher leverage ratios of the PE firms relative to the PMEs. The comparison may be even worse if the data is not dollar weighted. PE performance may actually underperform PMEs on a risk adjusted basis given the amount of leverage they employ should they generate equivalent results on a nominal basis.

Are these conclusions surprising? The PE results may be attributable to several factors. One is the fact that the concentration of capital among the top 20 firms has caused them to shift towards larger transactions, which is a more efficient segment of the market when compared to the early years of the industry. Large PE firms must focus on larger transactions given the amount of capital they have to deploy. This results in an increasingly smaller number of target companies in which they can invest. Further exacerbating the efficiency of the market is the concentration of capital in the US market. Many of the larger transactions are held via auctions, not off market transactions. The markets in Europe and Asia have received comparatively less capital and may be more inefficient than the US market. Another factor may be that GPs in the private markets behave more akin to their brethren in the public markets where it has been well documented that it is difficult to outperform the market consistently. Lastly, the sheer number of new firms and products has made the US overall market far more competitive.

As referenced above, the smallest segment of the PE buyout market has been the better performer over the past five years. But the statistics suggest that even this market segment is quite competitive, and its results are even more inconsistent than those of the mega funds.

What do these factors mean generally for the PE industry? What conclusions can we reach based upon the performance since the GFC when the industry changed profoundly as well as the behavior of the larger firms? Examining the mutual fund industry and its trends over the past 15 years may provide insights for the PE industry's future. Some thoughts for industry participants:

- The PE industry is simply different since the GFC
    - The capital concentration among a small number of firms is profound; is this a good thing?
    - Query whether the firms with the best performance are attracting capital, meaning are investors are rewarding the "brand" and early performance, not the performance of the past 10 years? Are investors allocating capital looking primarily in the rear view mirror?
    - Does the one stop shop approach to investing with a firm lead to optimal results?
    - The largest buyout firms are now public which has incentivized them to be AUM gatherers as opposed return optimizers. There are also potential conflicts between the private LP interests and the interests of the public shareholders.

- The increase in long duration funds and secondary funds (rollovers from prior funds) supports the suggestion that PE firms are attempting to secure long term management fees based on AUM.
- The industry appears ripe for disruption.
- Students coming out of college and business schools may reevaluate their prospects within these firms. The path to wealth may be in creating their own firms versus securing a position within a large PE firm.

- Investors may have to fundamentally change their investment approach to achieve the best possible nominal results.
  - The assumption that past performance for large cap and smaller cap PE firms predicts future performance is tenuous.
  - The return assumptions for large cap PE firms should be revisited.
  - The correlation assumptions between and among PE, public equities and fixed income should be reexamined.
  - Investors should consider that past results may be a function as much of luck versus skill.
  - Investors should consider that their future results, should they continue to invest in the same manner, will lead to average or median results.
  - Investors should consider alternative, disruptive investment strategies to achieve comparable results given the high costs associated with PE investments.
  - Investors should recognize that large GPs, both public and private, are now motivated by increasing their AUM, not necessarily producing the highest nominal returns. This fact has led to a shortened time between fund raising. This fact forces GPs to invest their committed capital as soon as possible because they cannot raise the next fund until 70-75% of the prior fund's committed capital has been "committed". The pressure to invest as quickly as possible has caused the large funds to essentially become "dollar cost averagers" as opposed to being able to respond to market cycles on a more opportunistic basis.
  - More direct investments and/or investments in lower cost vehicles with similar investment objectives may produce superior returns given the cost differentials, if the expected net returns are in the 13% range.
  - Investors may conclude that investing in the private markets is just another tool in their in their portfolio construction "toolkit" and that they want exposure to a large segment of the capital markets. However, if that is the conclusion, benchmarking, monitoring, and return expectations should be rethought. If some excess return premium is required, the data suggest the only obvious mechanism to achieve it is to reduce investment costs.

- GPs may need to rethink their investment strategies given the relative underperformance to the public PMEs

- Strategies focused on larger cap companies may be operating in a market that has become too efficient.
- GPs may need to return to their origins to better ensure their interests are better aligned with their investors, meaning they have actual "skin in the game", not corporate balance sheet co-investments, and that their primary compensation is derived from carried interests.
- When the facts that actively equity managers generally produced no alpha over time became accepted in the mutual fund business, profound changes occurred. Will that happen in PE?

As stated at the outset, this paper is not an indictment of the PE industry. Investors should want exposure to the large number of private companies that have opted to grow in the private markets. It is a call for investors to question **how to invest in the future, not whether they should invest in the industry** to avoid "average" PE returns. Average returns are, in essence, a "C". Is that good enough? Indeed, the academic literature suggests that the superior PE performance of certain private investors, such as the Yale Endowment, has waned over time. [91] These historically superior investors have regressed to the mean as the market has grown and become more efficient.

In the face of achieving only persistently average returns, investors in the mutual fund industry opted for passive alternatives that were less expensive. In essence, the clear trend in the public mutual fund industry has been to price investment management services as a commodity. This is the "race to the bottom" in terms of pricing. Will PE firms follow suit and cut their fees to attract capital? If current market conditions persist that is likely to happen.

When will this happen? The inertia associated with the belief in the benefits of active equity management was sustained for decades even after research clearly called this belief into doubt. As Kahneman said, ***"Cognitive illusions can be more stubborn than visual illusions."***[92] The very same factors exist and will likely persist in the PE industry, as the GPs, LPs, and the entire derivative service providers to it have an extraordinary interest in maintaining the status quo, for a very long time notwithstanding the evidence to the contrary regarding the fundamental assumptions concerning whether and how to invest in PE.

In the mutual fund industry, in addition to the inertia associated with strongly held beliefs supporting the belief in active management was the undeniable influence of pervasive and persuasive marketing. These efforts by the mutual fund industry to perpetuate the belief in the value of active management strongly reinforced these beliefs. The same powerful factor exists in the PE industry. The personal relationships between the GPs and LPs are strongly sustained by some of the most effective marketing professionals in the entire financial industry. These products are often "sold" not "bought" possibly explaining why so many of the GPs in the 4th quartile still exist and raise capital.

These conclusions, should they become widely accepted, have the potential to materially disrupt the PE industry in terms of how capital is allocated. However, given the entrenched interests not only of the PE firms and those firms who support them in maintaining the status quo, it may take an inordinate amount of time for these conclusions to be accepted by LPs and

will most certainly be strongly resisted by the entrenched interests. Eventually, though, the data should prevail, and the inexorable conclusion will be that the industry must change.

