

An Inconvenient Fact: Private Equity Returns & The Billionaire Factory

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Private Equity (PE) funds have returned about the same as public equity indices since *at least* 2006. Large public pension funds have received a net Multiple of Money (MoM) that sits within a narrow 1.51 to 1.54 range. The big four PE firms have also delivered estimated net MoMs within a narrow 1.54 to 1.67 range. Three large datasets show average net MoMs across all PE funds at 1.55, 1.57 and 1.63. These net MoMs imply an 11% p.a. return, which matches relevant public equity indices; a result confirmed by PME calculations. Yet, the estimated total performance fee (Carry) collected by these PE funds is estimated to be \$230 billion, most of which goes to a relatively small number of individuals. The number of PE multibillionaires rose from 3 in 2005 to 22 in 2020. Rebuttals from the big four and the main industry lobby body are provided and discussed.

* All the data and calculations used in this paper are available at: <http://pelaidbare.com/links/excel-book/>

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1. Introduction

The Private Equity (PE) model, especially in the Leveraged Buy-Out (LBOs) segment, is a costly form of financial intermediation. Consider the aggregate value of all companies subject to an LBO in a given year: they have earnings of \$60bn, an Enterprise value of (10x earnings) \$600bn, split between two thirds of Debt (\$400bn) and one third of Equity (\$200bn); see Table 1 for a summary of all the figures and computations. To acquire all these assets, many professionals (lawyers, consultants, advisers, accountants) spend long hours analysing companies from every angle, designing business plans and complex corporate structures (aimed at minimizing tax bills among other things). After the acquisition, there may be more work to be done by consultants, investments bankers and some additional fees charged by the PE firms. The management team also earn, in total, much more than in non-PE owned companies. Hence, bringing this \$600bn of assets per annum (p.a.) under PE ownership and holding them there, costs at the very least \$20bn p.a.¹

In addition, \$400bn is borrowed at a cost of \$10bn as lenders need to pay for their own due diligence. Some of this capital, however, needs to be raised from institutional investors. The cost differs as a function of the type of intermediary (Banks, CLO funds, Private Debt funds, or Public Debt markets) as well as the way it is charged (e.g. Private Debt Funds charge about 1.5% of amount invested, i.e. about 6% over the four years holding period, plus sometimes a performance related fee). We do not have a good estimate of the total cost of providing this debt, but 1.25% p.a. for four years seems reasonable, i.e. 5% of \$400bn = \$20bn (Table 1).

Next, \$200bn of equity is raised (it is, in fact, more than \$200bn as transaction costs need to be covered by equity providers). Institutional investors provide the equity via funds, and thus need to do due diligence on them, hire fund lawyers, consultants, etc. The funds hire lawyers, too, go on road shows, may hire placement agents, sponsor conferences and events, and so on. As shown in this paper and elsewhere, PE funds charge at least \$50bn to invest \$200bn.

Hence, the deployment of this money costs at least \$100bn. If investments were liquidated the next day, the equity would be worth \$200bn. Hence, what needs to be recouped for the equity holder is an amount equal to half the investment made; over just four years.²

Where are these \$100bn payments coming from and going to? The source of these payments is the set of companies subject to an LBO. The money goes to maybe 100,000 people who work in and around PE firms.³ These people do the type of jobs mentioned above, but the ecosystem who lives out of these payments is wide. In addition, there are many people in the ecosystem whose costs are borne by the equity and debt providers and come on top of the costs computed above. These are the fees earned by secondary and other funds of funds, providers of separate managed accounts and of feeder funds, asset allocation consultants, *etc.* The \$100bn figure is a conservative lower bound.

Given the costs, leverage employed, and that the value of (public) equity historically increased by 11% p.a., the value of private equity needs to increase from \$200bn to twice as much (\$400bn) to break-even (Table 1). Absent an increase in valuation, *organic* growth in earnings would then need

¹ To acquire these assets, there are also take-over premiums offered, and some taxes; these alone may represent a 100% transaction cost for the equity deployed in the deal.

² More broadly, Philippon (2015) shows and discusses a “puzzling” overall increase in the cost of financial intermediation.

³ Source: LinkedIn, where there are 275,000 people who report as their main industry PE/VC, worldwide. We do not know the exact subset of these who are on the LBO side, nor those who simply indicated this industry as a career goal rather than their current employer. Hence, I went with 100,000, as a conservative guess.

to be 11% p.a., which seems unrealistically high.⁴ Over the past two decades, valuations did increase and a lower earnings growth could then accommodate a doubling of equity value.⁵ Going forward, it may be more difficult to have the same increase in valuations (multiple expansion). In addition, if these large, and mostly fixed, costs were just about covered in a high-return market, then a low-return market might pan out differently. Note also that when fixed costs are large, size becomes an important factor. Most PE funds are small and it is difficult for them to cover their costs.

In the rest of the paper, I detail the empirical evidence that went into Table 1 and beyond. Specifically, I show that as of the end of 2019 (i.e., right before Covid-19), since at least 2006, net of fees performance of PE funds matched that of public equity markets.⁶ Despite this lack of clear outperformance, the fee structures are such that a few individuals shared a large performance-related bonus payment, known as Carry, which added up to \$230bn for funds raised over the decade 2006-2015 (these are the most recently raised funds that terminated (or were close to terminating) their investment period as of 2019 year-end).

It is widely believed that paying Carry is good news for investors because it means that returns have been good. A first caveat is that Carry works only in one direction. Hence, an investor may end up paying Carry to some managers even if its overall PE portfolio performed poorly. Second, Carry is paid as a fraction of absolute performance, rather than relative performance. Hence, although the latest decade of funds that terminated their investment period (2006-2015 vintages) returned about the same as public equity benchmarks (about 11% p.a.), their managers still received \$230bn of Carry, alongside a lot of other fees. Most of this money went to a relatively few individuals, mostly founders of large PE firms (Ivashina and Lerner (2019)). I find that the number of PE multibillionaires rose from 3 in 2005 to 22 in 2020, and are mostly affiliated to large PE firms.

Table 1: The World of LBOs, on Aggregate and in a Nutshell⁷

E. Entry Earnings		60bn	Total, targeted companies, yearly
EV. Enterprise value	10*E	600bn	
Eq. Equity Value	33%*EV	200bn	Coincides with \$1 trillion of Assets Under Management
D. Debt Value	66%*EV	400bn	
Ca. Acquisition cost	3.3%*EV	20bn	Inc. due diligence, legal costs, charges by GPs
Cb. Borrowing cost	2.5%*D	10bn	Payment to lenders (inc. bridge loans, rate mark-up)
Cd. Debt provision	5%*D	20bn	Debt comes from institutional investors at a fee
Ce. Equity provision	25%*Eq	50bn	Inc. organizational and fund expenses, fund fees, Carry
Financial Intermediation Cost		100bn	Ca+Cb+Ce+Cd
Of which carry		23bn	Payment to few individuals. 230bn over a decade
Number of people in PE		100,000	\$1mn per person for four years, but occurs each year
Break-even point			
EEq. Exit Equity		400bn	(Eq+Ca+Ce)*1.11 ⁴ = 400; 11% is public equity return
ED. Exit Debt		500bn	(D*(1+4.1%)+Cb+Cd)= 500
EEV. Exit EV	EEq+ED	900bn	
EF. Exit Earnings	EEV/10	90bn	Assumed no Multiple expansion
Growth in earnings		11%	Annualized organic growth over four years

⁴ This is silent about the source of value growth; it could come from better management, luck, market timing, breaking implicit contracts with, or capital transfers from, stakeholders; or a combination of all of the above. Note also that in practice EBITDA growth is often not organic but is due instead to add-on acquisitions or internal expansion.

⁵ Whether this is good for society, however, is not obvious and it is discussed, e.g., in Morris and Phalippou (2019).

⁶ Note that these performance results do not account for any potential differences in risk between public and private equity, or potential diversification benefits of some or all PE funds. See, e.g., Sorensen, Wang, and Yang (2013), Franzoni, Nowak, and Phalippou (2012), Ang et al. (2017) for related discussions.

⁷ Data on volume are from annual reports of both Preqin and Bain & Company; rounded up, for LBOs worldwide.

I also show that large pension funds have earned about \$1.5 (net of fees) per \$1 invested in PE funds (both since 2006, and since inception). At least since 2006, this return is about the same as what public equity has returned. The big-four PE firms seem to have delivered about the same. The average PE fund, too, delivered about the same. A large fund for which I have details on fees and expenses, also generated 1.5x capital invested and the cost to investors was \$1.4bn of carry and \$1.4bn of other fees (management fees, expenses, portfolio company fees); fund size was \$10bn. How could this be an economic equilibrium?

First, a headline figure that is often shown prominently as a rate of return in presentations and documents is, in fact, an IRR. IRRs are not rates of return. Something large PE firms have in common is that their early investments did well. These early winners have set up those firms' since-inception IRR at an artificially sticky and high level. The mathematics of IRR means their IRRs will stay at this level forever, as long as the firms avoid major disasters. In passing, this generates some stark injustice because it is easier to game IRRs on LBOs in Western countries than in any other PE investments. That means that the rest of the PE industry (e.g. emerging market growth capital) is sentenced to look relatively bad forever, for no reason other than the use of a game-able performance metric.

Second, it is easy to pick a public equity benchmark with low returns. The standard choice of benchmark used to be the S&P 500 Index. Now, it is the MSCI World Index (or MSCI All Country World Index, which includes emerging markets). Another common benchmark is the Russell 2000 Index. I show that these latter two indices have much lower returns than others. In addition, I show that average PE fund net returns, both pre-2006 vintages and post-2006 vintages, are within 1% p.a. of the net returns of both the oldest *passive* mutual fund investing in small stocks (Dimensional Fund Advisors micro-cap fund) and the oldest *active* mutual fund investing in small stocks (T-Rowe Price small-cap fund). Hence, both before and after 2006, PE funds have performed in line with comparable publicly traded stocks.

A more subtle, but crucial, related point is that the public equity portfolio of institutional investors is usually internationally diversified; thus, their public equity portfolio has a return close to that of MSCI World Index (or MSCI ACWI). The PE portfolio, in contrast, is mostly invested in the US. As US have stocks outperformed non-US stocks, institutional investors who simply compare their public equity with their private equity returns, without separating the US and non-US components, see a higher past performance in private equity, leading to the often heard statement that PE has been the highest performing asset class for institutional investors.

Why are trustees, investment teams, external managers, consultants, not seeing through this? Maybe because their livelihood depends on them not seeing it. Net-of-fee performance of PE funds being superior to that of public equity is the *sine qua non* condition for continued employment of at least 100,000 people. The importance of this condition might explain why the mantra of 'PE outperforms' has for many people, who work in and around PE, become a quasi-religious article of faith. Merely to question it is considered heresy: either you believe and you are one of us, or you question the existence of outperformance and you are an enemy.

In addition, many individuals want to avoid embarrassment; think of a pension fund board admitting paying billions of Carry in order to achieve the same returns as public equity markets. Board members and trustees typically have what economists would call poor incentives, in that they face only a potential downside (mostly reputational), with no upside. This encourages herding behaviour: it is easier to follow the crowd and hard to be a contrarian. Finally, there is self-selection. As data is incomplete, there is room for interpretation. Those sceptical about PE will not work in that industry whereas those who do, will.

Why are non-PE people not objecting? Those who know enough about PE are easily outnumbered, and even they may not know all the tricks (e.g., what is presented as a net return is not the rate of return earned by investors). But even when they understand the tricks, presenting a solid case against a myth perpetuated by thousands of clever people, who are well financed and in powerful positions (e.g., PE professionals often sit on Endowment investment committees), is still an uphill battle. This paper has effectively taken me over fifteen years to write. The reader may notice how dense it is in places even though I have spent many hours simplifying and clarifying the argument as much as possible. Much of what follows consists of best-approximations that deliver a series of consistent facts. The incomplete nature of the PE data that are made publicly available makes it easier than it should be to dismiss inconvenient facts.

But the real picture will eventually become clear. Ever since Phalippou (2014) pointed out that most of the pre-2006 vintage findings of PE outperformance was driven by the choice of the benchmark (e.g., large cap indices such as the S&P 500), evidence supporting that view has accumulated. For example, a group of notable practitioners replicated and generalized my findings using a more comprehensive and precise dataset (L'Her et al. (2016)). Then I pointed out in a series of blog posts that from vintage year 2006, PE returns lined up with any US public equity benchmark; a result confirmed by Harris, Jenkinson, and Kaplan (2016). Johnson (2017) found similar results using Cambridge Associates data and a variety of US small-cap stock indices in a white paper for members of the Institutional Limited Partners Association, which has just been released for the public. The last year has seen an avalanche of practitioner reports confirming that average PE returns are similar to those of public equity, notably Ennis (2020) and Ilmanen, Chandra, and McQuinn (2020).

