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Private Equity Performance Measurement Unwrapped: A Primer

(Medición de la rentabilidad en el private equity al descubierto, una guía)

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Sumario

Abstract

It is well known that performance measurement in Private Markets is a challenging task mainly because of the irregular timing and size of cash flows of private equity funds. When trying to compare different PE funds, benchmark them against public markets, or other asset classes with a view to multi-asset portfolio allocation, popular metrics, like IRR, show key shortcomings, leading to biased results. IRR, in particular, reflects GPs' perspective and we continue to be surprised whenever we see LPs buying into it. What this perspective does not incorporate is how much capital, when and for how long the capital itself is invested. Additional metrics like MOIC, TPVIs or PMEs have been developed and have gained popularity but they also carry several issues. Although the main scope of this article is to focus on private equity performance measurement, similar conclusions can be drawn when analysing other illiquid investments with irregular cash flows patterns, i.e. capital calls and distributions.

In this full article, we will dive into some of the most widely used performance measures and their limitations, suggesting some alternatives that can overcome the existing flaws of the metrics currently in use. The adoption of more advanced and accurate measures of performance can have many benefits and uses for both LPs and GPs. We share the conclusion of a recent research paper from INSEAD[1] "*As the market is maturing, there is hope that more sophisticated measures may become standard. It is up to LPs, as multi-asset class investors, to promote and request them.*"

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1   INSEAD (2019).

Keywords: Private Equity, Private Markets, Secondaries, Evergreen, Liquidity Solutions, Alternatives.

Resumen

Es bien sabido que la medición del rendimiento en los mercados privados es una tarea ardua, debido principalmente a la irregularidad del calendario y el volumen de los flujos de caja de los fondos de private equity. Cuando se trata de comparar distintos fondos de capital privado, comparaciones con los mercados públicos o con otras clases de activos con el objetivo de asignaciones en carteras multiactivo, métricas populares, como la TIR, muestran deficiencias clave que conducen a resultados sesgados. La TIR, en particular, refleja la perspectiva de los GPs y nos sigue sorprendiendo cada vez que vemos que los LPs la aceptan como medida de referencia. Lo que esta perspectiva no incorpora es cuánto capital, cuándo y durante cuánto tiempo se invierte el propio capital. Se han desarrollado otras métricas adicionales como MOIC, TPVI o PME, que han ganado popularidad, pero también conllevan varios problemas. Aunque este artículo se centra principalmente en la medición del rendimiento de los fondos de capital privado, pueden extraerse conclusiones similares al analizar otras inversiones ilíquidas con patrones irregulares de flujos de caja, es decir, con llamadas y distribuciones de capital en el tiempo.

En este artículo nos sumergiremos en algunas de las medidas de rendimiento más utilizadas y sus limitaciones, sugiriendo algunas alternativas que pueden superar los defectos existentes en las métricas actualmente en uso.

La adopción de medidas de rendimiento más avanzadas y precisas puede tener muchos beneficios y usos tanto para los LPs como para los GPs. Compartimos la conclusión de un reciente trabajo de investigación del INSEAD : "A medida que el mercado madura, existe la esperanza de que medidas más sofisticadas se conviertan en estándar. Corresponde a los LP, como inversores en múltiples clases de activos, promoverlas y solicitarlas."

Palabras clave: Capital Privado, Mercados Privados, Secundarios, Inversiones Alternativas, Iliquidez.

1. Private equity as an asset class and its intrinsic features

Private equity, as the term evokes, involves investments of equity capital in private businesses. Private equity is, indeed, a stake in a private company. Generally speaking, private equity refers to a leveraged acquisition/buyout of a large interest in a mature, cash-flow-stable company. Earlier stage investments are usually labelled as venture capital[2].

Investors usually access private equity investments through closed-end funds set up by General Partners (GPs) through Limited Partnership Agreements.

Limited partnerships have a fixed life-span (usual 10 years) and are self-liquidating. In the first 5-year (investment period) GPs have the right to call tranches of the capital committed by the investors, Limited Partners (LPs), to purchase private equity stakes. In the second 5 years (liquidation period) the stakes are sold and capital and net gains are

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2   Private Equity encompasses the following fund stage focus:
      Buyout fund: Funds acquiring companies by purchasing majority or controlling stakes, financing the transaction through a mix of equity and debt.
      Generalist fund: Funds investing in all stages of private equity.
      Growth fund: Funds that make private equity investments (often minority investments) in relatively mature companies that are looking for primary capital to expand and improve operations or enter new markets to accelerate the growth of the business.
      Mezzanine fund: Funds using a hybrid of debt and equity financing, comprising equity-based options (such as warrants) and lower-priority (subordinated) debt.
      Venture Capital: Early-stage fund: Venture capital funds focus on investing in companies in the early stages of their business lives.
      Later-stage fund: Venture capital funds providing capital for an operating company which may or may not be profitable. Typically, in C or D rounds.
      Venture fund (all stages): Venture capital funds focused on both early and later stage investments.