Exhibit 1 Assumptions on Returns, Volatilities, and Correlations for Various Asset Classes

Name	US Stock Market	Global ex-US Stock Market	Total US Bond Market	REIT	Commodities	Buyouts Proxy	Annualized Return	Annualized Standard Deviation	Sharpe ratio
US Stock Market	1	0.06	0.79	-0.05	0.76	0.21	14.72%	14.30%	0.925
Global ex-US Stock Market	0.06	1	0.05	0.6	0.18	0.26	6.59%	14.22%	0.358
Total US Bond Market	0.79	0.05	1	-0.02	0.61	-0.03	1.82%	3.60%	0.091
REIT	-0.05	0.6	-0.02	1	0.13	0.23	10.57%	15.98%	0.568
Commodities	0.76	0.18	0.61	0.13	1	0.27	-0.89%	22.02%	(0.108)
Buyouts Proxy - Accelerate Private Equity Alpha Fund ALFA.TO	0.21	0.26	-0.03	0.23	0.27	1	21.45%	21.75%	0.918

Covariance Matrix

	US Stock Market	Global ex-US Stock Market	Total US Bond Market	REIT	Commodities	US Buyouts
US Stock Market	0.02045	0.00122	0.00407	-0.00114	0.02393	0.00653
Global ex-US Stock Market	0.00122	0.02022	0.00026	0.01363	0.00564	0.00804
Total US Bond Market	0.00407	0.00026	0.00130	-0.00012	0.00484	-0.00023
REIT	-0.00114	0.01363	-0.00012	0.02554	0.00457	0.00799
Commodities	0.02393	0.00564	0.00484	0.00457	0.04849	0.01293
US Buyouts	0.00653	0.00804	-0.00023	0.00799	0.01293	0.04731

Risk-free rate ***1.49%***

Weights: Portfolio #1 with 5% standard deviation	
US Stock Market	7.87%
Global ex-US Stock Market	–
Total US Bond Market	68.18%
REIT	11.71%
Commodities	–
Buyouts Proxy - ALFA.TO	12.23%
Total	**100%**

Weights: Portfolio #2 with 5% standard deviation	
US Stock Market	22.86%
Global ex-US Stock Market	–
Total US Bond Market	43.71%
REIT	17.41%
Commodities	–
Buyouts Proxy - ALFA.TO	16.02%
Total	**100%**

Source: Compiled by authors from Refinitiv; Preqin; Portfoliovisualizer.com.

Exhibit 2 Buyouts Performance: Mega funds (more than $1bn), by vintage

Panel A

Buyouts Performance: 2018 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Blackstone Group	73	3.0x
Hg	60	2.2x
Searchlight Capital Partners	56	1.5x
Thoma Bravo	56	2.0x
The Jordan Company	54	2.0x
Nordic Capital	51	2.0x
Kelso & Company	49	1.7x
EQT	48	2.0x
GTCR	40	1.8x
Carlyle Group	34	–
Reverence Capital Partners	33	1.5x
Silver Lake	30	1.8x
Roark Capital Group	27	1.7x
Second Quartile		
Name	**IRR**	**MOIC**
TPG	53	1.6x
Hg	35	1.7x
American Securities	32	1.3x
Hillhouse Capital Managemer	29	1.4x
CVC	29	1.6x
PAI Partners	29	1.3x
Epiris	27	1.7x
Roark Capital Group	27	1.5x
Equistone Partners Europe	26	1.5x
Primavera Capital	26	–
Francisco Partners	25	1.7x
Siris Capital	25	1.6x
Wellspring Capital Managem	24	1.3x
Vestar Capital Partners	23	1.4x
Certares	22	–
Third Quartile		
Name	**IRR**	**MOIC**
Inflexion Private Equity Partn	31	1.4x
PAI Partners	29	1.3x
Wellspring Capital Managem	24	1.3x
Tailwind Capital	24	1.4x
Vestar Capital Partners	23	1.4x
Onex	22	–
Brookfield Asset Managemen	22	1.3x
Linden	22	1.3x
Charlesbank Capital Partners	20	1.3x
Centurium Capital	18	1.4x
Affinity Equity Partners	18	1.4x
H.I.G. Capital	17	1.3x
Nordic Capital	17	1.5x
Certares	15	–
Fourth Quartile		
Name	**IRR**	**MOIC**
Triton	18	1.2x
Silver Lake	15	1.3x
Palladium Equity Partners	13	1.3x
Novalpina Capital	13	1.1x
Platinum Equity	9	1.1x
Carlyle Group	8	1.1x
Pritzker Private Capital	7	–
Trilantic North America	5	–
Sycamore Partners	0	1.0x

Panel B

Buyouts Performance: 2017 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Veritas Capital	60	3.8x
Clayton Dubilier & Rice	53	2.1x
Vitruvian Partners	52	2.2x
KKR	42	2.2x
Altaris	38	1.9x
Parthenon Capital	37	2.2x
Genstar Capital Partners	33	2.4x
Second Quartile		
Name	**IRR**	**MOIC**
HGGC	34	1.8x
New Mountain Capital	33	2.0x
MidOcean Partners	32	–
EQT	29	1.8x
Leonard Green & Partners	28	2.1x
Permira	25	2.0x
Waud Capital Partners	24	1.7x
Third Quartile		
Name	**IRR**	**MOIC**
Waterland Private Equity Investr	33	1.5x
Brentwood Associates	27	1.4x
Kohlberg & Company	24	1.8x
Stone Point Capital	24	1.8x
Berkshire Partners	24	1.7x
MBK Partners	23	1.8x
Cornell Capital	23	1.4x
Quad-C	20	1.5x
BC Partners	19	1.6x
Lone Star Funds	18	1.5x
CVC	13	1.5x
Fourth Quartile		
Name	**IRR**	**MOIC**
GI Partners	23	1.6x
Corsair Capital	18	1.4x
Bain Capital	16	1.3x
Bernhard Capital Partners Mana	14	0.8x
Ares Management	10	1.3x
Levine Leichtman Capital Partne	8	1.2x
Chequers Capital	6	1.1x

Panel C

Buyouts Performance: 2016 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
TA Associates	42	2.6x
Apax Partners France	38	2.5x
Thoma Bravo	38	3.1x
Oaktree Capital Management	35	3.1x
Apax Partners	30	2.3x
Vista Equity Partners	28	1.9x
Hellman & Friedman	27	–
Bain Capital	27	1.6x
Audax Group	27	2.1x
The Sterling Group	27	2.2x
Harvest Partners	24	2.0x
PAG	20	2.0x
Second Quartile		
Name	**IRR**	**MOIC**
Ardian	29	1.85
Morgan Stanley	28	1.90
Oak Hill Capital Partners	27	1.59
FIMI	26	1.80
Advent International	26	2.25
Platinum Equity	25	1.85
Rivean Capital	24	2.02
Vista Equity Partners	24	2.15
Thomas H Lee Partners	24	1.87
Charterhouse Capital Partners	22	1.72
IK Partners	19	1.63
Third Quartile		
Name	**IRR**	**MOIC**
Blackstone Group	21	1.7x
ACON Investments	20	1.7x
Thoma Bravo	18	1.9x
KSL Capital Partners	17	1.6x
Investindustrial	15	1.5x
Carlyle Group	13	–
Ardian	10	1.3x
Fourth Quartile		
Name	**IRR**	**MOIC**
Goldman Sachs Asset Managem	20	1.5x
American Securities	14	1.5x
ONCAP	14	–
FIMI	12	–
Gamut Capital Management	11	1.3x
Trustar Capital	9	1.3x
Harvest Partners	8	–
Roark Capital Group	7	1.4x
Hony Capital	1	1.0x