More people have obtained access to other comprehensive datasets. Highly respected and visible academics -- Lerner et al. (2020) and Ivashina and Lerner (2019) – have reported what they found: average PE net returns in line with public equity returns. Lerner et al. (2020) even go further, as they have access to not just the main PE fund return data but that of all the side vehicles as well, such as Separately Managed Accounts. They report that the latter have delivered even lower returns. In turn, these findings made it into the widely read *Global Private Equity Report 2020* by Bain & Company, which cites Josh Lerner noting that “for the past decade U.S. public equity returns have essentially matched returns from U.S. buyouts which (to put it mildly) is not what PE investors are paying for.” Recently, as well, Andonov and Rauh (2020) collected the returns of 571 pension plans and show that over the last ten years, the mean performance in PE is 11.3%, which matches returns of US public equity, and all the statistics shown in this paper.

I pointed out in my first paper, fifteen years ago, that a combination of features - misleading performance information that was presented to investors, the fees being higher than those recorded in any other investment vehicles, the high transaction costs and the many layers of potential agency conflicts – suggested the outcome was unlikely to be positive for investors. Despite the progress noted above, regardless of when the above facts become widely admitted and solutions are found, some people will have become extraordinarily rich. That wealth will not return to pensioners, universities, *etc.* Broader society may become yet angrier at the whole PE industry and at the market system more broadly, even though most of the issues come from a subset of the PE industry, and despite the fact that PE can point to real achievements.⁸

⁸ The numerical picture may change post Covid-19 as some of the Carry from current funds can be recalled if realized performance decreases. However, it is unlikely to change the overall picture, and the lessons learnt.

2. The ‘best’ Leveraged Buy-Out of all times: Hilton Hotels

We begin by benchmarking performance at the deal level and use an iconic transaction to illustrate. The largest capital gain ever realized in Private Equity is the \$13.8bn of the Hilton Hotels buyout. Funds controlled by Blackstone invested a total of \$6.4bn into Hilton, starting right before the financial crisis (June 2007), and received \$20bn both from the sale of the equity at the Initial Public Offering (January 2014) and the subsequent equity sales all the way to December 2018. In September 2014, Bloomberg published a story that called the Hilton LBO *The Best Leveraged Buyout Ever*. Bloomberg wrote in glowing terms about the smart management and extraordinary growth. As Hilton was publicly listed before and after the transaction, we can observe the cash flows from and to Blackstone PE funds with reasonable accuracy; shown in Table 2.

The closest publicly listed competitor to Hilton, Marriott, saw a 9.2% p.a. return on its stock from June 2007 to December 2013. The Enterprise Value of Hilton went up by 4% p.a. over the same period. As Hilton was more leveraged, however, the value of its equity increased by more than 4%. Post IPO (2014-2018), we can compare the two stock-returns: 12% p.a. for Hilton and 21% for Marriott. For accurate comparisons, however, we need to calculate Net Present Values (NPVs). If we use the overall US stock-market index (CRSP value-weighted), NPV is \$5bn, which means that nearly two thirds of the \$13.8bn capital gain is explained by overall stock-market appreciation over this time period. If we use Marriott as a benchmark, NPV drops to \$1.8bn.

This outperformance is before fees. Management fees are difficult to attribute to a deal because they are charged at the fund level, and on capital committed to the fund and not on capital invested. To be conservative, I assumed that management fees were 1.2% on the total capital invested on this deal and were charged for ten years. As Blackstone funds were probably in the carry at the time of the IPO, they collected 20% of the gains from the IPO onwards. To be conservative again, I assumed they collected carry only from November 2016 (which is when they returned all the capital invested in the deal). Under these conservative fee assumptions, \$685mn of management fees have been charged, plus \$2.6bn of carry, and the NPV relative to investing in the stock of Marriott is then zero.

This example was chosen because it is famous but also because it illustrates the key take away of this paper: An investment made by a 2006 vintage fund generated \$2.6bn of carry for the PE firm (plus at least \$685mn of management fees), \$150mn for the CEO (\$100mn for rest of senior management), \$5bn for selling shareholders and \$470mn of direct acquisition costs (plus other professional service fees). After all those fees and carry, it is remarkable that the Hilton buyout delivered a rate of return to investors similar to that they would have earned by investing in its closest public equivalent (Marriott). This transaction is often portrayed as the best LBO ever; but for who?⁹

Table 2: Cash flows generated before fees on Hilton Hotel transaction

Date	Cash flows (mn)	Date	Cash flows (mn)
28/06/2007	-5700	07/06/2017	391
08/04/2010	-819	13/06/2017	1086
17/12/2013	100	20/06/2017	342
27/06/2014	2271	25/09/2017	184
08/11/2014	2536	04/11/2017	1078
14/05/2015	2674	01/12/2017	460
15/11/2016	1285	15/02/2018	10
15/03/2017	6469	15/05/2018	1374
		15/08/2018	14

⁹ NPV relative to the S&P 500 (net of these assumed fees) is positive (\$2.8bn), hence Blackstone could be credited for market timing, i.e. (either by skill or by luck) they bought and sold the equity of a large hotel company at the right time.

3. Blackstone rebuttal on the benchmarking of the Hilton LBO

Blackstone helpfully replied to my solicitation for feedback. Their letter is reproduced verbatim in Appendix I. I comment here on the part of the letter that relates to the Hilton LBO.

Blackstone first assert that my cash flow data (Table 2) are incorrect. As mentioned, I took the cash distributions from SEC filings, but the timing and size of the investments is indeed not public information and I had to make an assumption. They also argue that they obtain different NPV figures. The Excel spreadsheet with all the data and calculations is publicly available.

They argue that comparing the return obtained on the Hilton LBO to an investment in Marriott is ‘flawed’ because it is not possible to buy \$6bn of Marriott stock on the market. Although this is obviously correct, it does not invalidate this standard benchmarking exercise. Any pension fund investing in Blackstone will have an exposure to Hilton equity of at most \$300mn (i.e., 5% of the Blackstone fund that invested in Hilton) via this transaction. An individual pension fund could quite reasonably ask what would have happened to this \$300mn if instead of investing via Blackstone in Hilton, it had invested instead via the public market in Marriott stock.

More generally, it is unclear whether large amounts deployed in public equity generate large transaction costs. We have limited empirical evidence on this issue but note that the Norwegian Sovereign Wealth fund deploys \$600bn in public equity with relatively low transaction costs. For small investors, however, it is unlikely that public equity investing comes with a significant transaction cost. Note as well that my analysis above does not take account of the costs associated with institutional investors having to provide large amounts of cash at short notice, as it is the case here for Hilton LBO, and more generally in PE.

Next, Blackstone point out that the Marriott stock price rose by 7% on the announcement of the Hilton LBO and suggests to set the first cash flow on that day. Marriott stock went up 1.2% (day-2), 1.6% (day-1) and 7% (day-0; July 5th), then went down from the next day onwards and ended with a negative return for the whole month of July (-4%). If we set the first cash flow date as being July 5th, the NPV does become positive and equals \$700mn. Usually, we set the cash flows dates on the day they occur. If the transaction was announced on July 5th, and given that the Hilton stock was delisted on October 24th it is unlikely that the cash flow occurred on July 5th. Above, I had simply set it to end of June. Changing it to end of July, would further lower the NPV (as Marriott stock went down after July 5th). Changing it to end of August would increase NPV a bit. Changing it to end of September, would give the same results as those above.

Finally, Blackstone point out that their Real Estate funds have outperformed REIT indices. This may be true, though I am unable to verify it because Blackstone does not to publicly disclose the fund’s cash flows and reports no PMEs. It is an open question in the literature whether REITs, which tend to have low leverage and to invest mostly in so-called core real estate, have higher or lower risk profiles than investments in private equity real estate funds, with the latter focusing generally on highly levered opportunistic real estate.

To conclude, there are many nuances one can bring to the brief Hilton analysis in section 2. The overall picture seems to remain that while the change in the equity value of Hilton before the LBO and after the LBO is large, a large proportion of this change in value went to the selling shareholders and to fees, including Carry. The value of what is left for the equity investors (i.e., Limited Partners) depends on the choice of the benchmark. Regardless of the assumptions made, the difference in performance (after fees) compared to the most similar quoted stock (Marriott) appears to be lower than what one might expect based on widely-reported accounts of the investment.

4. Analysis of aggregate fund-level performance

Table 3 shows the return of different stock market indices and those of several mutual funds (net of all fees). The first column shows the average for the time period 2006-2019. We observe that the stock-market indices all have returns around 10% and are all close to one another, except for MSCI World and Russell 2000.¹⁰

Turning to private equity (PE) fund performance, Burgiss is widely seen as the most accurate provider of fund cash flow data, especially for North American PE funds, which is our focus. This is the most widely used dataset in academic research.¹¹ Although this dataset has effectively started in the mid-2000s, and added data over time; I expect any bias to be small.

To benchmark PE fund performance, the standard textbook solution is the use of a Net Present Value, just like we did with the Hilton Hotel case in the previous section. Kaplan and Schoar (2005) popularized an NPV-based measure called Public Market Equivalent (PME). PME is the ratio of the present value of distributed capital to the present value of invested capital. The discount rate is the benchmark public stock index. Until recently the literature largely advocated that the benchmark should be the S&P 500 Index, before switching to prefer the MSCI World and Russell 2000 instead. As shown in Table 3, indices can differ significantly in terms of performance because they each reflect a different investment strategy.

The results pre-Covid-19 (i.e., for the period ending December 2019) were made available in April 2020, and are shown in Table 4. We focus on Private Equity North American funds as they represent the largest portion of the private equity capital invested and this geographic focus makes it easier to choose a meaningful benchmark: US stock-market indices.¹² As shown in Panel A, at the end of the year 2019, the dataset includes 2132 Private Equity (PE) funds from vintages 2006 to 2015, which together raised \$1.7 trillion.¹³ The subset of PE funds that focus on Leveraged Buy-Out (LBO) have had higher returns – perhaps because they also have the highest systematic risk. LBO funds represent about one quarter of the funds by number, but half of the capital invested in PE. Net of fees, PE funds collectively earned about the same as the S&P 500 (PME is slightly below unity), while LBO funds slightly outperformed. The 1.05 PME of LBO funds reflects annual outperformance of about 1% p.a. as these investments are held for an average of 4.5 years and PME represents the cumulative outperformance.

Note that when IRR is close to public equity returns, it is not severely biased (as the assumed re-investment rate is realistic). IRR here is 11% for PE funds and 12% for LBO funds. This IRR is consistent with the Multiple of Money (MoM) of 1.57x (\$1 growing at 11% over 4.5 years becomes \$1.6), and this IRR is close to public equity indices (although these two numbers are often not comparable).¹⁴

From vintage 2016 onwards, all the PMEs are below unity for private equity funds, hence performance would have been lower if these funds were included. Including these vintages could be misleading, though, because these funds have not finished their investment period. For this reason, I could have also taken out 2015 as some funds from that vintage year might not have finished

¹⁰ Note that MSCI World is not a US index and its underperformance is driven by its non-US component.

¹¹ See, e.g., Harris, Jenkinson, and Kaplan (2016), Harris, Jenkinson, and Kaplan (2014).

¹² Fund of funds, including secondary funds are not included; including them would further lower average returns. Similarly, our exclusion of non-US funds, Private Debt funds, and side vehicles also increases average performance.

¹³ Private Equity includes all private market funds except for those investing in debt. For example, we exclude infrastructure debt but include infrastructure equity, same for real estate.

¹⁴ Any IRR below about 5% and above 15% over this time period should be discarded because the re-investment assumption it uses would be unrealistic. IRRs around 10%, therefore, may be used in this context.

investing either. Excluding vintage 2015 leads to a lower PME than that shown in Table 4. The starting year is more important. I start with vintage 2006 because results are different before that vintage year. PME for vintage years 1996 to 2005, although based on fewer observations, are high. For example, in Burgiss figures are: 1.33 for LBO and 1.25 for PE (Table 4).

PME for these earlier vintage years is sensitive to the data provider (perhaps because of less complete coverage and different backfilling approaches) and, most importantly, to the choice of the benchmark index. Although Burgiss provides several alternative benchmarks, for US mid-cap and small-cap stocks it provides only the Russell 2000 Index. As shown in Table 3, this index seems to be an outlier.¹⁵ As PE and LBO funds invest almost entirely in companies that would fall below the S&P 500 size range, Phalippou (2014) pointed out that it would be more pertinent to use traded (i.e., net of all fees) returns from the oldest passive mutual fund operating in the small- and mid-cap space: Dimensional Fund Advisors (DFA) ‘micro-cap’ fund. As this benchmark is not available in Burgiss, we need to use Preqin cash flow data. In addition, it may be pertinent to also use the oldest small cap actively-managed mutual fund in the US, that of T-Rowe Price.