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returned to LPs. Upon LPs' approval, the fund life can be extended to facilitate liquidation.

Private equity lifecycle spans a period of 7-10 years and differs from public equity investing and other investable asset classes, encompassing four distinct stages: establishing the fund and fundraising, identifying and investing in target companies, boosting operational and management efficiency and creating value in portfolio companies, exit portfolio companies, realising investment and, if successful, distributing gains and returning cash to investors. Funds that are halfway through their lifecycle are in the sweet spot, with the final stage when investments are realised usually labelled as the harvest period.

Private equity investors' performance experience through the lifecycle of a fund is usually mapped out and graphically represented in a chart plotting growth with respect to time as a "J"-Curve, which illustrates the initial dip in returns that private equity investment experience before realising significant returns. In the first few years, investors face capital calls, while also paying management fees and upfront costs. As the fund deploys the capital, returns do not materialise being insufficient to overcome fees, thus resulting in negative return. As time passes and the fund enters the next stages of its lifecycle returns generally improve, delivering positive readings.

However, in our view, private equity investors' performance experience is better mapped out as a sigmoid curve, which better represent the influence of time on cash flows patterns. In fact, as the market becomes saturated and divestment materialise, eventually leading to liquidation and distribution of returns to investors, the performance growth slows, flattening out and leading to the levelling off of the curve.

(Graphic: Exhibit 1.)

Private equity characteristics significantly differs from traditional asset classes like stocks and bonds. The fact that in unlisted private markets there are no standardised market practices for reporting and regulatory compliant metrics for calculating funds' performance makes it difficult to evaluate private equity investments. Navigating the intricacies of the asset class, which is relatively less transparent than its public counterparts, may be difficult.

Furthermore, the GIPS Standards clarify that performance reporting is of little value unless the underlying valuations are based on sound valuation principles. In particular, GIPS Standards (https://www.gipsstandards.org/) dictate that "*private equity investments must be valued in accordance with the definition of fair value[3] and the GIPS Valuation Principles in Chapter II.*"

Exhibit 1. J-Curve vs. S-curve in PE investing
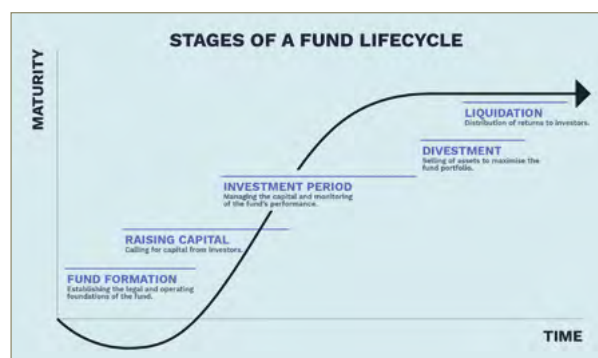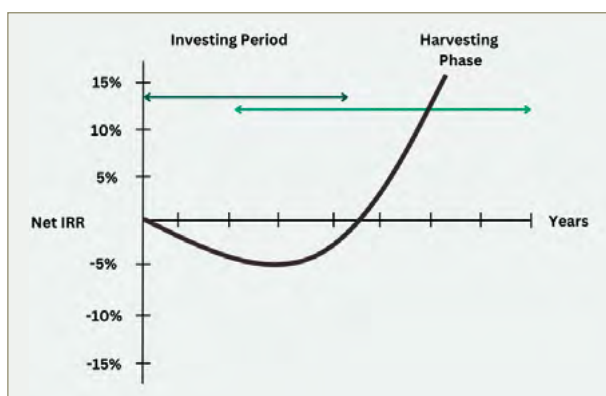
Source: Hamilton Lane and Oister Global

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3   The GIPS Standards define the fair value as "*the amount at which an investment could be exchanged in a current arm's length transaction between willing parties in which the parties each act knowledgeably and prudently. The valuation must be determined using the objective, observable, unadjusted quoted market price for an identical investment in an active market on the measurement date, if available. In the absence of an objective, observable, unadjusted quoted market price for an identical investment in an active market on the measurement date, the valuation must represent the firm's best estimate of the market value. Fair value must include accrued income.*"

The performance measurement of private equity investments faces a number of challenges, not only because of the typical lifecycle of private equity funds, but also for the cash flows dynamics and the dry powder[4] consideration.