Panel D

Buyouts Performance: 2015 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Brookfield Asset Management	48	2.5x
Francisco Partners	35	3.7x
Lindsay Goldberg	35	2.2x
Genstar Capital Partners	35	2.6x
Aquiline Capital Partners	34	2.1x
Wynnchurch Capital	31	2.4x
Veritas Capital	29	3.7x
Waterland Private Equity Investments B.V.	28	2.4x
EQT	27	2.2x
Bridgepoint	25	2.3x
Irving Place Capital	20	4.3x
Second Quartile		
Name	**IRR**	**MOIC**
Welsh, Carson, Anderson & Stowe	30	2.5x
Vector Capital	27	–
Searchlight Capital Partners	25	1.9x
Rhône Group	22	1.7x
One Equity Partners	22	2.1x
Partners Group	21	2.0x
Pacific Equity Partners	21	1.7x
Thoma Bravo	20	2.3x
TPG	20	1.8x
KKR	19	1.8x
Third Quartile		
Name	**IRR**	**MOIC**
Advent International	19	1.7x
Centerbridge Partners	19	1.6x
FFL Partners	18	1.7x
AEA Investors	18	1.9x
Inflexion Private Equity Partners	17	1.7x
Hahn & Company	17	1.8x
Madison Dearborn Partners	16	1.6x
Astorg	16	1.7x
Charlesbank Capital Partners	15	1.6x
Exponent Private Equity	13	1.7x
Fourth Quartile		
Name	**IRR**	**MOIC**
Siris Capital	14	1.5x
Crestview Partners	13	1.5x
RRJ Capital	12	1.3x
Lone Star Funds	12	1.3x
Cortec Group	12	1.5x
ABRY Partners	11	1.4x
Equistone Partners Europe	9	1.5x
Carlyle Group	6	–

Panel E

Buyouts Performance: 2014 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
GTCR	43	4.4x
Thoma Bravo	31	3.8x
Vitruvian Partners	30	–
TowerBrook	26	2.2x
Permira	25	3.1x
Sentinel Capital Partners	22	2.0x
Second Quartile		
Name	**IRR**	**MOIC**
H.I.G. Capital	25	1.9x
Stone Point Capital	23	2.3x
Vista Equity Partners	22	2.3x
The Jordan Company	21	2.1x
PAI Partners	18	2.1x
Altor	18	2.0x
Carlyle Group	18	–
Tailwind Capital	12	1.6x
Third Quartile		
Name	**IRR**	**MOIC**
CVC	17	1.8x
Altor	17	2.0x
Carlyle Group	16	2.0x
Olympus Partners	15	1.6x
HitecVision	14	1.6x
Apollo Global Management	12	1.5x
Freeman Spogli & Co	11	1.6x
Palladium Equity Partners	10	1.5x
Fourth Quartile		
Name	**IRR**	**MOIC**
H.I.G. Capital	15	1.5x
Onex	9	–
Littlejohn & Co.	8	1.4x
Sycamore Partners	5	1.2x
Hopu Investment Managem	1	1.1x
Odyssey Investment Partner	0	1.0x

Panel F

Buyouts Performance: 2013 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
TDR Capital	36	3.6x
Bain Capital	31	2.5x
Silver Lake	27	2.7x
New Mountain Capital	23	2.2x
Partners Group	19	2.4x
Hg	18	2.2x
Second Quartile		
Name	**IRR**	**MOIC**
Clayton Dubilier & Rice	27	2.4x
H.I.G. Capital	23	2.1x
Affinity Equity Partners	16	1.7x
IK Partners	15	1.9x
CCMP Capital Advisors	15	2.0x
Third Quartile		
Name	**IRR**	**MOIC**
Nordic Capital	17	1.8x
Vista Equity Partners	16	2.1x
Audax Group	15	1.8x
Carlyle Group	13	1.6x
CCMP Capital Advisors	13	1.8x
Archer Capital	13	1.7x
MBK Partners	12	1.7x
RRJ Capital	11	1.4x
Fourth Quartile		
Name	**IRR**	**MOIC**
EQT	9	–
Lone Star Funds	9	1.2x
Morgan Stanley Private Equi	8	1.4x

Panel G

Buyouts Performance: 2012 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Thoma Bravo	40	3.2x
Baring Vostok Capital Partners	23	2.9x
Second Quartile		
Name	**IRR**	**MOIC**
TSG Consumer Partners	30	2.7x
Platinum Equity	30	1.9x
Providence Equity	24	2.1x
KKR	20	2.2x
Bain Capital	19	–
Third Quartile		
Name	**IRR**	**MOIC**
Court Square	19	1.9x
Roark Capital Group	17	2.6x
AEA Investors	17	2.0x
Kohlberg & Company	16	1.7x
Ares Management	16	2.0x
Apax Partners	15	1.9x
Ardian	13	1.7x
Actera Group	8	1.4x
Fourth Quartile		
Name	**IRR**	**MOIC**
Audax Group	13	1.6x

Panel H

Buyouts Performance: 2011 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Waterland Private Equity Investments B.V.	41	3.3x
Sycamore Partners	29	2.2x
Hellman & Friedman	25	3.3x
Francisco Partners	24	3.5x
American Securities	23	2.3x
Second Quartile		
Name	**IRR**	**MOIC**
Harvest Partners	21	2.1x
GTCR	21	2.0x
PAG	19	2.0x
Berkshire Partners	18	2.1x
Wellspring Capital Management	17	1.7x
EQT	16	1.9x
Equistone Partners Europe	16	1.7x
Vista Equity Partners	16	2.1x
BC Partners	16	2.0x
Chequers Capital	16	1.9x
Third Quartile		
Name	**IRR**	**MOIC**
Equistone Partners Europe	16	1.7x
Wellspring Capital Management	16	1.7x
EQT	16	–
ABRY Partners	14	1.8x
Blackstone Group	13	1.8x
KSL Capital Partners	10	1.3x
BPEA EQT Asia	9	1.6x
Fourth Quartile		
Name	**IRR**	**MOIC**
Carlyle Group	8	–
Rhône Group	6	1.2x
Advent International	1	1.1x

Panel I

Buyouts Performance: 2010 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
TA Associates	27	3.9x
Birch Hill Equity Partners	23	3.6x
Second Quartile		
Name	**IRR**	**MOIC**
NA	NA	NA
Third Quartile		
Name	**IRR**	**MOIC**
Littlejohn & Co.	14	1.9x
Oaktree Capital Managem	13	1.6x
Stone Point Capital	12	1.9x
Fourth Quartile		
Name	**IRR**	**MOIC**
The Gores Group	1	1.0x

Panel J

Buyouts Performance: 2009 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Clayton Dubilier & Rice	26	2.7x
Second Quartile		
Name	**IRR**	**MOIC**
Clessidra Capital Partners	16	1.5x
Third Quartile		
Name	**IRR**	**MOIC**
Waterland Private Equity Ir	17	1.6x
Clessidra Capital Partners	16	1.5x
Charterhouse Capital Partn	13	1.5x
Triton	10	1.6x
Fourth Quartile		
Name	**IRR**	**MOIC**
Onex	11	–
FFL Partners	4	1.0x

Panel K

Buyouts Performance: 2008 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Madison Dearborn Partners	23	2.3x
American Securities	21	1.9x
Ares Management	20	2.1x
MBK Partners	20	2.3x
Altor	19	2.6x
Bain Capital	18	2.0x
CVC	17	2.0x
Advent International	17	2.1x
Second Quartile		
Name	**IRR**	**MOIC**
Apollo Global Management	25	1.7x
ABRY Partners	20	2.1x
Avista Capital Partners	16	1.7x
PAI Partners	13	2.2x
KKR	13	1.8x
Bridgepoint	13	1.8x
Third Quartile		
Name	**IRR**	**MOIC**
CVC	13	1.6x
GI Partners	13	1.6x
Welsh, Carson, Anderson & St	12	1.7x
Lone Star Funds	12	1.6x
TA Associates	11	1.8x
HGGC	10	1.3x
TPG	10	1.5x
Bain Capital	10	1.6x
Riverside Company	9	1.5x
Fourth Quartile		
Name	**IRR**	**MOIC**
Carlyle Group	12	1.6x
Yucaipa Companies	9	1.7x
TowerBrook	8	1.3x
Lindsay Goldberg	8	1.4x
Nordic Capital	8	1.6x
Pacific Equity Partners	8	1.4x
Kelso & Company	7	1.4x
Lee Equity Partners	6	1.2x