Preqin’s cash flow dataset is much smaller than that of Burgiss and appears to be positively biased towards better performing funds. Yet, the pattern in the Preqin data is clear. Vintage years 1996-2005 strongly outperform the S&P 500. Vintage years 2006-2015, in contrast, outperform the S&P 500 index only slightly. When comparing to a more relevant benchmark, however, results are similar across both time periods: PE funds have always had a performance close to that of DFA micro-cap fund, and of T-Rowe Price small cap fund. LBO funds of 1996-2005 outperformed these mutual funds, but not by a wide margin. We also need to bear in mind both the fact that there are fewer observations for these vintage years and the bias towards better performing funds (which can be seen by comparing the S&P 500 PMEs for LBOs in Preqin vs. Burgiss).

Interestingly, the Cambridge Associates database enables one to compute PMEs with other small- and mid-cap indices. Table 4 shows results through December 31, 2019 for a dataset of 3,106 funds selected to be similar to my Burgiss sample in terms of geography, strategy and vintage years (1996-2015). Using the S&P 600 Small-Cap Index as a benchmark generates coherent results: for each of the vintage-year cohorts shown, PME is between 0.99 and 1.10 for PE funds and LBO funds, with only a slight over-performance in either decade.

A primary factor behind all these results can be seen in Table 3. All the stock indices shown have similar returns between 2006 and 2019, but not between 1995 and 2009. Between 1995 and 2009, the largest stock decile has a return of about 7%, hence all the indices dominated by large-cap, like the S&P 500, have returns of about 7%. In contrast, the other nine (Fama-French size) stock deciles together had returns averaging 11%, just like DFA micro-cap mutual fund and T-Rowe Price small cap fund. Note again that the Russell 2000 has a distinctively lower performance despite operating in the small-cap space.¹⁶ The 4% underperformance of the S&P 500 compared to the rest of the US stock-market coincides with the 4% underperformance of the S&P 500 compared to PE funds. Given

¹⁵ From Johnson (2017): “A third observation is the implied poor performance of the Russell 2000 Index versus the S&P 600 Index for every time-period represented by a given vintage year’s cash flow patterns in this analysis. While not shown on the exhibit, other U.S. small-cap indices such as the MSCI US Small Cap 1750 Index and the Dow Jones US Small Cap Index also outperformed the Russell 2000 Index over every vintage year’s cash flow pattern from 1995 to 2014. Further data can be found in the Appendix section of this report. This third observation is somewhat problematic, since the Russell 2000 Index is quite frequently used as a policy benchmark for US small-cap stocks.” There are different views as to why the Russell 2000 Index has such a low performance; many observers point to the rebalancing strategy that is used as the main issue.

¹⁶ It has been argued that the magnitude and frequency of the rebalancing made the Russell 2000 index a poor performer.

these relationships, it makes sense that PE performance for the pre-2006 period is very similar to that of stock indices which exclude the largest companies.

Figure 1 provides an additional illustration of the above result. We see that the ten-years' buy and hold returns are similar for Vanguard S&P 500 fund and DFA micro-cap fund, except for a period that spanned the mid 1990s to the mid 2000s. We see the same result on the figure below with the largest stock decile vs. the other nine stock deciles. PE fund performance simply followed that of small cap stocks throughout and from the mid 1990s to mid 2000s that happened to be below the performance of large caps.

Figure 1: 10-years Moving Average Stock Returns

Ten-years' moving average from the beginning of the year shown on the x-axis. Decile 10 is the return of the largest stock decile as provided on Ken French's website.

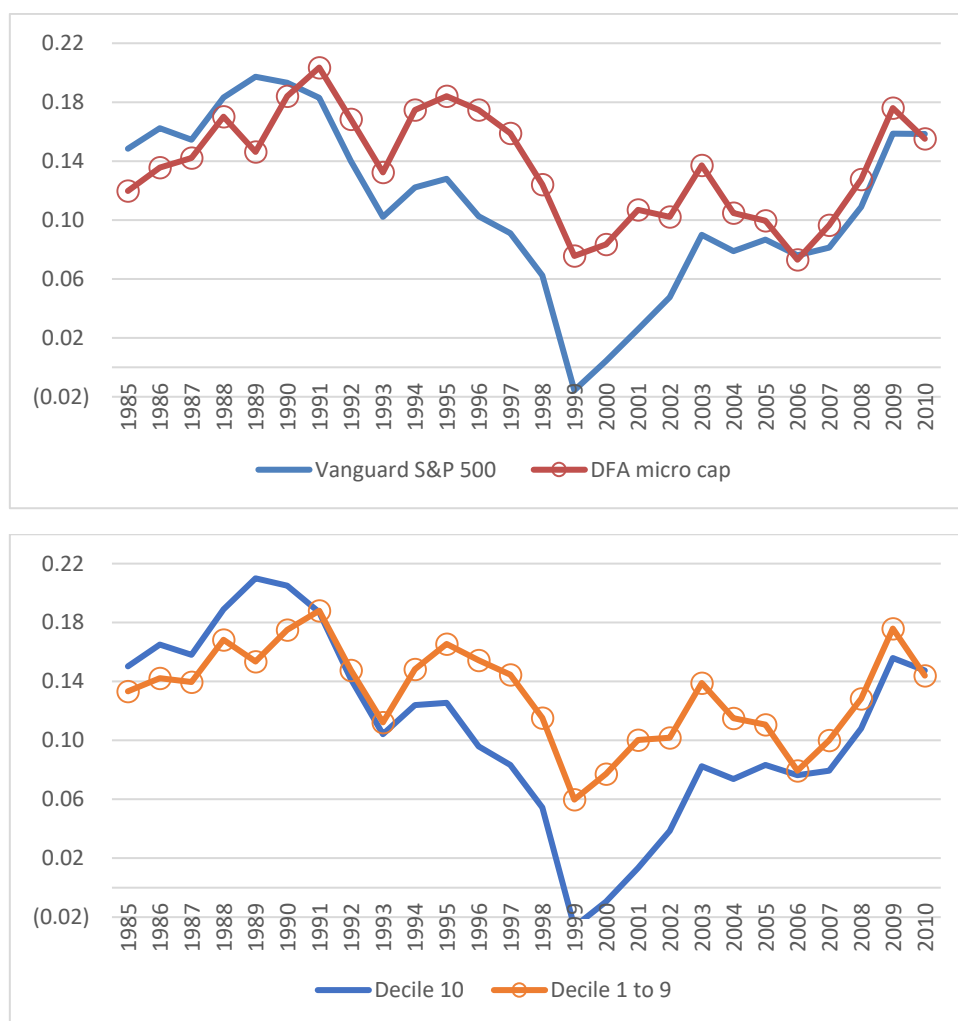


Figure 2: Performance Report of an Institutional Investor

Public equity annualised net returns		Private equity annualised net returns	
to 31 December 2018	%	to 31 December 2018	%
3 years	10.0	3 years	14.5
5 years	9.1	5 years	17.6
10 years	10.6	10 years	13.9

Table 3 – US stock-market indices returns, 2006-2019

Annualized Arithmetic Average Monthly Returns. Fama-French index data are from Ken French website; ex-largest decile index is the monthly average across the nine other stock deciles. Vanguard, T-Rowe Price and Dimensional Fund Advisors (DFA) are mutual fund providers whose returns are reported net of all fees.

	2006-2019	1996-2009	2010-2019
Vanguard S&P 500 index fund	10.3%	7.6%	14.3%
CRSP Value Weighted index	10.1%	8.2%	13.4%
Fama-French US stock-market index	10.6%	7.9%	14.5%
Fama-French US largest decile index	10.4%	7.2%	14.4%
MSCI World	8.6%	6.9%	11.0%
Russell 2000 index	8.5%	7.3%	11.8%
T-Rowe Price (active) small-cap mutual fund	12.1%	10.5%	16.0%
DFA (passive) micro-cap mutual fund	10.0%	11.5%	14.1%
Fama-French US ex-largest decile index	10.7%	11.2%	14.0%

Table 4 – Private Equity Fund Net Performance (Pre-Covid)

North American funds, Private Equity includes all Private market funds except Private Debt funds. IRR is the since inception pooled internal rate of return. MoM – Multiple of Money -- is the ratio of total amount distributed plus net Asset Value divided by the total amount paid in, also called Total Value per Paid In (TVPI). Burgiss PME is the Public Market Equivalent with the S&P 500 index as the benchmark, as in Kaplan and Schoar (2005). With Preqin data net mutual fund returns are used as benchmarks in the computation of the PME: Vanguard S&P 500, DFA micro-cap fund, and T-Rowe Price small-cap fund.

Panel A: Aggregate Performance, Burgiss data

	Vintage	Size (bn)	Number	IRR	MoM	PME
Private Equity (PE)	2006-2015	1,698	2132	11%	1.57	0.99
Leveraged Buy-Out (LBO)	2006-2015	741	550	12%	1.65	1.05

Panel B: PMEs with different benchmarks, pre vs post 2006, Preqin, Burgiss, Cambridge Associates

	Vintage	Preqin					Burgiss	Camb.Assoc. ¹⁷	
		Russell 2000	MSCI World	DFA Micro	TRowe- Price Small	Vanguard S&P 500	S&P 500	S&P 500	S&P 600 Small
PE	1996-2005	1.21	1.23	1.04	1.05	1.29	1.25	1.28	1.07
	2006-2015	1.12	1.16	1.04	0.96	1.03	0.99	1.01	0.99
LBO	1996-2005	1.33	1.36	1.13	1.15	1.43	1.33	1.38	1.10
	2006-2015	1.19	1.24	1.11	1.01	1.09	1.05	1.07	1.05

Panel C: Funds in the carry (net IRR>8%), Burgiss data

	Amounts (\$ bn)	
	Private Equity MoM=1.78, 70% in the carry	Leveraged Buy-Out MoM=1.77, 77% in the carry
Paid-in capital	1,182	568
Total Net Value	2,104	1,005
Net profit	922	437
Carry due	230	109
Gross profit	1,152	547

¹⁷ Cambridge Associates data are from analyses prepared by TVPI Advisors: <https://tvpiadvisors.com/research>

5. Estimating Carried Interest (Carry) -- Burgiss data

The fraction charged as Carry is nearly always the same (20%). The base on which it is charged does vary across funds but should be close to the total cash paid in by investors (which is the variable reported by Burgiss). The hurdle rate is almost always 8%, but one issue is that catch up rates vary a bit across funds and the way the hurdle rate is calculated may vary, too. The ways in which hurdle rates are computed vary as well and are complex but they are usually close to net IRR.

Carry is not reported in datasets like Burgiss and few, if any, investors have collected the amount paid in Carry over a sufficiently long time period. No-one knows the actual figure! That said, carry is the least difficult part of the fee bill to estimate from net cash flows. In addition, the approach described below has been tested on several cases where I had information on the carry paid and on net cash flows of a fund, and the approximation has always worked well (an example is given below).

I assume that all the funds whose net IRR is above 8% at the end of December 2019 are in the Carry and that the Carry is 20% of the profits. Profits are defined as total value (realized and unrealized) minus total paid in (i.e. total invested including fees).

In practice, the effect of the hurdle rate is that for funds whose net IRR is slightly above 8%, Carry will be less than 20% of profits. The exact amount depends on the catch-up rate. Most funds have a 100% catch up but some have an 80% catch up. It is possible to fine tune the above approach by assuming an 80% catch up rate and apply the amended profit amount to each IRR level. This correction, however, makes a difference only to funds with an IRR between 8% and 10%, and as there are few funds falling within this bracket, results are not affected much by this extra layer of complexity. Similarly, results are also not sensitive to the threshold choice of 8%.

Note as well that some funds might have an IRR below 8% as of December 2019 and yet have earned a Carry. If net IRR reaches 8% and then falls below it, some Carry is often earned (and repaid, partly, much later). In my procedure, I assumed these funds did not earn any Carry. All is all, my Carry estimate, therefore, does not have an obvious bias in either direction.

Most importantly, the carry I am computing here contains three types: the carry that has been earned and will never be returned, the carry that has been earned and that will be returned (clawbacks), and the so-called latent carry (i.e. has not been charged yet but is due given current performance). This total carry is the most relevant metric since the performance reported above is also not fully realized and calculations are made as if funds were liquidated at the end of year 2019, at the reported Net Asset Value.

Results are shown in Table 4 – Panel C. 70% of the money invested in PE is eligible for a carry payment whilst, once again, net returns are equal to those of public equity indices. The fraction in the carry is even higher for LBO funds, where even bottom quartile funds earned a Carry!