In fact, not only do multiples, as well as alternative money-weighted performance measures, not factor in the time taken to generate returns, but they also fail to account for the private equity fund's lifecycle. Thus, comparing these metrics across funds may not be meaningful unless they have the same vintage years and similar cash flows patterns.

Conversely, time-weighted rates of return do not reflect cash flows in and out of a portfolio, thus specifically sterilising the impact of cash flows on the calculated rate of return.

2. Private Equity performance valuation: A review of existing metrics and their weaknesses

IRR (Internal Rate of Return) is the most commonly adopted money-weighted metrics to compute returns on private equity investments. IRR is a discount rate that makes the net present value (NPV) of all cash flows equal to zero. IRR is widely published by GPs in marketing documentation as a standard to calculate performance at fund level and lure LPs investments. However, IRR cannot be accurately averaged and aggregated at portfolio level, as well as compared across asset classes and within peer groups.

The problem with IRR arises from LPs' perspective, which should incorporate the notion of time in their investment decisions, factoring in how much capital, when and for how long the amount of committed capital is invested. However, IRR is atemporal and only relevant for a point in time and cannot be accurately averaged, delivering an inaccurate proxy of portfolio's performance. Furthermore, compounding (as computed with

geometric means) implies asset realization and reinvestment assumption.

In this respect, one of the major flaws of IRR is just its reinvestment assumption, i.e., the fact that capital distributed to LPs early on will be reinvested over the life of the PE fund at the same IRR as calculated at the early exit

Furthermore, IRR is influenced by debt financing techniques[5] that postpone contributions and anticipate distributions, thereby artificially increasing the reading. Since IRR is driven by early distributions, fund managers can strategically manipulate IRR.

Exhibit 2 below illustrates the role played by early distributions on IRR, with the first distribution accounting the most in the calculation of the final IRR reading. All funds have early distributions. Fund A and B have the same multiple of money (MOIC), but the first distribution of Fund B is half that of Fund 1 (€35 instead of €70). Fund C distributed almost twice as much as Fund A on Dec. 31, 2022, but its IRR increases only relatively by 9.6 percentage points. Despite a relatively low difference in IRR between Fund A and C, Fund C shows a MOIC that is significantly higher than Fund A (1.87 vs. 1.39), suggesting that Fund C is a better investment choice.

(Tablet: Exhibit 2)

In Exhibit 3 it is evident how three different funds of the same 2018 vintage, with an identical committed capital of 100 euros and different percentage of drawn capital and cash flow amounts, occurring at different dates (contributions with negative readings and distributions with positive readings), lead to identical IRR, DPI, and TVPI results.

TVPI means "total value to paid-in" capital and calculates the total value—both realized returns (distributions) and unrealized returns (residual values)—that a private equity fund has generated for investors relative to the amount of capital

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4   Dry powder refers to the amount of capital that has been committed by investors but has yet to be "called" by investment managers in order to be allocated to specific investments.
5   Amongst others, fund subscription lines of credit to defer capital calls and equity bridge financing to increase dividend payments.

Exhibit, 2 – Influence of early distributions on IRR

	Capital Commitment	31/01/2018	Residual Value 31/12/2018	31/12/2019	31/12/2020	31/12/2021	31/12/2022	31/12/2023	Drawn Capital	IRR	DPI	TVPI	MOIC
Fund A	100	-65	70	3	3	3	50	10	65.00%	39.3%	2.0	2.1	1.39
Fund B	100	-65	35	3	3	3	80	15	65.00%	21.6%	1.9	2.1	1.39
Fund C	100	-65	70	3	3	3	95	13	65.00%	48.9%	2.7	2.9	1.87

Source: authors' calculations

Exhibit 3 – Buyout funds, vintage 2018 – Cash flows vs. performance metrics and multiples

	Capital Commitment	31/01/2018	Residual Value 31/12/2018	31/12/2019	31/12/2020	31/12/2021	31/12/2022	31/12/2023	Drawn Capital	IRR	DPI	TVPI	MOIC
Fund A	100	-20	-41	20	97	5	-	13	61.00%	37.4%	2.0	2.2	1.35
Fund B	100	-	-30	-60	30	150	-	18	90.00%	37.4%	2.0	2.2	1.98
Fund C	100	-	-	-25	-50	25	125	15	75.00%	37.4%	2.0	2.2	1.65

Source: authors' calculations

contributed. When comparing TVPIs of different funds it is critical to compare funds of similar vintage years in order to avoid the apples-to-oranges peer group trap. DPI (distributions to paid-in capital) focuses on cash returns and liquidity as it factors in realised returns only (distributions) in the calculation. A DPI above 1.00 means a fund generated positive returns. MOIC (multiple on invested capital) tries to answer at fund level what TVPI answers for an individual investor, i.e. how much value did the fund generate? Although it does not calculate a time-weighted rate of return, as it does not factor in the timing of capital calls or distributions, MOIC tells investors how the value of an investment has grown on an absolute basis.