Buyouts Performance: Mid-Market Funds (less than $1bn), by Vintage

Panel L

Buyouts Performance: 2018 Vintage

Top Quartile

Name	IRR	MOIC
Sole Source Capital	102	–
CONSTELLATION CAPITAL	69	3.9x
Periscope Equity	57	2.9x
WestBridge Capital	55	1.8x
INVL Asset Management	48	3.1x
LFM Capital	46	1.6x
New State Capital Partners	45	–
Wind Point Partners	42	2.5x
Exponent Private Equity	39	2.1x
ArchiMed	36	1.6x
ECI Partners	35	1.7x
Verdane Capital Advisors	33	1.6x
Acathia Capital	32	2.0x
Cressey & Company	30	1.4x
Revelstoke Capital Partners	30	1.6x

Second Quartile

Name	IRR	MOIC
New Heritage Capital	43	1.6x
Cressey & Company	39	1.6x
Hastings Equity Partners	35	1.8x
Glenwood Private Equity	35	–
Miura Partners	31	1.6x
Andera Partners	31	1.5x
Advent Partners	28	1.5x
Behrman Capital	27	1.6x
Frazier Healthcare Partners	26	1.4x
Presidio Investors	26	1.8x
Lee Equity Partners	26	1.3x
Borromin Capital Management	25	1.6x
LightBay Capital	25	1.4x
Innova Capital	25	1.5x
B & Capital	24	1.4x

Third Quartile

Name	IRR	MOIC
Lee Equity Partners	26	1.3x
Blue Point Capital Partners	21	1.4x
ParkerGale	20	1.3x
Windjammer Capital Investors	19	1.3x
Star Capital	19	1.3x
Anacacia Capital	18	1.3x
IK Partners	16	1.2x
Down 2 Earth Capital	15	–
Bolster Investment Partners	14	1.4x
GCP Capital Partners	12	1.3x
Progressio SGR	9	1.3x
Ardian	8	1.2x
Ethos	6	1.3x

Fourth Quartile

Name	IRR	MOIC
Great Point Partners	11	1.1x
Water Street Healthcare Partners	9	1.2x
KJK Capital	3	1.1x
Crescendo Equity Partners	3	1.1x

Panel M

Buyouts Performance: 2017 Vintage

Top Quartile

Name	IRR	MOIC
Hg	90	2.1x
GMT Communications Partners	89	2.1x
Francisco Partners	81	3.7x
Gemspring Capital	77	2.7x
Sole Source Capital	60	–
Value4Capital	57	2.9x
Novacap	55	2.6x
Prospect Hill Growth Partners	55	–
LongueVue Capital	41	2.7x
BV Investment Partners	39	1.9x
Seidler Equity Partners	36	1.9x
Marlin Equity Partners	33	2.1x
Main Capital Partners	32	2.2x
EmergeVest	28	3.0x

Second Quartile

Name	IRR	MOIC
Trinity Hunt Partners	55	1.8x
Frontenac Company	50	2.3x
The Vistria Group	36	1.9x
Kinderhook Industries	30	1.9x
RUBICON Technology Partners	30	1.6x
Argos Wityu	28	1.7x
Incline Equity Partners	27	1.6x
Gilde Equity Management Benelux	25	1.6x
Procuritas Partners	23	1.5x
Lightyear Capital	22	1.7x
Montefiore Investment	20	1.7x
Axcel	19	1.8x
Amergent Capital	17	3.2x

Third Quartile

Name	IRR	MOIC
New MainStream Capital	33	1.7x
Bain Capital	31	1.7x
Cotton Creek Capital	31	1.7x
Incline Equity Partners	26	1.6x
Gallatin Point Capital	22	1.4x
Lightyear Capital	22	1.8x
EmergeVest	20	–
Palatine Private Equity	19	1.4x
NB Renaissance Partners	16	1.4x
August Equity	14	1.5x
Innova Capital	11	2.1x

Fourth Quartile

Name	IRR	MOIC
Centre Lane Partners	21	–
Marlin Equity Partners	17	1.5x
Riordan, Lewis & Haden Equity Partners	17	1.3x
Procuritas Partners	15	1.3x
Omaha Beach Capital	15	–
Vista Equity Partners	12	1.4x
Arcadia SGR	11	1.3x
Vaaka Partners	10	1.2x
Quadrant Private Equity	10	1.2x
EQT	7	–
Platte River Equity	6	1.1x

Panel N

Buyouts Performance: 2016 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Renovus Capital Partners	79	6.4x
Falfurrias Capital Partners	75	6.9x
Nautic Partners	53	1.7x
Avista Capital Partners	48	2.1x
Bridgepoint	43	2.3x
Bertram Capital	39	2.4x
EagleTree Capital	36	2.7x
Synova	36	2.7x
YFM Equity Partners	32	2.1x
Imperial Capital Group	32	2.6x
Palm Beach Capital	32	2.2x
Veronis Suhler Stevenson	31	2.0x
Atlantic Street Capital	31	2.1x
Cordovan Capital Management	30	2.2x
Speyside Equity	30	3.1x
Accelmed	30	–
Altaris	30	2.7x
Key Capital Partners	30	2.3x
Vendis Capital	23	2.6x
Second Quartile		
Name	**IRR**	**MOIC**
Graycliff Partners	46	1.9x
CBPE Capital	33	1.8x
Wind Point Partners	31	1.9x
Arlington Capital Partners	29	2.0x
DC Capital Partners	29	1.5x
Artá Capital	28	1.7x
DW Healthcare Partners	28	2.2x
WindRose Health Investors	28	2.3x
Branford Castle	28	–
CenterOak Partners	27	2.0x
Levine Leichtman Capital Partners	26	2.1x
Seaport Capital	25	2.0x
Via Equity	24	2.0x
MCH Private Equity	23	1.8x
Endeavour Capital	21	2.0x
AEA Investors	20	2.0x
Holland Capital	20	1.8x
OpenGate Capital	19	2.0x
Third Quartile		
Name	**IRR**	**MOIC**
DC Capital Partners	26	1.5x
Excellere Partners	24	1.6x
CenterGate Capital	24	1.9x
Phoenix Equity Partners	24	1.7x
Seaport Capital	24	2.0x
Korona Invest	23	1.1x
Argand Partners	22	1.8x
Growth Capital Partners	21	1.7x
Oriens Investment Management	21	1.6x
AEA Investors	20	2.0x
Holland Capital	20	1.8x
NB Renaissance Partners	20	1.8x
Angeles Equity Partners	20	1.6x
Mason Wells	19	1.9x
OpenGate Capital	19	2.0x
NorthEdge	18	1.7x
STAR Capital Partners	17	1.6x
Liberty Hall Capital Partners	16	1.3x
Flexpoint Ford	15	1.8x
Endeavour Capital	15	1.6x
OpCapita	15	1.6x
Quadrant Private Equity	14	1.6x
Glenwood Private Equity	12	1.1x
L Catterton	9	1.3x
Fourth Quartile		
Name	**IRR**	**MOIC**
EOS Investment Management Group	15	1.5x
Shamrock Capital Advisors	14	1.3x
Century Equity Partners	14	1.3x
Flexpoint Ford	13	1.3x
Frazier Healthcare Partners	13	1.5x
Swander Pace Capital	13	1.4x
Gen Cap America	12	1.2x
Mobeus Equity Partners	12	1.3x
MBO & Co	11	1.3x
PineBridge Investments	11	1.3x
DFW Capital Partners	10	1.4x
Livingbridge	9	1.3x
Omaha Beach Capital	8	–
Karmijn Kapitaal	8	1.4x
Arbor Private Investment Company	8	1.2x
TDR Capital	5	1.4x
Australis Partners	2	1.0x