To compute how much carry has been charged, we need the total paid-in capital of the funds that are in the carry and their total net value (distributed plus NAV). For PE funds, it is \$1.2 trillion that has been paid into PE funds raised between 2006 and 2015 and the total value (net of fees) is \$2.1 trillion. The net profit is therefore \$922 billion. This profit is after the carry was retained, hence we need to divide that number by 4, which gives \$230 billion to obtain the carry earned.

The total profit pre-carry was \$1,152 billion, 20% of which is \$230 billion. Again, net of fees, all the PE funds in the sample had an aggregate performance in the vicinity of that of public equity.

6. The Billionaires

We just saw that American PE funds raised \$1.7 trillion between 2006 and 2015, generated \$230 billion of carried interest, and delivered to investors an overall net performance equal to that of stock indices and small-cap mutual funds). Most of this money goes to the largest PE firms and within the largest PE firms most of the money goes to a few partners, often the founders. At least, this was the model until a few years ago. First, the largest four PE firms went public in the late 2000s. Since then, the Carry they earn (as well as other fees) has been distributed to their shareholders (including the founders). Next, over the last few years, some PE funds have bought stakes in privately held PE firms and thereby paid the existing shareholders (mainly the founders of these firms) a large amount of money in order to gain access to a share of their future stream of fees and Carry. These transactions resulted in many PE firm founders becoming multi-billionaires. Many founders who did not sell part of their PE firms are also probably multi-billionaires as well but have not realized that value and are therefore not showing up in multi-billionaires rankings.

Comparing the Forbes list of the richest people in America in 2005 and 2020 is consistent with the idea that a small number of individuals in PE have benefited disproportionately. In 2005, there were three LBO multibillionaires: Henry Kravis and George Roberts, ranked 93, followed by Alec Gores ranked 181.

In 2020, Steve Schwarzman (Blackstone) is 29th, Leon Black (Apollo) 63rd, Henry Kravis, George Roberts, and Ale Gores are about 110th, Robert Smith (Vista) is 131st, Josh Harris (Apollo) is 154th. In total, 22 people working in PE (I did not include private equity real estate, infrastructure) appear above the \$2 billion net worth mark; versus 3 in 2005 (in year 2020 dollars).

Table 5: Cliffwater report on Public Pension Fund performance

Exhibit 6: State Pension 10-Year Returns by Major Asset Class

	Total Fund	US Stocks	Non-US Stocks	Fixed Income	Real Estate	Private Equity	Absolute Return
Highest Return	11.13%	15.62%	9.58%	9.38%	13.58%	18.14%	7.97%
25th Percentile	10.12%	14.65%	8.20%	5.56%	10.76%	15.19%	6.29%
Median Return	9.59%	14.35%	7.42%	4.98%	9.71%	13.88%	5.25%
75th Percentile	9.19%	13.80%	6.91%	4.44%	7.18%	13.53%	4.89%
Lowest Return	7.73%	6.74%	5.27%	2.99%	-1.03%	6.90%	3.78%
Average Return	9.66%	14.11%	7.75%	5.18%	9.34%	14.27%	3.87%
Benchmark Return	8.68%	14.67%	6.54%	3.90%	9.24%	14.03%	3.21%

Table 6: Investor Performance – Public Pension Funds

	Multiple of Money – Private Equity Funds
California (CalPERS)	1.51
Washington (WISB)	1.56
Pennsylvania (PSERS)	1.49
Florida (FSBA)	1.51
Oregon (OPERF)	1.53

7. Analysis of Public Pension Plan Performance in PE

One of Blackstone's rebuttals (see Appendix I) is that: "Public pension funds and other investors are highly satisfied with private equity's outperformance. A 2020 Preqin study found that 87 percent of limited partners said that private equity 'returns either met or exceeded their expectations' and 86 percent intend to allocate 'as much or more to the asset class' than they did in the preceding year. This reflects their well-informed view – as outlined by CalPERS, Yale, and many other of the world's most sophisticated and successful investors – that private equity has and continues to deliver substantial excess returns compared to public markets net of all fees." In other words: Since people are freely choosing to invest in PE and in fact want more of it, PE must be a very good deal.

Figure 2 shows an excerpt from the annual report of a large UK-based institutional investor. We see public equity over the last 10 years returning 10.6% p.a. Meanwhile Table 2 shows that over the last ten years all the US public equity indices are at about 14% p.a., which matches the PE returns reported on Figure 2 (and it is unclear whether the PE figures being reported are IRRs or not; and we should bear in mind currency differences).¹⁸ This particular investor highlighted in its annual report that PE is the best performing asset class in its portfolio.

The reason why the public equity returns look lower than PE is that most institutional investors' public equity portfolios, like the UK-based investor in question, are internationally diversified and include a significant fraction in emerging market equities. In contrast, their PE portfolios are overweighted towards the US. As the US dollar has appreciated against other currencies, global equity indices have had lower returns than American stock indices, and therefore than PE indices. In addition, emerging markets public equity underperformed whereas there is relatively little PE invested in emerging markets. Table 3 shows that MSCI World index has performance below that of US stock indices. Note how close the performance of public equity shown in Figure 2 is to that of MSCI World, whereas the performance of PE is close to that of US stock indices.

Taking into account currencies and country compositions is important. Interestingly, a recent study by Cliffwater shows the relevant breakdown for a group of large pensions.¹⁹ They collected the Comprehensive Annual Financial Reports of 66 state pension plans. Their exhibit 6 (reproduced in Table 5) shows the past ten years' returns broken down by "major asset classes." The average pension fund return is 9.7% and PE is the best performing asset class at 14.3%. These figures are close to what is shown in Figure 2. Importantly, stocks are split between US and non-US. Non-US stocks are at 7.8% and US stocks are at 14.1%. It is therefore clear that there is no difference in returns between PE and US stocks in this sample of the largest 66 pension plans over the past ten years. For the past twenty years, however, PE is shown to outperform US stocks, with returns of 9.6% versus 6.4%. But this 6.4% figure shows that pension funds invested in large-cap stocks. The 9.6% return on PE is below the return of both small-cap stock indices and mutual funds (Table 2).²⁰

The consultant concludes: "PE continues its history of providing state pensions the highest asset class returns, with average returns equal to 9.55% and 14.27%, respectively, over the 19-year and 10-year study periods. These returns outperform public market equivalent..." An alternative interpretation that is equally consistent with the facts would state that "PE returns over the 19-year

¹⁸ Pension funds (and others) may earn less than stock-market indices as they rarely invest passively into public equity.

¹⁹ <https://cliffwater.com/research>

²⁰ Andonov and Rauh (2020) collected an even larger set of pension plan annual reports and find an average return over the past 10 years of 11.3%. They do not detail US versus non-US public equity. Overall public equity return is 7.7%.

and 10-year periods (9.6% and 14.3%, respectively) have been equal to or higher than returns from large-cap stocks; but lower than returns from small-cap stocks.”

A standard response is that PE also has international exposure. I do not have enough data to do a detailed analysis, but it seems widely accepted that 70% of PE is invested in North America. Most non-US PE is invested in the UK, followed by Scandinavia and the rest of western Europe. The country distribution of non-US PE investments may differ substantially from that of the most common international stock indices and of the international public equity exposures of pension funds. Most importantly, the PE funds used in my above analysis are those that Burgiss, Cambridge Associates and Preqin are categorizing as funds that primarily invest in North America.

Another problem with the presentation of pension fund performance is that for PE, time-weighted returns such as those in Table 5 are not the most pertinent measure of performance. Asking how much pension funds gave and got back in dollar terms from PE, i.e., MoM, would be more pertinent. I went through the largest 15 funds websites to collect information on their performance. Few of them post their PE fund returns online. In most cases, they post information on their past performance in PE, but nothing that enables any meaningful benchmarking. *E.g.*, CalSTRS provides only the net IRR for each fund they invest in. As IRR can never be aggregated or compared to stock-market returns, such information is useless for performance evaluation.

In the Blackstone rebuttal (see appendix), CalPERS and Yale are cited as examples of successful investors. I comment below in more detail on Yale’s returns, but Yale like many other famous investors (e.g. CPPIB) does not give data on their MoM and we can therefore not make a definitive conclusion about their success. CalPERS does provide this information, along with four other large public pension plans, and we can therefore conclude more precisely as far as they are concerned.²¹

I select all the PE funds (excluding debt funds) that these five public pension funds invested in between 2006 and 2015. Results are shown in Table 6. What is remarkable is how close the MoMs of the five pension funds are. A multiple of 1.5x corresponds to a rate of return of 10.7% if investments are held for four years. 10.7% coincides with the since-inception IRR of CalPERS: “As of September 30, 2019, the since inception Net IRR is 10.7 and the Net Multiple is 1.5x.”²²

Not only do these pension funds have the same net MoM but that MoM is slightly below the overall net MoM reported in Burgiss and other datasets. So it makes no difference how much these pension funds have spent over time on their staff investment team; how much they have spent on their consultants (or who their consultants have been); what their Strategic Asset Allocation has been; how large their PE portfolio is; how much access they have to top-quartile PE firms; or how long they have been investing in PE (Oregon is one of the world’s longest-standing investors in PE). They have all ended up with the same net performance: just below average.

We can compute the total carry they paid in order to obtain this net performance. All five pension funds report the net IRR of each fund, hence we can estimate with reasonable accuracy which funds are in the carry. Both CalPERS and WSIB have made estimated carry payments of \$5 billion, just for these 2006-2015 funds; yet these funds delivered the same net return as quoted stock indices. Results are similar if I include vintage years 2005 and before, because on a size-weighted basis these vintage years are not large and MoMs have been stable over time.

²¹ Performance, for some reasons, is reported with one more quarter lag compared to Burgiss and other data providers. In the case of PSERS, it is even a full year lag. As in previous sections, I excluded all Private Debt funds and, to the extent they can be identified, fund-of-funds, separately managed accounts, etc.

²² Remember that if the IRR is close to what a reasonable re-investment rate is, then it is a reasonable figure to use; anything between 8% and 12% over the past two decades would qualify.

8. Yale Endowment: the Making of a Super-Star

An often-heard rebuttal is that the Yale Endowment (Yale) proves that investors can earn outstanding returns in PE. This story has taken on an almost mythical dimension, which has been addressed in Phalippou (2013). There it is shown that what Yale had presented as a performance figure every year, which had led to the common belief about Yale's performance, had never changed over the years. Phalippou (2013) speculated that the reason was the use of IRR to measure performance. As noted earlier, an IRR is not a rate of return. Yale's published track record until the publication year of Phalippou (2013) is reproduced in Table 7.

Yale then admitted that these returns were in fact IRRs, and perhaps coincidentally, after 2013 Yale changed the presentation of its performance. In 2014, they reported the past 20-year IRR, instead of the since-inception IRR: it was 36.1%. Then, in 2015, they separated LBO and VC, as recommended in Phalippou (2013). As anticipated, given the suspicion that the performance figures were IRRs, an implausibly high figure for VC was then reported (93% p.a.) and a more human figure was reported for LBO (16% p.a.); see Table 8. Yale Endowment continued to report the past 20-year IRR. The figure for VC became yet more implausible over time, culminating in their last annual report (2019) at a whopping 241% p.a. This is self-evidently implausible as an annual rate of return over a 20-year time period. The figure for LBO became more human, and apparently simply matches the industry average: 12%

To its credit, Yale now acknowledges that the figure they provide in their report for past performance does not reflect the returns they have actually earned. Adding this footnote does not seem to have altered the myth, but it is certainly progress. This is the phrasing of the relevant footnote in Yale's 2017 report: "Yale's 106.3% venture capital return over the past twenty years is heavily influenced by large distributions during the Internet boom. Since such a calculation assumes reinvestment of proceeds from the portfolio during the period at the same rate of return for the rest of the period, it is inappropriate to compound the 106.3% return over the twenty-year time horizon. For reference, the twenty-year time-weighted return of Yale's venture capital portfolio is 25.5%. Returns for other illiquid asset classes are not subject to large distortions."

Note that the time-weighted return is not a useful measure either in this case, because the returns are very skewed: the period probably includes one or two years with a return of 100% or more. The most informative measure of performance would be the MoM but despite being repeatedly asked, Yale has yet to communicate this common measure.

Interestingly, if Yale opts to report their past twenty-year return in VC again next year, the mathematics of IRR is such that their return will probably drop from a 256% p.a. average to about 15% p.a. average, which will look particularly odd. It will be interesting to see whether they then revert to reporting a since inception IRR, in which case the reported figure will be over 30%, or show the past twenty years average, in which case the explanation should be an interesting read.

To sum up sections 7 and 8: although Rebuttals often invoke track records of the Yale Endowment and other large institutional investors, the right information to assess their performance (MoMs, PME's) is rarely made publicly available. When the information is available to compute MoMs, we observe very little dispersion around an average of about 1.5x, which coincides with what US public equity has delivered as well.