Panel O

Buyouts Performance: 2015 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Gridiron Capital	55	6.1x
New State Capital Partners	42	–
Detong Capital	40	4.7x
Crescendo Equity Partners	39	2.9x
Linden	38	2.9x
Apax Partners	36	3.1x
J.F. Lehman & Company	35	2.6x
WM Partners	35	2.2x
Main Capital Partners	33	2.6x
Sumeru Equity Partners	32	2.8x
Sparring Capital	32	2.5x
Carlyle Group	32	–
EmergeVest	28	2.8x
Polaris Private Equity	26	2.1x
Lineage Capital	26	2.2x
Palatine Private Equity	25	2.0x
Evoco	24	2.1x
Crescent Capital Partners	22	3.3x
Revelstoke Capital Partners	21	2.4x
Second Quartile		
Name	**IRR**	**MOIC**
Riverside Company	46	1.5x
Cressey & Company	26	2.3x
Fortissimo Capital	25	2.0x
Invision	25	1.8x
Latour Capital	24	1.8x
Kedma Capital	24	2.1x
Panoramic Growth Equity	24	2.1x
Nippon Mirai Capital	23	2.1x
Amulet Capital Partners	23	2.1x
Hamilton Robinson	21	–
Kinderhook Industries	21	2.4x
SkyKnight Capital	20	–
Levine Leichtman Capital Partners	19	1.9x
Stirling Square Capital Partners	19	2.2x
Gilde Equity Management Benelux	16	1.9x
Third Quartile		
Name	**IRR**	**MOIC**
IK Partners	23	1.7x
Ridgemont Equity Partners	21	1.8x
Birch Hill Equity Partners	20	1.7x
Lovell Minnick Partners	20	1.7x
Encore Consumer Capital	19	1.8x
CapStreet Group	19	1.6x
Riverside Company	17	2.0x
Gilde Equity Management Benelux	16	1.9x
EQT	16	–
Shorehill Capital	14	1.6x
Bernhard Capital Partners Management	14	1.9x
IFM Investors	13	1.8x
MidOcean Partners	13	–
Azulis Capital	13	1.5x
Fourth Quartile		
Name	**IRR**	**MOIC**
Flexpoint Ford	16	1.6x
GHO Capital	14	1.6x
MSouth Equity Partners	14	1.6x
Brentwood Capital Advisors	13	1.2x
Comvest Partners	12	1.6x
AE Industrial Partners	12	1.5x
True North	12	1.6x
Linzor Capital Partners	11	1.4x
JZ Capital Partners	11	1.4x
Livingbridge	10	1.4x
ParkerGale	10	1.5x
Segulah	10	1.4x
Neuberger Berman	9	1.3x
AnaCap Financial Partners	9	1.2x
HCapital Partners	9	1.5x
Elysian Capital	9	1.4x
Harwood Capital Management Group	8	1.3x
CAI Capital Partners	8	1.4x

Panel P

Panel Q

Buyouts Performance: 2014 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Detong Capital	82	4.7x
ArchiMed	46	2.3x
Nautic Partners	43	4.1x
Novacap	43	4.1x
Riverside Company	39	5.9x
Alpine Investors	38	3.7x
Marlin Equity Partners	34	2.5x
Aksìa Group	34	2.6x
LFM Capital	32	2.6x
Harvest Capital	32	2.9x
Nordian Capital Partners	32	4.3x
Altaris	32	2.5x
Stripes	27	2.6x
Quadrant Private Equity	27	1.8x
Reverence Capital Partners	24	1.9x
Portobello Capital	23	1.9x
Second Quartile		
Name	**IRR**	**MOIC**
ACA Group	35	1.6x
ZMC	27	–
Glenwood Private Equity	27	1.7x
The Vistria Group	26	2.5x
Next Capital	26	2.3x
Tritium Partners	25	2.2x
Webster Equity Partners	24	2.5x
Andera Partners	23	1.9x
Miura Partners	20	2.3x
Seidler Equity Partners	19	2.3x
Novacap	19	1.9x
ProA Capital	18	1.8x
Egeria	18	1.9x
JLL Partners	17	1.8x
Bluegem Capital Partners	11	2.3x
Third Quartile		
Name	**IRR**	**MOIC**
Stellex Capital Management	21	1.5x
ProA Capital	19	2.0x
Hastings Equity Partners	18	1.8x
Blue Point Capital Partners	17	1.6x
RUBICON Technology Partners	16	1.6x
Timesbole Venture Capital	16	–
Sorenson Capital	16	1.8x
Union Park Capital	15	2.2x
Prospect Hill Growth Partners	15	–
Sovereign Capital Partners	13	1.5x
Sentica Partners	12	1.6x
STAR Capital Partners	8	1.6x
Ford Financial	8	1.7x
Fourth Quartile		
Name	**IRR**	**MOIC**
Content Partners	12	1.5x
Harbert Management Corporation	10	1.6x
New MainStream Capital	10	1.4x
Primary Capital Partners	10	1.5x
Paine Schwartz Partners	9	1.4x
Mill City Capital	8	1.5x
OpCapita	8	1.4x
EmergeVest	7	–

Panel R

Buyouts Performance: 2013 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Consonance Capital	74	3.5x
Holland Capital	74	5.1x
Eureka Equity Partners	41	3.0x
Down 2 Earth Capital	38	2.8x
Clarion Capital Partners	37	2.8x
Thoma Bravo	36	3.3x
Water Street Healthcare Partner	36	2.9x
Harren Equity Partners	36	3.3x
Accel-KKR	35	2.7x
Quad-C	30	2.6x
FSN Capital	28	2.9x
Synova	25	2.5x
Second Quartile		
Name	**IRR**	**MOIC**
Alvarez & Marsal Capital	27	2.1x
Clearview Capital	26	2.6x
Pencarrow Private Equity	23	2.0x
August Equity	23	2.2x
Montefiore Investment	22	2.3x
Insignia Capital Group	22	1.9x
Vaaka Partners	22	2.3x
Silver Oak Services Partners	22	2.6x
Great Point Partners	22	1.8x
CID Capital	20	2.2x
New Heritage Capital	19	1.9x
Windjammer Capital Investors	17	2.2x
HCI Equity Partners	15	2.2x
Third Quartile		
Name	**IRR**	**MOIC**
NorthEdge	18	1.6x
Invision	16	1.9x
GenNx360 Capital Partners	15	1.7x
High Road Capital Partners	15	1.9x
Guardian Capital Partners	13	1.8x
Parallax Capital Partners	13	1.6x
Anacacia Capital	10	1.4x
ACON Investments	10	1.6x
Nexus Group - Peru	9	1.5x
Swander Pace Capital	9	1.7x
Spire Capital	8	1.3x
Fourth Quartile		
Name	**IRR**	**MOIC**
Riverside Partners	12	1.7x
AAC Capital Partners	8	1.5x
ICV Partners	8	1.3x
Brentwood Associates	7	1.4x
JPB Partners	7	1.4x
Palatine Private Equity	6	1.3x
Graphite Capital Management	6	1.4x
CapMan	4	1.1x