Table 7: Yale track record in Private Equity until 2013

Annual report for the year	Annualized return in PE since inception	Annualized return in PE over ten years
2000	34.1%	37.9%
2001	32.9%	35.3%
2002	31.4%	36.9%
2003	30.7%	36.0%
2004	30.6%	37.6%
2005	31.0%	39.5%
2006	30.6%	33.9%
2007	31.4%	33.9%
2008	30.9%	35.9%
2009	30.4%	25.8%
2010	30.3%	6.2%
2011	30.3%	10.2%
2012	30.0%	13.2%
2013	29.9%	14.4%

Table 8: Yale track record in Private Equity since 2015

Annual report for the year	Annualized return in VC Past 20-year	Annualized return in LBO Past 20-year
2015	93%	16%
2016	77%	14%
2017	106%	13%
2018	166%	12%
2019	241%	12%

Table 9: Track record of the big-four PE firms²³

	Invested '06-'15	Gross MoM '06-'15	Gross MoM '76-'15	Net MoM '06-'15	Net MoM '76-'15
Apollo	46519	1.76	1.85	1.57	1.64
Blackstone	62921	1.89	1.94	1.67	1.70
Carlyle	39613	1.72	1.82	1.54	1.63
KKR	34886	1.92	2.29	1.67	1.95
Total	302,260	1.83	1.96	1.62	1.72

²³ I assume that what is reported as capital invested or capital paid-in include management fees and fund expenses. As a result, only Carry is taken out of the Gross MoM. If it is not the case then Net MoM is lower, and so is the Carry amount charged.

9. The Full Experience of One Institutional Investor in one large 2006 vintage LBO fund

Most of the calculations in this paper require assumptions regarding fees because available data are incomplete. There is one fund for which I have all the data, however, as a member of an investment committee which invested in a well-known large LBO fund in 2006. Thanks to a college alumnus, we were able to invest in what we were told was a unique and otherwise inaccessible opportunity.

Investors in blue-chip PE firms do receive a lot of information. So much so, in fact, that it is difficult to navigate through it. Also, the content is so complex that it is hard to follow all the computations. It took me many hours to compute the figures below.²⁴

The fund called \$10bn from its investors. Management fees over the life of the fund added up to 10% of this amount: \$1bn. Only half of that amount was charged to LPs because of the refunds from fees charged directly to portfolio companies (transaction fees, monitoring fees etc.). Hence, Limited Partners (LPs) paid \$1bn but only half of this amount was invoiced and then showed up in a way that allows them to be tracked. None of the fees charged directly to portfolio companies were disclosed. As most of these fees entitled us to a 50% to 80% refund, maybe another \$150mn extra was charged on our assets. Fund expenses are disclosed and add up to \$250mn. After asking a few times, I obtained a break down by category. Most of fund expenses represent the cost of credit lines that the fund buys from banks to bridge (or delay) capital calls; this is basically debt put at the fund level (aka subscription lines). Thus, \$1.4bn of fees and expenses were charged in total.

When the fund reached its tenth anniversary, at the end of 2016, the net IRR was 6%. Because this fund had a European-style carry waterfall, no carry was due. Most of the portfolio had not been fully exited. Many portfolio companies were publicly traded because they had gone through an IPO, but the PE firm had not yet fully liquidated the resulting equity stakes. What did this PE firm do?

They obtained extensions from their LPs, hardly exited any investments, and after thirteen years, the net IRR finally crossed 8% (the stock-market had done well in the meantime); at that point, coincidentally, or not, many investments were exited.²⁵ Total distributed is \$17bn. The math is quite simple: net profit is $\$17\text{bn} - \$10\text{bn} = \$7\text{bn}$ and carry due is \$1.4bn! The partners of this PE firm (and relevant investment teams) will be sharing \$1.4bn! And the performance that goes with this remuneration? 8% net IRR, gross MoM of 1.64x and a net MoM of 1.51x. Notice how close the net MoM is to what pension funds earned (see above), hence the fees that those pension funds paid (which they do not fully track) must be close to what is here.

Anecdotally, I had guessed that the firm would just ride the market until they crossed the 8% hurdle rate. When I asked to speak with the so-called Limited Partner Advisory Committee members (supposedly our representatives), I was told it was not possible to obtain their contact details because that would be a violation of the data protection legislation. I was also told that other investors were happy with fund extensions because they were under-invested in PE, thus did not want distributions! When I wrote in 2019 to applaud this multi-billion coup, the response read: "Thank you for your email. We can assure you that the GP is aligned with its LPs and has been working diligently to realise all the remaining investments in order to maximise value for investors (...), over 80% of LPs approved the extension of the fund. The extension was discussed at the LPAC meeting, the minutes of which are available on the investor portal."

²⁴ One needs to navigate recycled capital and deals with Special Limited Partners vs. other Limited Partners, and some of the distributions are retained, hence the cash flows that we observed will differ from what the fund reports etc. Note that figures on fund size and dates have been slightly modified to avoid identifying the PE fund.

²⁵ This pattern has also been observed on large samples by Robinson and Sensoy (2013).

10. Analysis of private equity firm level performance: The big four

Most of the billionaires listed above come from one of the big-four PE firms. We can analyse these firms' track records to a limited extent because they are publicly listed. This exercise makes it possible to address a common response, namely: "even if average PE returns are disappointing, some firms did exceptionally well. That means the pension funds that invested their money with these firms also did exceptionally well, and therefore these billionaires have earned their wealth."

Founded in 1990, Apollo presents itself as follows in its 10K filings: "As of December 31, 2019, we had total AUM of \$331 billion, including approximately \$216 billion in credit, \$77 billion in private equity and \$39 billion in real assets. We have consistently produced attractive long-term investment returns in our traditional private equity funds, generating a 39% gross IRR and a 25% net IRR on a compound annual basis from inception through December 31, 2019."

Similarly, KKR, in its 10K filings prominently states: "From our inception in 1976 through December 31, 2019, our investment funds with at least 24 months of investment activity generated a cumulative gross IRR of 25.6%, compared to the 11.8% and 9.1% gross IRR achieved by the S&P 500 Index and MSCI World Index, respectively, over the same period, despite the cyclical and sometimes challenging environments in which we have operated."

The IRR of Apollo's first four funds together is the same as Apollo's since-inception IRR: 39%. The IRR of the 'legacy' funds of KKR, i.e. those raised before 1996, is 26%, which is nearly the same as the IRR KKR reports in 2019. In fact, in the S1 filings that accompanied KKR's IPO in 2007, twelve years ago, the firm stated: "From our inception through March 31, 2007, our first ten traditional private equity funds achieved a multiple of invested capital of 2.7x and a cumulative gross IRR of 26.3%, compared to the 13.6% gross IRR achieved by the S&P 500 Index over the same period." Hence KKR's 'return' on its funds up to 1996 is the same as the return for all its funds as of 2007 and is the same as the return for all its funds as of 2019!

This pattern of never-changing return figures is no coincidence: it simply reflects the mathematics of IRR, and the basic fact that IRR is not a rate of return. Above, we saw that Yale Endowment reported a return in PE that hardly changed from one annual report to the next. The same is happening here. KKR's since-inception IRR is 26% in every SEC filing they have published since 2006, just as Apollo's 39% since-inception IRR never changes from one 10K to the next. In fifty years, assuming no major disasters, Apollo's gross since-inception IRR will still be 39% and that of KKR, 26%.²⁶

The use of such an absurd measure of performance may seem surprising in an SEC filing, but it is standard practice; the same is true for many private documents that are 'for sophisticated investors only.' This puzzle becomes easier to understand after looking into the widely used Global Investment Performance Standards (GIPS) that the CFA Institute maintains. GIPS makes use of since-inception IRR mandatory. By way of background, the 2010 edition of GIPS explicitly mandated "since-inception IRR" and I provided some feedback about this practice. The specific term "IRR" disappeared from the updated 2020 edition of GIPS. Unfortunately, the substance has not changed and the calculation that GIPS requires a since-inception IRR, just under another name:

²⁶ For their Corporate Private Equity funds, Carlyle report a 26% gross since inception IRR (18% net). Gross and net IRRs are 12% and 7% respectively for their Real Asset Private Equity track record. Blackstone does not report a gross IRR (only net IRR: 15% both for their Real Estate Private Equity funds, and for their Corporate Private Equity funds).

“2.A.29 When calculating money-weighted returns, the firm must: a. Calculate annualized since-inception money-weighted returns.”²⁷

One would have hoped that since-inception IRRs might have been banned by now (Phalippou (2013), Phalippou (2008)), but they continue to be prominently displayed and treated as if they were rates of return. For example, see the statement above by KKR directly comparing IRR with a stock-market index geometric average return.

The most common counter-argument is that ‘sophisticated people are not fooled by IRRs’ and detect distortions by comparing IRRs and MoMs. Let us therefore compare gross IRRs and gross MoMs. Apollo’s gross MoM is 1.82x. Hence, for 39% to be anywhere near the rate of return they generated, they would have needed to hold their investments, on average, for less than two years (\$1 earning 39% over two years would turn into \$1.93). An overall holding period of less than two years is, arguably, unrealistic, and therefore shows that this IRR is severely distorted. Another way to see the absurdity of 39% return is to compound it. An investment of \$100mn in 1990 at 39% p.a. would be worth \$2.3 trillion!!!!

As shown in Table 9, the gross MoMs of the big-four are remarkably close to one another; details of the track records are provided in Table 10. These gross MoMs are for their funds with vintage years 2006-2015, so we can compare to results in the rest of this paper, and their MoMs since inception are also displayed. Apollo’s gross MoM is 1.76, close to that of Carlyle (1.72). KKR and Blackstone MoMs are slightly higher and nearly identical (1.92, 1.89).²⁸ Results are similar when we include all vintages.

The 1.57x Burgiss figure is net of all fees. We therefore need to estimate the MoMs of the big four after fees. As mentioned above, taking out carried interest is not difficult. For each of the big four, we subtract the estimated carried interest for their 2006-2015 vintage funds. MoM after carry is about 0.2 lower. As shown in Table 9, the MoMs net of carry get even closer to one another and, interestingly, the average is 1.62x, which is nearly identical to the Burgiss average. In other words, across the big four, we find that after Carry alone, MoM is the same as the average MoM across all PE funds in the Burgiss universe (net of *all* fees).

Obviously, PE firms charge more in fees (both type and quantum) than carried interest alone. Adding these other fees to invested capital would further reduce their net MoMs. Perhaps most management fees are charged to portfolio companies rather than at the fund level, and, as a result, the total amount invested that is reported might include most of the management fees. That said, the remaining fees charged at the fund level (including fund expenses) should still be non-negligible. As it is difficult to make a reasonable assumption here, all I can conclude is that the overall MoM is at most 1.62x across the four-big PE firms; and this upper bound coincides with the average across all PE funds; and that average matches the return of the stock-market, as shown above.

²⁷ “Global Investment Performance Standards for Firms”, 2020 edition, page 12

²⁸ For Apollo, credit funds are excluded; their credit funds MoM is 1.2x. For Carlyle, we use the funds they report (they do not seem to report them all). We include only American and global funds. We exclude credit funds (their credit funds MoM is similar to that of Apollo: 1.3x), investment solutions and strategic partnerships (e.g. AlpInvest, NGP) and their renewable energy funds. All the American funds of KKR are included (their credit funds are excluded). For Blackstone, tactical opportunity investments are excluded as no investment years are provided for these; secondaries and credit funds are also excluded. For each of the top-four, the funds that are excluded have lower MoMs. Hence, if anything, the picture in Table 9 is on the optimistic side.

11. Rebuttals from the Big Four

Apollo

Apollo's representatives wrote: "The paper makes general carry calculations by taking the gross profit and multiplying by 20%. The figures reflected are inaccurate because they fail to discount for the fact that Apollo's carry is AFTER [sic] fees and expenses."

Apollo does state clearly that the amount in Table 9 is capital invested, hence does not include fees and expenses. If I add 15% of fees and expenses (see section 9) to this amount, the carry is indeed lower, but the net MoM also decreases from 1.57x to 1.42x and from 1.64x to 1.49x, respectively.

Apollo's representatives also wrote this regarding IRR: "In making the acceptable assertion that life to date IRR is a less meaningful performance metric after a certain period of time, one should also note the importance of time value of money. It is inarguable that returning money to LPs enables them to put that money to work elsewhere and increase overall future value."

If the point being made is that MoM does not account for differing holding periods and the opportunity cost of capital, that is correct. That is the reason why the analysis in prior sections focused on PME. If PE firms chose to switch to publishing their PMEs, with respect to at least the set of benchmarks shown above (if not also additional indices relevant to each fund's strategy), the picture would indeed be much more accurate. I could only work with the data that PE firms make publicly available.

They point out that "While the paper states that Apollo does not disclose net Multiples of Money in its public filings, it should be noted that Apollo does disclose net multiples in its PPM and offering documents, which is most important because those are the documents on which investors base their investment decisions." This is certainly true, as shown in section 9. Whether investors realize that a net MoM around 1.5x coincides with that of public equity is an open question though. Do investors also realize, for example, that the net MoM of, say, the T-Rowe Price small cap fund is 4.4x over the last ten years, or 1.95x over a 4.5 holding period?

"Furthermore, a fair analysis would also exclude Fund VIII, as it is in the early stages of its harvesting phase and still has meaningful value creation to come given the portfolio is relatively young on a weighted average basis."

Note that all reports of PE industry performance on past ten years, past twenty years, etc. include all funds, including those younger than Fund VIII in this case. Apollo's headline 39% return since inception includes young funds. The limited empirical evidence we have is that NAVs have been close to subsequent performance and that is why academic studies usually include funds that are passed or close to pass their investment period. One can redo the calculations excluding younger funds and adding older funds but going back to 2005 and earlier also means including what was a different market environment. Note also that taking out this particular fund changes their MoM only marginally. It is, however, possible that Apollo is more conservative about setting its NAV than other PE funds. In the Burgiss dataset, PME goes down (not up) if I remove vintage year 2015.

A Carlyle representative gave the following feedback: “It is inappropriate to include other asset classes and strategies with different risk/return profiles and then compare them to buyout funds. This is especially true with Carlyle Global Partners (long-dated PE), real estate, and energy – all of which are distinct asset classes with different investor expectations, time horizons, and risk parameters.”

It is true that I did not make any distinction regarding risk. Regarding the long-dated PE fund, if anything, this would be the fund whose returns are most comparable to public equity as this fund uses less leverage and tends to buy-and-hold equity in companies. The LBO funds should have higher risk parameters and should therefore have a benchmark higher than public equity.

I have removed global funds (CGFSP, CGP, CIEP) because the focus is on American funds, and maybe these global funds invest significantly outside the US. Results are hardly affected by this choice. Carlyle’s argument that it is unfair to include real estate and energy funds was also made by Apollo and Blackstone. It is a reasonable point that is already taken care of by the way the results in section 4 are shown: (a) all PE funds (including real estate, energy, etc.) and (b) LBO funds only.

The Energy sector had poor performance over this time period. It is argued that Energy is a separate asset class and that within this sector, PE funds did relatively well. It would be interesting to test this hypothesis as we currently do not have evidence on this issue. Note that if we start benchmarking on a sectoral basis, it seems fair to do it for every sector. For example, if some PE funds invested wholly or mainly in tech companies, then we would need to compare those funds’ returns to those of quoted tech companies over the same time period. One study which corrects for the sectoral composition of PE portfolio is L’Her et al. (2016). They find that PMEs decrease (rather than increase) when accounting for sector performance.

Blackstone sent extensive comments. Their five pages are reproduced verbatim in the Appendix. As their arguments overlap with those of others, I do not go over them here.

12. Why do investors not see it this way?

It would be natural to assume that pension funds which saw these net MoMs would react by reducing their PE commitments until fees decreased. This reasoning ignores the multiple layers of principal-agent conflicts that are involved and perhaps a lack of financial literacy among some of their decision-makers (e.g., some trustees).

People working in a pension fund’s PE division may already be familiar with the points made above and thus ignore IRRs and focus solely on a range of net PMEs and MoMs. But if these individuals speak up, the pension fund’s allocation to PE may go down and they may lose their jobs (and hamper their job market prospects). How about other parts of the pension fund, like the strategy unit or the board? These people know less about the complexities of benchmarking PE returns and might rely on their specialized colleagues in the PE division. In addition, it is not in their career interests, either, to admit that previous investment decisions led to poor outcomes.

Pension funds uniformly present their past PE performance in a positive light. CalPERS boasts its 10.7% annual return in PE. Check Table 2 again, which shows this is similar to the returns on public equity. Why would CalPERS celebrate a 10.7% return? Similarly, consider this statement from New York State Pension Fund: “Since 2007, Comptroller DiNapoli has doubled the capital committed to

this (PE) program: i) Approximately 10 percent internal rate of return on fully exited investments; ii) Over \$1.1 billion returned to the Fund on \$715 million exited investments.”

Notice that the New York State Pension Fund’s net MoM is 1.54x, very close to the industry’s overall average, and this MoM and a 10% return are presented as the key reasons for doubling investments. In addition, this pension fund is computing performance only on exited deals. As losers are held longer, overall returns are always lower than realized returns. Hence, the pension fund itself is trying to suggest a performance that is higher than the actual one.

Career concerns and other agency conflicts can explain why pension funds present past performance in the best light possible, but it is unlikely to explain why they would dramatically increase their allocation. They must genuinely believe that returns are good, even after they look at more accurate measures such as net MoMs. Where is this belief coming from?

What we can observe in many documents is that pension funds routinely compare the returns of their public equity portfolio to that of their private equity portfolio, and the former does indeed show much lower returns, a point that was discussed above.

The main rule when pitching ‘sophisticated’ investors is that one cannot lie. As we know, there are many ways to present information in a way that leads to a false conclusion, without having lied. As an example, consider the KKR statement shown above: “From our inception in 1976 through December 31, 2019, our investment funds with at least 24 months of investment activity generated a cumulative gross IRR of 25.6%, compared to the 11.8% and 9.1% gross IRR achieved by the S&P 500 Index and MSCI World Index, respectively.” It is not just that IRR is presented as if it was a rate of return here (it is not!), but also that it is a comparison of the gross performance in PE with the gross performance in public equity! This is especially surprising as the two assets have fees that are orders of magnitudes apart (e.g. 0.2% p.a. for public equity, vs 7% p.a. for PE).

Showing only gross returns is, however, remarkably common. Even Capital Market Assumptions are sometimes presented gross of fees. A tangible example of this appears in an anecdote told by one of the most renowned economists in this field, Brad Case: “I was asked to comment on a set of slides being developed to encourage defined contribution plans to include private equity investments. The “historical performance” was entirely gross of fees, meaning it didn’t come close to what “beneficiaries” would actually receive. When I pointed this out, the author explained that showing net returns would be false and misleading, because different investors pay different fees: only the gross returns are consistent across all investors. So instead of showing “historical performance” numbers that are accurate for some and somewhat accurate for all, the author said the only “honest” approach is to show numbers that are hugely wrong for everybody!”²⁹

Another type of misleading information consists of arguments such as: “there has never been a year with negative returns in PE.” Similarly, I often hear people are impressed with the track record such as the ones shown above because not a single fund lost money. Figure 1 shows that if you simply buy and hold mid- and small-cap stocks for ten years, you would not have experienced a single *vintage* year with any money lost. In addition, it is important to note the consequences of the ‘holding on to losers’ effect. If you randomly buy stocks, sell your winners quickly and hold on to your losers, then it would have been difficult to lose capital with such a strategy with US stocks.

I have already showed many examples of the how people can easily tweak track records to make them more flattering (e.g. Phalippou (2009)). Here is a recent one: a PE firm is raising its third fund but has a net IRR of only 8%. A footnote explains that their new fund will have lower fees and, more

²⁹ <https://www.linkedin.com/feed/update/urn:li:activity:6660907310090715137?commentUrn=urn%3A%3Acomment%3A%28activity%3A6660907310090715137%2C6660942973007654913%29>

surprisingly, will time investments differently, which leads to an adjusted return of 15%, i.e., it applies these changes to its historic track record to conclude that its past performance would have been 15%. And the figure that is highlighted is the one achieved if all these changes are only applied to their realized investments (which typically are the sub-set of winners) and then a more PE-like 24% is highlighted.

Lax rules force everyone into a race to the bottom. If others are showing misleadingly high measures of their past performance, you must do the same to remain in business. Note also that certain types of PE fund do not have as much access to the standard tricks. A stark example is emerging market funds. The nature of their investments prevents them from gaming their IRR (e.g., no subscription lines, not easy to exit early their home-runs). I have heard countless emerging market PE funds say that because their true rates of returns after fees are only about 10%, fundraising is very difficult. American PE funds, among others, also have actual returns of about 10%, but many can show misleadingly high IRRs instead. These effects might create major misallocations of capital in addition to unwarranted wealth transfers.

13. KKR rebuttal

A KKR representative responded: “Your paper singles out the following sentence from our 2019 10-K filing for repeated criticism [paste the above quote on IRR] We strongly object to the way you have represented this one sentence out of context and we take very seriously the inference you are making that we would “present information in a way that leads to a false conclusion, without having lied.” Please remove this unsubstantiated and false claim from the paper. We stand by the metrics we provide to our stakeholders, including the use of IRR and MoM which are definitively the measures most widely used to evaluate the performance of PE funds by the investor community and their consultants. It should not be a surprise that we report the performance metrics of interest to our customers. We are proud of our relative outperformance, as demonstrated in this study, over both the short and long term based on these metrics, even based on the flawed calculations you have presented (...)In the above passage you are attempting to suggest the consistency of our performance over time is some kind of accounting trick. This assertion is misleading and should be removed from the piece. You have not provided any evidence to support the inference you are making that our performance is artificially inflated or that we have not outperformed these benchmarks as stated.”

This response is particularly instructive; it helps to show why the use of IRR remains both so prevalent and so prominent. It may also indicate that only a minority of people who work in PE understand IRR’s key flaw. That would be consistent with my experience during fifteen years of explaining this point not just to my students but also to countless people working in this industry.

The key flaw in IRR is the mechanical assumption that the calculation makes about re-investment. If the initial cash flows reflect unusually high returns, the IRR calculation automatically assumes that these initial distributions are re-invested at an implausibly high rate. This in turn produces an IRR result which - if it is being thought of as a rate of return that an investor actually earns – is implausibly high. When an implausibly high IRR of this sort is presented as if it was a rate of return that is comparable to stock-market rates of return, I believe that is unquestionably misleading.

Another consequence of high early cash flows is that after a few years the IRR will stop changing. The mathematical reason for this is that the early cash flows, reinvested automatically as the calculation assumes, become so large in value that it makes no difference to the IRR result whether the later actual cash flows are high or low. The data on Yale Endowment shown in Table 7 gives an example of this hardly ever-changing IRR. A figure like this cannot possibly be a rate of return that someone has actually earned; it is therefore highly flawed. One would hope that the fact that KKR’s IRR on its legacy funds is about 26%, and that KKR has reported a since-inception IRR of also about

26% each year since it started filing with the SEC thirteen years ago, would also be enough to show that this measure of performance is deeply flawed.

This problem is not unique to KKR. Over the years I have discussed IRRs with some of the most prominent individuals in the industry. It was striking in these discussions that the people involved seemed to genuinely not understand why IRR is so flawed. It is plausible that they continue to use IRRs not in order to mislead, but because it is the “traditional” measure and investors ask for it. I have noted earlier that the main set of industry reporting standards (GIPS) continues to mandate that PE fund managers use the seriously flawed measure: since-inception IRR. This is a serious problem.

KKR seem to believe they are being singled out unfairly, given the GIPS approach and the fact that others also uses since-inception IRR. But some examples have to be provided. This paper uses the IRRs of Yale, KKR and Apollo as examples because the reader can easily verify the figures in publicly available documents. I readily acknowledge that even KKR’s direct comparison of IRR to the stock-market, highlighted above, is not unique to KKR. Sadly, I have seen this countless times. Steve Schwarzman, the number one PE billionaire, has stated publicly that Blackstone’s private equity funds have outperformed public equity by 10% per year.³⁰ Though he failed to identify which measure he was using, in light of the figures shown above one can only assume he was comparing IRR, and probably a gross IRR, to a stock market index.

Nowhere do I say that examples such as those above are exceptions. The whole point is that this mistake is universal. That makes it quite disturbing that US policy makers have just made a change that will allow retail investors to invest in private equity via their 401(k) plans. Private equity will now almost certainly be sold to retail investors on the basis of IRRs presented as though they are actual rates of return. Most of those retail investors will likely accept without question that the IRRs of 20% or 30% that private equity can boast are actual rates of return. If policy makers fail to take account of this issue, there are serious risks for retail investors coming into PE.

IRRs continue to be almost universally used. I regret, therefore, that I have apparently failed to explain clearly over the last fifteen years, including in my book “Private Equity Laid Bare”, why IRRs are misleading. When I show how the track records of Yale and others fail to change over time when IRR is used, people often think I am alleging some kind of manipulation; they may even think of high-profile frauds. It is almost predictable that KKR’s representative should suggest above that my explanation of IRR insinuates that KKR are using an “accounting trick” to inflate their track record. Nowhere do I say this. What this comment shows, once again, is that the key flaw of IRR is not understood. To repeat: there is no fraud here. I explicitly wrote that there is no lie. What the article actually says is that many people in PE, including senior figures at both PE firms and asset owners (and consultants), do not seem to understand what the key flaw of IRR is. The key flaw is the reinvestment assumption, which can lead to implausibly high and sticky IRRs.