Panel S

Buyouts Performance: 2012 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
CapVest	48	4.2x
WindRose Health Investors	44	4.2x
Imperial Capital Group	41	5.5x
BV Investment Partners	40	2.4x
Parthenon Capital	39	4.2x
Incline Equity Partners	37	2.5x
Frontenac Company	35	2.4x
DFW Capital Partners	34	2.9x
Cortec Group	31	4.1x
Trinity Hunt Partners	27	3.3x
Main Capital Partners	27	3.1x
Livingbridge	27	2.7x
The Growth Fund	21	2.7x
Second Quartile		
Name	**IRR**	**MOIC**
Excellere Partners	32	2.1x
One Rock Capital Partners	26	2.2x
Centre Lane Partners	25	–
Ridgemont Equity Partners	25	2.5x
Hg	23	2.4x
Bridgepoint	23	1.9x
Wicks Group	22	2.3x
Linsalata Capital Partners	21	2.1x
Thompson Street Capital Partners	21	1.8x
FIMI	20	2.5x
Elbrus Capital	20	2.9x
DW Healthcare Partners	19	2.2x
Procuritas Partners	18	2.3x
Fortissimo Capital	17	2.2x
Third Quartile		
Name	**IRR**	**MOIC**
Ridgemont Equity Partners	25	2.5x
Arsenal Capital Partners	25	2.4x
Ardian	19	2.2x
Yellow Wood Partners	18	1.5x
FIMI	15	2.2x
Juggernaut Capital Partners	14	1.9x
The Gores Group	14	1.4x
MSouth Equity Partners	14	1.7x
Heartwood Partners	13	1.5x
Summer Street Capital Partners	12	1.5x
Stripes	11	1.9x
The Halifax Group	3	2.1x
Fourth Quartile		
Name	**IRR**	**MOIC**
Harbour Group	13	1.6x
EagleTree Capital	12	1.5x
Fort Point Capital	10	1.3x
RFE Investment Partners	9	1.5x
Encore Consumer Capital	9	1.5x
Renovus Capital Partners	9	1.7x
ECM Equity Capital Management	8	1.3x
Riverside Company	8	1.2x
Karmijn Kapitaal	8	1.6x
Crescent Capital Partners	7	1.4x
KarpReilly	6	1.3x
Siris Capital	6	1.2x
LNK Partners	4	1.1x
SG Private Equity	3	1.0x
Turkven Private Equity	3	1.2x
Victoria Capital Partners	2	1.1x

Panel T

Buyouts Performance: 2011 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Via Equity	49	3.3x
Key Capital Partners	37	2.7x
Atlantic Street Capital	37	3.3x
Levine Leichtman Capital Partners	37	4.4x
Alpine Investors	28	6.9x
Novo Tellus Capital Partners	28	3.9x
Vestar Capital Partners	24	2.0x
Lightyear Capital	24	2.3x
Second Quartile		
Name	**IRR**	**MOIC**
Latour Capital	29	2.6x
Falfurrias Capital Partners	24	2.5x
Inflexion Private Equity Partners	21	1.8x
Blue Sea Capital	21	3.4x
Waud Capital Partners	20	2.1x
ONCAP	19	–
Rivean Capital	14	1.9x
Third Quartile		
Name	**IRR**	**MOIC**
Borromin Capital Management	26	2.4x
Rising Japan Equity	22	1.6x
Advent Partners	16	1.5x
Litorina	13	1.9x
Altus Capital Partners	13	1.7x
Argos Wityu	11	1.6x
Nexus Group - Peru	11	2.0x
Alpha Group	11	1.4x
Linden	10	1.8x
GCP Capital Partners	9	2.0x
American Industrial Partners	9	1.7x
Endeavour Capital	9	1.5x
Pegasus Capital Advisors	9	1.5x
Carousel Capital	1	3.3x
Fourth Quartile		
Name	**IRR**	**MOIC**
Brass Ring Capital	8	1.5x
Arcadia SGR	8	1.3x

Panel U

Buyouts Performance: 2010 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Riverside Company	47	9.6x
Seaport Capital	40	5.0x
Quadrant Private Equity	32	2.1x
The Sterling Group	29	2.8x
Seidler Equity Partners	27	22.7x
Dominus Capital	26	–
ECI Partners	25	2.3x
Bertram Capital	23	3.1x
GEC	19	2.0x
Growth Capital Partners	19	1.9x
Second Quartile		
Name	**IRR**	**MOIC**
Comvest Partners	27	1.8x
Wynnchurch Capital	25	2.0x
Gen Cap America	24	2.6x
Freeman Spogli & Co	23	2.8x
Palm Beach Capital	22	2.3x
Mason Wells	20	3.0x
L Catterton	20	2.4x
CBPE Capital	19	2.1x
AEA Investors	19	2.4x
Green Arrow Capital	17	1.8x
WestBridge Capital	15	1.8x
Rizvi Traverse Management	15	2.7x
Risk Capital Partners	13	1.9x
Third Quartile		
Name	**IRR**	**MOIC**
Silverhawk Capital Partners	21	1.8x
Cressey & Company	20	2.2x
Green Arrow Capital	17	1.8x
WestBridge Capital	15	1.8x
Risk Capital Partners	14	2.1x
MBO & Co	14	1.7x
Commerce Street Holdings	13	1.9x
J.H. Whitney & Co	13	1.9x
Hahn & Company	13	1.8x
Phoenix Equity Partners	12	1.6x
Corsair Capital	11	1.6x
Fourth Quartile		
Name	**IRR**	**MOIC**
Lovell Minnick Partners	11	1.6x
TruArc Partners	9	1.5x
Insight Equity	9	1.6x
Aquiline Capital Partners	8	1.5x
Andera Partners	7	1.4x
Castle Harlan	6	1.2x
Innova Capital	6	1.2x
Progressio SGR	5	1.3x
True North	4	1.2x
Bunker Hill Capital	3	1.2x
Linzor Capital Partners	2	1.1x

Buyouts Performance: 2009 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
Vista Equity Partners	39	3.0x
Karnell	38	2.3x
Sentinel Capital Partners	37	2.7x
Vendis Capital	26	3.5x
Egeria	22	2.2x
Bruckmann Rosser Sherrill & Co	22	2.5x
Bridgepoint	20	2.4x
Sentica Partners	20	2.5x
Second Quartile		
Name	**IRR**	**MOIC**
Partnership Capital Growth Investors	33	1.7x
KSL Capital Partners	25	2.2x
KPS Capital Partners	23	2.0x
Riverside Partners	21	2.4x
Harwood Capital Management Group	20	2.4x
Polaris Private Equity	19	2.0x
Leeds Equity Partners	18	2.5x
Elysian Capital	15	2.2x
Third Quartile		
Name	**IRR**	**MOIC**
Wind Point Partners	19	2.0x
Pfingsten Partners	16	2.1x
Stripes	13	1.7x
Azulis Capital	10	1.7x
Riverside Company	7	1.4x
Vision Capital	5	1.3x
Fourth Quartile		
Name	**IRR**	**MOIC**
Chart Capital Partners	11	1.9x
Lincolnshire Management	9	1.4x
21st Century Group	7	1.3x
Halder	3	1.2x
ACON Investments	2	1.1x
Carlyle Group	1	–
KKR	0	1.0x