KKR’s representative also states “We encourage investors to evaluate a wide range of factors to assess the performance of our funds (e.g., IRR, MoM, distributions vs paid in capital, % of capital put to work, timing of capital calls and distributions, the decisions of GPs to commit capital, standards for disclosure and fund reporting, etc.). Your out-of-context use of one sentence from our 10-K is particularly harmful and misleading because it suggests we do not provide extensive disclosure to our public stockholders and our clients in order for them to judge our performance.”

³⁰ ‘The stuff we do, the alternative class, tends to make around 1,000 basis points more than the stock market,’ Schwarzman said in an interview with Bloomberg Television’s Erik Schatzker and Stephanie Ruhle at the Milken Institute Global Conference in Beverly Hills, California. Investors shouldn’t be concerned about a ‘stomach issue’ since Blackstone loses virtually no money in its funds, he said. Source: <http://www.fa-mag.com/news/blackstone-s-schwarzman-says-individuals-need-more-alternatives-17773.html>

This point has already been discussed above, but I repeat it here because it seems to be a significant source of misunderstanding. It is true that KKR reports MoMs. In the 10-K filing that is publicly available, KKR discloses only gross MoMs. These are not very helpful for assessing investors' past net returns. It is also true that net MoMs are privately available to KKR investors. I am unclear what KKR's representative means by "out-of-context". I reproduced verbatim the whole of the first paragraph on performance that KKR itself publishes in its 10-K filing with the Securities and Exchange Commission. In addition, Table 10 reproduces the gross MoMs per fund which KKR reports later in the 10-K filings. The full 10-K is 330 pages long and is publicly available to anyone who needs additional context.

KKR's next observation is: "Since 2008 we've gone from 2 investing businesses to 24. We have gone from 10 offices to 21 and \$45 billion of AUM to \$207 billion and have launched strategies to invest in Infrastructure, Real Estate, Tech Growth, Core (long-term PE), Impact, Direct Lending, etc. Our diversification and scale provide us with numerous advantages, including the speed with which we can deploy capital into compelling opportunities around the world (something that has directly contributed to our sustained IRR performance despite increased competition particularly in the US PE market). We would note also that, in addition to our US-focused funds where we benchmark to and regularly outperform the S&P 500, we invest regionally focused funds in both Asia and Europe, and as a result believe that non-US focused indexes help our investors evaluate and understand the relative outperformance of our regionally focused funds. The MSCI World was 65.82% weighted to the United States as of May 29, 2020 and, as prominently stated in our 10-K, our private equity portfolio has 54.0% exposure to the Americas."

None of the analysis in this article includes non-US funds. The reason is that benchmarking against public equity is even more difficult outside the US than it is in US markets. In most countries, stockmarkets are dominated by a small number of companies from a limited number of industries. This makes it harder to obtain a meaningful comparison between private and public equity. In principle, KKR's performance in non-US PE funds could be strong. Some data, including gross MoMs, are publicly available on these other strategies, but there is no analysis of them in this article for the reason already stated.

The next observation of KKR's representative is: "Institutional investors do not have the option to simply invest all of their assets into the S&P 500 and low cost mutual funds. Nor would it be advisable to do so as it would expose their organizations to a greater degree of market volatility than many find acceptable and also would deprive their beneficiaries of the "illiquidity premium" which is an incremental source of return which has been reliably delivered over decades and which is compensation to investors for "locking up assets" for a longer period of time. It is particularly important to investors in today's low rate environment."

This point has already been addressed, but is included here so that the record is complete.

KKR's final observation is: "You repeatedly dismiss "narrow" ranges in returns when these figures make an enormous difference." They point out that the difference between a MoM at 1.54 and at 1.67 is that cumulative distributions from the latter fund would be 13% higher. Annualized, this 13% equates to 2.7% per annum. Readers can decide for themselves whether this is a large difference, given the uncertainty that surrounds all these estimates (the exact figure for the overall average does vary somewhat from one large database to the next) and given the conservative assumptions used on fee levels. But I accept that the difference between 1.54x and 1.67x is indeed not negligible.

Table 10: Detailed Track record of the big-four, US PE funds, vintage 2006-2015

Panel A: Apollo – '06-'15

	Invested	Gross IRR	Net IRR	Gross MoM
Fund VIII	15,821	19	13	1.60
Fund VII	16,461	33	25	2.01
Fund VI	12,457	12	9	1.70
RE Fund I	636	14	10	1.50
ANRP I	1,144	19	10	1.13
Total	52,569			1.73x

Panel B: Carlyle – '06-'15

CEO I	1173	13	9	1.50
CEO II	2046	5	neg.	1.10
CGFSP I	1081	20	14	2.30
CGFSP II	943	22	15	1.70
CGP	2800	5	4	1.10
CIEP I	2288	24	13	1.50
CP V	13191	18	14	2.10
CP VI	12874	14	10	1.50
CPP II	1098	13	7	1.30
CRP V	3371	12	9	1.70
CRP VI	2155	27	19	1.80
CRP VII	3705	21	13	1.60
Total	46725			1.68x

Panel C: KKR – '06-'15

2006 Fund	17,305	12	10	2.1
Natural Resources Fund	887	-26	-28	0.2
Global Infrastructure Investors	1,048	18	16	2.1
North America Fund XI	9,580	24	19	2.1
Real Estate Partners Americas	1,011	19	14	1.5
Energy Income and Growth Fund	1,963	0	-2	1.0
Global Infrastructure Investors II	3,094	13	11	1.3
Total	55,574			1.92x

Panel D: Blackstone – '06-'15

BREP VI (Feb 2007 / Aug 2011)	11,060		13	2.5
BCP VI (Jan 2011 / May 2016)	15,192		13	1.9
BEP I (Aug 2011 / Feb 2015)	2,435		13	1.9
BREP VII (Aug 2011 / Apr 2015)	13,497		16	2.0
BEP II (Feb 2015 / Feb 2021)	4,913		8	1.3
BREP VIII (Apr 2015 / Jun 2019)	16,630		16	1.5
Total	62,921			1.89x

14. The American Investment Council (AIC) rebuttal

The lobby group for American PE fund managers posted a rebuttal on their website regarding the above evidence.³¹ Their points consist of three “facts”, which I comment on in turn:

Fact 1: “Private equity returns have continued to outperform public markets. Research from a wide range of academics and organizations confirms that private equity investments regularly deliver higher returns than returns in the public stock market during both bull and bear markets, including for recent fund vintages (...)”

They cite two studies to demonstrate this fact: a paper by Brown and Kaplan (2019) and the 2020 Cliffwater study.³² The latter has already been commented on, above (Section 7). The paper by Brown and Kaplan (2019) uses the same data source as I do here, and all of their empirical evidence is consistent with what I show above. They too show that PME with respect to the S&P 500 index is close to one after 2006. They also show PME with respect to MSCI World Index. I have explained above why this benchmarking choice generates more flattering results. I also showed results from other databases, and against other benchmarks.

AIC offers three additional arguments under this first heading. First, they argue that the S&P 500 Index is not appropriate for benchmarking PE. As shown above, however, results are the same with many other American stock indices. They argue that MSCI World Index should be used because PE investments are made globally. This point has been discussed above. It seems unlikely that the fraction of investments made abroad by *American* PE funds is substantial. I have excluded *Global* funds and non-America focused funds. Also, American publicly listed companies are exposed to non-US markets as well. It would be surprising if American PE funds had the same exposures to non-US markets as the MSCI World Index.

Second, they cite a study by McKinsey arguing that “mega” PE funds (...) on average delivered the highest returns over the past decade.” While plausible, this does not change any of the above statistics. Note that this study also shows that from 2006, PE funds performance is close to that of US stocks.

Third, they argue: “Cherrypicking time period. Phalippou uses the 2006 vintage—one of the lowest-performing in recent history—as his starting point. This creates concerns that he is trying to gerrymander a particular result in his analysis. Even according to his own methodology, other periods show clear private equity outperformance.”

I would be cherrypicking if I started in 2006 and claimed that the result held in any time period. But what I wrote is that *since* 2006 there is no evidence of outperformance of most US stock-market indices. This is not cherrypicking; this is pointing to when things start to be different. The change from 2006 can also be seen in Brown and Kaplan (2019). Pre-2006, there is outperformance only if the S&P 500 is chosen as a benchmark. For the big four, I show results for all the funds and from the 2006 vintage. Results are similar. For the five pension funds, I did not show the results since inception because they are nearly identical.

Fact 2: “As investors face declining opportunities in the public markets, private equity allows investors to diversify their portfolios—and reduce risk.”

I do not know how to measure risk and diversification in PE, nor know any academic studies offering a well-accepted approach, and this is the reason why I have not addressed those issues.

³¹ <https://www.investmentcouncil.org/correcting-the-record-private-equity-industry-has-delivered-substantial-outperformance-to-pension-funds-and-other-investors/>

³² http://uncipc.org/wp-content/uploads/2019/05/HavePrivateEquityReturnsDeclined_05022019.pdf

This paper does not say anywhere that there is no reason to invest in PE. This paper is a comprehensive analysis of the economics of PE. It is possible that PE investment professionals and trustees, and all of the principals on whose behalf they work (including hundreds of millions of pension scheme members), agree with all the evidence shown in this paper but choose to invest in PE to diversify their portfolios and reduce risk. However, reliable measures of these benefits are at best hard to come by. The mean-variance analysis that typically supports these assertions is particularly flawed in the presence of an illiquid asset such as PE.

Fact 3: “Private equity investors are highly satisfied with performance and disclosure.”

AIC first states that public pension officials are well advised by consultants and premier law firms. This is probably true, but it does not bring into question the presentation of facts in this paper. Perhaps AIC means that since investors are represented by premier law firms, the contracts they sign must be optimal. This is an often heard argument. The best discussion I have read of this issue is Clayton (2020) – the paper’s title is “The Private Equity Negotiation Myth.”

Second, they cite the Preqin study that shows that investors want to increase their allocation to PE. I have commented on this above.

Third, AIC states that “private equity firms are highly transparent with their investors, providing a wide range of data including individual IRRs, MOICs, recent performance (of both funds and individual investments) and realizations. They also provide bespoke analysis and data upon request from their limited partners. While the inception-to-date IRRs for many private equity funds are highly impressive, limited partners rely on multiple return measures for allocation decisions.”

As shown and discussed in section 9, investors do receive a lot of clear and useful information. That said, it has been widely reported that some large investors (e.g. PSERS, CalPERS) have tried to find out and then disclose how much Carry they had paid (and how much is due) in total for their PE programme. But they have been unable to obtain the exact figure because not all GPs had given them the information. Portfolio company fees and other indirect charges on portfolio companies are not always disclosed with sufficient granularity (see section 9). I leave it to the reader to judge AIC’s statement on how impressive the never-changing and implausibly high since-inception IRRs are. The reader can also take a view on the usual defence, as presented here by AIC, which I would paraphrase as: “IRR is shown as the headline figure, but investors look at more accurate measures. This makes it acceptable for the misleading measure (IRR) to be used as the headline, and presented as if it was a rate of return.”

Fourth, AIC writes ‘Carried interest is only paid once a fund meets a preferred return net of all fees and expenses. This hurdle requirement results in a lower carry percentage than 20% of gross gain assumed by the author. Many other large limited partners also receive substantial discounts on management fees (including fee holidays at the beginning of funds and size discounts), which further reduce fees.’

The first part of the comment has already been tackled above. If I add fees and expenses to ‘capital invested’ for the big four, the carry is lower but the net MoMs will also be lower than those I displayed. As I do not know exactly the fees and expenses charged, I was being conservative by assuming them to be zero. It is trivial to add 15% of fees and expenses, the average net MoM will go down. Importantly, in section 4, the computation of Carry takes into account fees and expenses because Burgiss ‘paid-in’ figures include fees and expenses. Hence the estimated \$230 billion Carry is computed after fees and expenses. Finally, AIC suggests that no-one knows exactly how much is being charged in fees. That is indeed unfortunate: any effort by the PE sector industry to provide accurate data for research purposes will be widely welcomed.

15. Conclusion

Perhaps the following quote, albeit twenty years old, provides a good summary: “Paying 20 percent of the profits to the general partner instead of 20 percent of the value-added drives a meaningful wedge between the result for the general partners and limited partners. Poor incentive schemes cause buyout fund managers to benefit by placing limited partner assets at risk, creating an extraordinarily valuable option for the general partner that comes at the expense of the providers of the funds(...) If private manager compensation depended on generating returns in excess of marketable investment opportunities, most would fail to receive a profits interest as results for the majority of private funds fall short of traditional equity alternatives (...) Because the investment management industry receives compensation far in excess of levels justified by the degree of value created” (pp. 232-233 and 286; Swensen (2000)). Note that this is David Swensen, the CIO of Yale Endowment.

The economics of the private equity industry constitutes a puzzle for anyone who does not accept the existence of multiple layers of agency conflict in the asset management industry; and of low financial literacy among both principals and even many agents - people who policy makers uniformly classify as “sophisticated investors”.

Most economists think that if “sophisticated investors” want to increase their investment in PE, it must be that returns are good. However, this view implies that fund managers are too generous (or public-spirited) to increase their fees to the point where this free lunch is eliminated. Alternatively, it might be the case that fund managers need to deliver excess returns to compensate for the illiquidity. But if the excess return is a compensation for risk, then it is just a fair return and investors should not be enthusiastically increasing allocations as a result of this excess return. Perhaps investors find it attractive to earn the same in PE as they do in public equity (at least in a bull market) because reported returns in PE are smooth and thus appear to be less volatile. That would mean investors demand a negative liquidity premium.

The PE industry is less of a puzzle, however, if one recognises the multiple layers of agency conflicts and the complexity of measuring risk and returns of illiquid assets, whose effect is exacerbated by the lack of knowledge on that particular issue by some of the decision makers.

The private equity industry is broad and these issues are more serious in some areas than in others. Most of the people who work in PE are hard-working and well-meaning and earn salaries commensurate with their work and human capital investments. To be sustainable, the PE industry may need to reconsider its model and aim to lower costs, both the level (e.g., by increasing holding periods, eliminating unnecessary costs) and the computation (e.g., reconsider how Carry is paid). We do observe several innovative models developed by several investors. These developments are going in the right direction and they will hopefully develop further. More broadly, while the PE industry can play a positive role for society, it is unlikely to be sustainable if it continues to allow some participants to present arguably window-dressed performance information and incomplete fee information.

One reason why this sustainability question has not been central yet is that the facts highlighted in this paper have not been exposed to, and admitted by, most market participants. In a complex environment riddled with multiple layers of agency conflicts, misleading information can and does proliferate. The result is a highly inefficient and unfair equilibrium. The absence of a level playing field encourages a race to the bottom in terms of misleading information.

Only facing facts, disclosing all relevant information, having level playing rules, better education, and simplified structures can bring a superior overall equilibrium. This superior equilibrium, however, will probably generate fewer billionaires.

16. References

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Appendix 1: BLACKSTONE RESPONSE

Thank you for allowing us to review and comment on your draft paper. We appreciate the opportunity to engage with you on this important topic. Unfortunately, we found a number of very serious statistical and conceptual errors in your analysis that we wanted to take this opportunity to correct.

As detailed further below, the facts show we've delivered exceptional outperformance to our investors – including 31 million US pensioners and millions more retirees worldwide. Additionally, through both our detailed, quarterly, fund-by-fund public SEC filings and extensive disclosures to our fund investors, we are fully transparent about our net performance data.

As you know, public pension funds and other investors are also highly satisfied with private equity's outperformance. A 2020 Prequin study found that 87 percent of limited partners said that private equity "returns either met or exceeded their expectations" and 86 percent intend to allocate "as much or more to the asset class" than they did in the preceding year. This reflects their well-informed view – as outlined by CalPERS, Yale, and many other of the world's most sophisticated and successful investors – that private equity has and continues to deliver substantial excess returns compared to public markets net of all fees. We are a firm of nearly 3,000 hard-working employees who are deeply committed to our core mission of responsibly serving our investors and operating with the highest integrity. We are deeply mindful that the investment decisions we make help support the retirements of teachers, firefighters, and millions of other public employees. That's why we take the factually inaccurate claims in this paper about industry participants "misleading" and "tricking" limited partners incredibly seriously. Over our 35-year history, delivering exceptional performance and earning the trust of our investors has been our most important responsibility.

Hilton

Your conclusions about our investment in Hilton are based on multiple computational errors. To start, the overall profit on the investment is \$13.8 billion, not the \$13.6 billion cited in the text of your paper. Additionally, we sought to run this analysis using your apparent, intended/preferred methodology³³ and we found that ***Blackstone's investment in Hilton outperformed Marriott's public stock by approximately 400 basis points annually – resulting in an excess profit of \$4.8 billion (not the \$1.8 billion cited in your paper)***. We are not sure of the source of the data in your chart, but it appears to include multiple errors related to the size and timing of the events related to this investment.

Your paper also appears to broadly cite the S&P 500 as the best metric for evaluating private equity performance. While this is much disputed in the academic literature, we thought given your preference for that benchmark it would be instructive to compare Blackstone's Hilton investment to this yardstick. Doing so demonstrates even greater Blackstone outperformance during that time period: ***Blackstone's Hilton investment more than doubled the total return of the S&P 500 (approximately 800 basis points of annual outperformance) – an excess profit of more than \$9 billion.***

We also believe a theoretical comparison of our investment in Hilton to Marriott's public common equity is flawed to begin with because it would not have been possible to buy approximately \$6 billion of Marriott stock on the open market in July 2007 in the manner you suggest (more than one-third of its \$17 billion market capitalization). In fact, Marriott's stock price increased *by approximately 7 percent alone* on the next trading day after we announced our Hilton deal. Beginning our analysis even that single day later, Blackstone's Hilton investment would have outperformed Marriott by \$5.6 billion (an additional approximately \$800 million in outperformance). This does not even account for what would have likely been the even larger bidding up of Marriott's stock price (and further Hilton outperformance) if an investor attempted to buy \$6 billion of Marriott shares on that day. At its core, you are comparing one investment opportunity that delivered substantial outperformance and profits to investors in the real world to another theoretical one that wasn't actually available to investors.

Additionally, as you note, fees and carry are not charged on individual investments, but rather on the fund level. Looking at the fund level: All three Blackstone real estate private equity funds you cite in your paper outperformed the relevant REIT index by 400-700 basis points annually net of all fees.³⁴ Moreover, even

³³ Comparing identical investments and sales/realizations in Hilton v. Marriott from the day after we announced this transaction in July 2007, our subsequent follow on investments, and our share sales through 2018.

³⁴ RMS index (US REIT)

taking your methodological approach at face value, the Hilton investment would still have produced a substantial excess profit for our investors net of all fees compared to an investment in Marriott public stock by any measure.

Other Blackstone Funds Cited in Your Article

In reaching your conclusions related to recent Blackstone funds, you mix and match multiple different asset classes (real estate, energy, LBO), which must be evaluated individually based on their relevant indexes and circumstances:

- The real estate funds outperformed the relevant REIT index by 400-700 basis points net of all fees as noted above.
- The energy funds you cite invested during periods when *the relevant energy index declined by 18-36%*. Nonetheless, they delivered substantial positive performance net of all fees (3000-4000 basis point outperformance relative to the energy index).³⁵
- You cite only a single Blackstone private equity fund (one data point over a 35-year history). However, during the time period in your analysis, this fund outperformed the MSCI World Index by more than 300 basis points annually, which is a more appropriate benchmark given the composition of our portfolio and global investment focus (as described further below).
 - Furthermore, as we've previously noted publicly, this fund was impacted by a concentration of energy investments (during a period when energy markets declined substantially). The fund has delivered outperformance relative to the S&P 500 ex-energy. Additionally, its successor fund does not have the same high level of energy exposure.
- The IRRs/MOICs you cite include a substantial number of unrealized investments. Historically, we've realized such investments at a 30 percent premium to their unrealized marks. More broadly beyond just Blackstone, your methodology also understates the potential return of more recent vintage funds across the industry given the nature of MOIC returns (which don't peak until the later years of a vintage).

Additional Issues

We also believe there are a number of other conceptual errors in the article – several of which we address below:

Cherry-picked Time Period/Discounting Diversification Benefits

- As you acknowledge at the beginning of the paper, your analysis primarily focused on a bull market period with substantial gains in public equities (whereas other periods, including recessions, demonstrated clear and convincing private equity outperformance even according to your methodology). Furthermore, beginning your analysis at the 2006 vintage – one of only two vintages between 2006-16 according to Preqin that didn't generally meet or exceed the S&P 500 – creates concerns that the analysis is driven to produce a pre-conceived conclusion about private equity returns.
- Additionally, you further admit that your analysis does not account for the diversification benefits of private equity and other private asset classes (which could be particularly valuable during a period of diminished public equity performance, as many expect in the coming years).

Excluding MSCI World Index (Which Shows PE Outperformance from 2006-15) is Misguided

- For early Blackstone PE vintages, the S&P 500 was a more appropriate comparison given these funds focused primarily on US companies and the S&P was less concentrated in a few large tech firms.
- Our more recent flagship private equity funds invest globally, with the last two vintages investing approximately one-third of capital outside the US. This makes the MSCI World index a more appropriate benchmark.
- Today, the S&P 500 is heavily weighted with five mega-cap tech companies (MSFT, AAPL, G, AMZN, FB) whose market cap makes up ~20% of the index, which is not consistent with our portfolio.

Portrayal of public pension funds and PE disclosure practices

- We fundamentally disagree with your portrayal of public pension officials. These are exceptionally sophisticated investors who would not continue to allocate to this asset class if they didn't believe in its value to their beneficiaries. We are also fully transparent with our limited partners to ensure

³⁵ S&P 600 Small Cap Energy index

that they can make well-informed decisions when allocating to our funds and assessing our performance.

- As you note, our flagship funds have returned approximately 15% annually since inception net of all fees, reflecting substantial outperformance relative to public equities. However, this is by no means the only metric that LPs evaluate when making allocation decisions. When diligencing potential commitments, investors also receive from us and consider far more than the aggregate IRR since inception, including, but not limited to, individual fund IRRs, MOICs, track records, recent performance and realizations. We also disclose performance metrics and returns for individual portfolio companies to LPs on a quarterly basis.
- The sophistication of these pension fund investors is augmented by an established industry of pension advisors, which supplement their diligence and serve as an additional check on the prudence and wisdom of investing in the alternative asset class.
- As it relates to LP disclosure (you seem to incorrectly imply we don't report net MOICs): While reporting to public shareholders is focused on gross MOICs (i.e. carry available to public investors based on gross returns), reporting to fund investors is inclusive of both gross and net figures and an extensive data room is made available to prospects and LPs to provide increased transparency to our investors. Additionally, we routinely fulfill custom requests for LPs and prospects that includes a large range of information depending on their unique needs.

Article Assumes 20% Carry Rate, When It's Lower in Practice

- Carry is only paid when a fund meets a certain level of performance (preferred return, generally 8 percent) net of all fees and expenses. The “net of fees” threshold results in a lower carry percentage than 20% of gross gain. In addition, some funds exceed the 8 percent hurdle, but do not reach “full catch up” and therefore less than 20 percent of even the net gains are paid to the sponsor.
- Management fees and carry paid by many of our investors are also far lower than the negotiated rates due to substantial, free co-invest offered to LPs.
- Your implication that our most senior executives derive their financial success primarily from “low-taxed Carry payments” is also misleading. (The net worth figures you cite primarily reflect their equity ownership of our publicly traded firm.) Moreover, since our senior leadership lives in the New York-metro area, they generally pay tax rates of around half their annual income – not the 20 percent carried interest figure often quoted in the media.

Incorrectly generalizes that “management fees are typically paid by portfolio companies”

- This is not true of Blackstone's most recent funds – where fees are charged on invested/committed capital at the fund level. Moreover, to the extent that such fees are paid by portfolio companies, management fees are reduced by 100 percent in the case of the Limited Partners' share of net break-up, topping, commitment, monitoring, transaction, directors', and organization fees.

Conclusion

Thank you again for the opportunity to correct the record on these important points. We are deeply proud of the work we do to invest in and improve companies, generating positive returns for our investors, including millions of public pensioners seeking a more secure retirement.

Public pension funds and other investors' increasing allocation to alternative investments in recent years show they understand its value to their beneficiaries. These include our ability to deploy capital in attractive investments at scale, generate outperformance compared to public markets through cycles, and diversify their portfolios.

Indeed, we believe the private equity model is particularly well built for moments such as the current market. Our long-term capital commitments mean we never need to be forced sellers during periods of dislocation and can control the timing of our exits. We also have significant dry powder to deploy into attractive investment opportunities when others are retrenching. And our strong governance rights, informational advantages in analyzing companies, and ability to intervene operationally to improve businesses have helped us deliver exceptional performance to our investors over more than 35 years.

Thank you again for the opportunity to comment so that the corrections we have provided can be reflected in any article you ultimately decide to publish. We are available to further discuss these matters at your convenience. Again, we very much appreciate your willingness to thoughtfully and constructively engage with us on these issues in advance of publication.