KKR has small fund

Panel V

Buyouts Performance: 2008 Vintage		
Top Quartile		
Name	**IRR**	**MOIC**
OFS Energy Fund	123	3.5x
Thoma Bravo	45	3.8x
ZMC	44	2.7x
Anacacia Capital	41	3.4x
Helix Kapital	37	–
Egis Capital Partners	37	3.7x
Vaaka Partners	28	2.4x
Water Street Healthcare Partners	28	2.3x
Altaris	27	2.6x
MSouth Equity Partners	27	2.4x
CAI Capital Partners	26	5.1x
Fortissimo Capital	26	3.8x
Accel-KKR	24	5.6x
Procuritas Partners	22	2.3x
Imperial Capital Group	20	3.0x
FIMI	19	2.3x
Partners Group	17	2.6x
Carlyle Group	16	1.9x
Second Quartile		
Name	**IRR**	**MOIC**
CapStreet Group	25	2.1x
Graham Partners	23	2.3x
Evergreen Pacific Partners	22	2.0x
Guardian Capital Partners	21	2.6x
Chicago Growth Partners	20	2.1x
Amberjack Capital Partners	18	2.4x
Hamilton Robinson	18	–
Swander Pace Capital	17	2.3x
Pechel Industries	12	1.6x
FSN Capital	12	1.6x
ProA Capital	11	1.7x
Iwakaze Capital	11	2.1x
Capvis AG	8	1.4x
Third Quartile		
Name	**IRR**	**MOIC**
Calera Capital	14.93	1.7x
Transportation Resource Partners	14.51	1.9x
Hastings Equity Partners	12.76	1.5x
Brazos Private Equity Partners	12.71	1.6x
High Road Capital Partners	11.00	1.5x
Endeavour Capital	10.70	2.0x
MCH Private Equity	8.70	1.5x
RLJ Equity Partners	8.10	1.5x
RFE Investment Partners	7.95	1.7x
Halyard Capital	6.60	1.5x
Turkven Private Equity	6.20	1.5x
Accent Equity Partners	5.60	1.3x
Altra Investments	5.25	1.5x
Bowmark Capital	5.10	1.4x
Fourth Quartile		
Name	**IRR**	**MOIC**
Sparring Capital	5	1.3x
Vance Street Capital	4	1.2x
Riverside Company	4	1.1x
Riverlake Partners	2	1.1x

Source: Preqin, accessed December 21, 2021.

Note: Quartile performance is calculated by Preqin and includes both IRR and MOIC metrics

Exhibit 3 Concentration Measures - Methodology

We use **Preqin** database to analyze aggregate capital raising dynamics of Top 100 fund managers that operate across buyouts verticals. We study the data in four dimensions: Top 25 and Top 100 fund managers in the world; Top25 and Top 100 fund managers in the US

The goal of the analysis is to gauge private capital industry consolidation in terms of concentration of funds in industry constituencies. For this purpose, we use two standard market concentration measures:

- **Herfindahl–Hirschman Index** defined as $H = \sum_{i=1}^{N} S_i^2$ where and S_i is the market share of fund manager ***i*** (funds raised by fund manager relative to total funds raised) and N is the number of fund managers. HHI below 2000 signifies relatively competitive markets.
- **Concentration Ratio** defined as $CR = \frac{S_1 + \ldots + S_n}{T}$ where S is fund manager, n is chosen to be 5, and T is the total funds raised during the period. CR between 40-70% implies medium concentration.

Source: Authors.

Endnotes

[1] What It Takes: Lessons in the Pursuit of Excellence, Stephen A. Schwarzman, 2019

[2] Barbarians at the Gate, The Fall of RJR Nabisco, Bryan Burrough, and John Helyar, 1989.

[3] Query why these firms opted to go public when the very nature of their business is buyouts. Why were the next generation of leaders unwilling to assume the risk of the leverage that would have been required to buy the firm? Instead they transferred the future risk of performance primarily to their public shareholders.

[4] UBS Global Family Office Report 2022, file:///C:/Users/nglie/Downloads/ubs-gfo-2022-single-pages.pdf, accessed June 29, 2022. (UBS Report)

[5] A. Lee, Why the Private Equity Model Needs to Evolve, Private Equity International May 13, 2021.

[6] Thompson Reuters Refinitiv Private Equity/VC Research Tool, accessed July 17, 2022; Buyout Firms Seek $1 Trillion of New Funding Even as Markets Drop and Deal Making Dries Up, M Gottfried and L Cooper, Wall Street Journal, July 18, 2022. https://www.wsj.com/articles/buyout-firms-seek-1-trillion-of-new-funding-even-as-markets-drop-and-deal-making-dries-up-11658136602, Accessed July 18, 2022.

[7] Ibid.

[8] Private Equity May Be Heading for a Fall, Economist, July 7, 2022.

[9] Mendoza, Carmela, CPP: the World's Largest Investor Gets Bigger and Bigger, Private Equity International, July 1, 2022, accessed July 11, 2022.

[10] Blackstone Other Large Private-Equity Firms Turn Attention to Vast Retail Market - WSJ.pdf; Blackstone Other Large Private-Equity Firms Turn Attention to Vast Retail Market - WSJ.pdf, June 7, 2022, accessed June 30, 2022.

[11] Shi, Madeline, Wealth Managers Want to Pass the Baton ("Passing the Baton"). PE Firms are Ready, PitchBook, July 6, 2022, Accessed July 11, 2022.

[12]Buyout Firms Seek $1 Trillion of New Funding Even as Markets Drop and Deal Making Dries Up, M Gottfried and L Cooper, op cit.

[13] This Figure depicts where the capital has been raised. Some of the capital has been raised by global firms to be invested outside the US. Some of the European capital may have also been invested in the US. However, the preponderance of the capital is presumably invested regionally.

[14] Subscription Lines are credit facilities obtained by General Partners collateralized by the Limited Partners capital commitments used to finance early acquisitions and initial expenses so that the General Partners do not need to draw Limited Partner capital early in the life cycle of a fund. This practice can have the result of artificially increasing the reported returns early on by reducing or eliminating the so-called J Curve.

[15] S. Kaplan and A. Schoar, Private Equity Performance: Returns, Persistence and Capital Flows, The Journal of Finance, Vol LX, No. 4, August 2005. ("Original Persistence Paper")

[16] R. Harris, T. Jenkinson, and S. Kaplan, How Do Private Equity Investments Perform Compared to Public Equity? , Journal of Investment Management Volume 14, Number 3, Third Quarter 2016. In this study the authors examined cash flows of over 2000 funds through 2010.

They observed outperformance versus the public markets in the vintage years pre 2006. Funds formed post 2005 did not outperform, similar results to those depicted in **Figure 10**.

[17] L.Phalippou, Performance of Buyout Funds Revisited?, November 2012, file:///C:/Users/nglie/Downloads/SSRN-id1969101.pdf accessed July 22, 2022.

[18] L. Phalippou, Beware of Venturing into Private Equity, Journal of Economic Perspectives, Volume 23, Number 1, Winter 2009 p 147-166.

[19] Marks, Howard, Sea Change Memo, December 13, 2022, Memos (oaktreecapital.com) Accessed December 18, 2023.

[20] Marks, Howard, Further Thoughts on Sea Change Memo, October 11, 2023, Further Thoughts on Sea Change (oaktreecapital.com), Accessed December 18, 2023.

[21] FPA Risk is Where You're Not Looking, January 2, 2019, p. 10, https://fpa.com/docs/default-source/funds/fpa-crescent-fund/literature/risk-is-where-you're-not-looking.pdf?sfvrsn=8, Accessed May 30, 2022.

[22] We have assumed this data reflects the average, not the median results. We contacted both Bain Capital and Cambridge Associates to ask whether the data reflects the average or median results and did not receive clarification.

[23] Note that State Street reported median results not average results and their results were for Global funds, not US funds.

[24] The performance discrepancies between **Figures 15** and **Figure 16** are explained by such factors as time horizon (**Figure 15** reflects the performance from 2001 to 2021 while **Figure 16** measures the performance during the period between 2005 and 2020), geography (**Figure 15** focuses on the US and European markets separately while **Figure 16** addresses the global market), as well as being annualized IRRs, calculated slightly differently than the pooled IRRs.

[25] S. Kaplan, The Effects of Management Buyouts on Operating Performance and Value, Journal of Financial Economics 24, 217-254, 1989; A. Smith, Corporate Ownership Structure and Performance: the Case of Management Buyouts, Journal of Financial Economics 27, 143-164; and S. Smart and J. Waldfogel, Measuring the Effect of Restructuring on Corporate Performance: The Case of Management Buyouts, Review of Economics and Statistics 76, 503-511.

[26] J Cohn, L Mills, E Towery, The Evolution of Capital Structure and Operating Performance after Leveraged Buyouts: Evidence from U.S. Corporate Tax Returns, April 2013, https://faculty.mccombs.utexas.edu/jonathan.cohn/papers/CMT_2012_4.10.2013.pdf, accessed June 16, 2022.

[27] D Rasmussen, Private Equity Overvalued and Overrated? , American Affairs Journal, Vol II, Number 1, Spring 2018, 3-16. https://americanaffairsjournal.org/2018/02/private-equity-overvalued-overrated/, accessed June 16, 2022. The author examined the financial statements of 390 transactions aggregating over $700 billion and hypothesized that if PE firms added value, they should see an increase in revenues, margins, and increased capital expenditures. In fact, they found in the companies, 54% had slower revenue growth, 45% had margin contraction, and 55% had reduced capital expenditures as a percentage of sales.

[28] Rassmussen, Dan, Private Equity Operational Improvements, Measuring Value Creation in LBOs, July 10, 2023, https://verdadcap.com/archive/private-equity-operational-improvements, accessed July 14, 2023.

[29] Kaplan, Steven and Schoar, Antionette Private Equity Performance: Returns, Persistence and Capital Flows, Journal of Finance, Vol. LX, No. 4, August 2005. Referred to herein as "the Original Persistence Paper". They analyzed the essentially realized performance of 746 funds invested from 1980 through 1997.

[30] Robinson and Sensoy (2016) Chung (2012). While these authors used different data sources (Preqin versus Venture Economics), their conclusions were directionally consistent with those of Kaplan and Schoar in the Original Persistence Paper. In Private Equity Performance: Returns, Persistence, and Capital Flows, Robinson and Sensoy (2016) found analogous persistence results, using Venture Economics data, as well as superior results in liquidity constrained markets contexts.

[31] Chung, Ji-Woong, Performance Persistence in Private Equity Funds, February 2012, file:///C:/Users/nglie/Downloads/SSRN-id1686112.pdf, accessed June 15, 2022. Chung found directionally consistent results with the Original Persistence paper using Preqin data. However, Chung found somewhat different results such as a lack of persistence in the third and thereafter funds and with subsequently larger funds.

[32] Ibid. p. 4

[33] Ibid. p. 6

[34] J. Lerner, A. Schoar and W. Wongsunwai, Smart Institutions, Foolish Choices? The Limited Partner Performance Puzzle. Journal of Finance 62, 731-64., 2007.

[35] Sensoy, Berk, Y. Wang and M.S. Weisbach, Limited Partner Performance and the Maturing of the Private Equity Industry, Journal of Financial Economics Vol. 112, 320-343, 2014.

[36] Harris, Robert, Jenkinson, Tim, Kaplan Steven, and Stucke, Ruediger, Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds, November 2020, NBR Working Paper No. 202-167, November 2020 Available at SSRN: https//ssrn.com/abstract=3735676, ("Updated Persistence Paper"). The authors utilized the Burgiss database of their LP client portfolios covering 893 buyout funds. The switch was made to Burgiss as some flaws in the original Venture Economics data were subsequently uncovered. The Burgiss database is the most comprehensive of the ones noted above in that it includes actual cash flows, the IRRs and MOICs from LP portfolios.

[37] Ibid

[38] Ibid., p.22

[39] Ibid., p 30

[40] Ibid., p. 2

[41] Ibid.p., 9

[42] Ibid.p., 3.

[43] Ibid., p. 2

[44] Ibid. p13

[45] Ibid. p20.

[46] Pitchbook, Allocator Solutions, Evaluating Persistence in Fund Performance, Q 3, 2023, p. 7.

[47] Persistence in Alternative Asset Strategies: Private Equity Buyouts, Preqin, 2022.

[48] Ibid., p. 8

[49] Ibid., p.8

[50] Ibid., p.3 and 8.

[51] Updated Persistence Paper, p. 3-4. These secondary products have investment strategies that vary from the original flagship fund and in all likelihood the anticipated return may well be lower. These secondary products need to be compared to those with comparable investment strategies, i.e., credit to credit, real estate to real estate, etc.

[52] The Preqin database ranks firms based on GP reported IRRs that include both realized and unrealized results to calculate the IRRs and MOICs. They equally weight both the IRR and MOIC over the time period measured to determine their quartiles. The Burgiss data contains the same information regarding unrealized returns reported by the GPs. Nonetheless Preqin provides directional guidance as to how firms are performing after the investment period and their results are consistent with those in the Harris et.al. paper.

[53] https://www.privateequityinternational.com/cvc-confirms-close-on-largest-ever-buyout-fund-collecting-e26bn/ Accessed July 24, 2023.

[54] Steven N. Kaplan, Antoinette Schoar, Original Persistence Paper, 12 August 2005.

[55] Original Persistence Paper, Ibid.

[56] Original Persistence Paper, Ibid. But in the later Updated Persistence Paper, Kaplan et al reached the opposite conclusion. F. Lopez-de-Silanes, L. Phalippou, O. Gottschalg, Giants at the Gate: on the Cross-Section of PE Investment Returns, March 2009, https://www.researchgate.net/publication/48376484_Giants_at_the_Gate_On_the_Cross-Section_of_Private_Equity_Investment_Returns, accessed July 21, 2022, which found diseconomies of scale which negatively impacted returns; Berk and Green (2004), Kaplan and Lerner 2010 Pastor and Stambaugh 2012

[57] Ibid.

[58] Portfolio Management In Private Equity, Gregory W. Brown, Celine Yue Fei, David T. Robinson ("Brown *et al"*) Working Paper 31664, http://www.nber.org/papers/w31664, National Bureau of Economic Research, September 2033.

[59] Decreasing Returns or Mean-reversion of Luck? The Case of Private Equity Fund Growth, Andrea Rossi, Working Paper Fischer College of Working Paper Series, 2017-03-026, Dice Center Working Paper 2017-26, referred to herein as Rossi Paper.

[60] Ibid, p.2

[61] Ibid, p. 2

[62] Brown *et al*, op cit.

[63] Mutual Fund Flows and Performance in Rational Markets, Jonathan B. Berk and Richard C. Green, Journal of Political Economy, Vol. 112, No. 6 (December 2004), pp. 1269-1295

[64] Ibid.

[65] https://fundresearch.fidelity.com/mutual-funds/view-all/316184100, Accessed September 2, 2022.

[66] Blackstone web site, https://www.blackstone.com/our-businesses/private-equity/, accessed June 13, 2022.

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