MOIC has different implications whenever the time required to generate the underlying return is taken into account. A MOIC of 1.35 that is generated in six years implies a return that is different from the same MOIC generated in four years. In fact, MOIC of Fund A (1.35) in Exhibit 3 corresponds to an annualized return of 5.13% taking into account the calendar time of 6 years. Conversely, for the same calendar period, MOIC of Fund C (1.65) corresponds to an annualized return of 8.70%.

It is important to note that the readings at the numerator of both MOIC and TVPI—distributions to the fund and residual fair value—are all calculated

before fees, expenses, and carried interest, meaning that effective readings for investors are lower than what is generally published.

The relative importance of TVPI and DPI in private equity valuations depends upon investors' perspective and the fund lifecycle, as described earlier. In early stages of private equity investment TVPI ranks higher among investors' peer group screening factors as it reflects both the potential upside (from NAV) and any early distributions. As the investment matures, exits and distributions step up, making DPI a relatively more important metric.

(Tablet: Exhibit 3)

Money-weighted metrics such as IRR and multiples do not account for the time-value of money.

IRR, in particular, **is not an annualized compound growth rate**. In Exhibit 3 above, the 37.4% IRR does not return every year 37.4 euros on the 100 euros invested capital as an annualized compound growth rate. Also, the residual value factored in the calculation of TVPI and MOIC is a fair value estimate that may significantly differ from the value realized when the investments are liquidated by GPs and distributed to LPs. Because of that, TVPI and MOIC readings may be subject to change at liquidation.

Public Market Equivalent (PME) is a methodology to assess the performance of a private equity fund relative to a public market benchmark. It compares public and private market investments by theoretically investing in the index the cash flows from the private equity fund and then determining the IRR of the theoretical investment.

PME's adoption by market practitioners is based on the apparent ability of the metric to determine whether there is positive or negative alpha in private equity investment, thus assessing the ability of GPs to deliver risk premia. Further variations of the PME include the PME+, Modified PME, Kaplan Schoar PME (KS-PME), Direct Alpha, and PERACs Alpha.

However, PME calculations are performed on a single-asset basis and the results are hardly comparable across funds, and cannot be averaged out.

PME is not a compound growth rate that can be used in performance measurement and multi-asset portfolio allocation decisions. Rather it is a measure of relative performance that does not capture the full dynamics of private market investments either from GPs' perspective, who do not set their targets in terms of relative performance versus a listed benchmark, or from LPs' one, who have not found a consensus on the appropriate private market benchmarks to consider, given the current debate on PE risk-adjusted returns. Similar to IRR, PME does not allow additivity. Furthermore, LPs are reasonably not interested in any "closet indexing" features that the PME, measuring the wealth multiple effect of investing in private markets versus public market indexes, appears to test at fund level.

In summary, no single performance standard of those highlighted above captures the actual growth in wealth generated by a private equity investment over time.

To date, the main issue preventing the accurate calculation of private equity returns (disentangled in their beta and alpha components) with the traditional money-weighted metrics was the lack of the properties of additivity and compounding of those measures.

The most recent introduction of Duration-adjusted Return on Capital (DARC) to measure private equity performance places the valuation of private investments in a time-weighted context.

By adding the critical element of duration to private equity return calculation, DARC provides an understanding of:

a) when, on average, investors start to earn the return that IRR represents;

b) on how much capital; and

c) how long that return is earned.

The new paradigm of DARC computes private equity returns in the same time-weighted fashion of any other asset class, thus making unbiased pricing, proper benchmarking, multi-asset portfolio allocation, and risk transfer in private markets possible. As it calculates private equity returns in a traditional time-weighted framework, DARC overcomes the aggregation and averaging limitations of IRR, which are well-documented in literature.

The Exhibit 4 below provides an overview of the advantages and weaknesses of various Private Equity valuation metrics.

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Exhibit 4 - Advantages and Weaknesses of Various Private Equity Valuation Metrics

Method	Authors	Advantages	Weaknesses
IRR	Irving Fisher in his book "The Rate of Interest" (1907) called it "rate of return over costs."	· Intuitive appeal, although practitioners often interpret (erroneously) IRR as the equivalent annual return on a given investment. · At deal level, IRR is a proxy for time-weighted returns.	· IRR can be skewed by large contributions or distributions. · Period return, not a total return measure. · Sensitive to early distributions. · Unrealistic reinvestment assumptions. · Lack of additivity needed to infer an unbiased fund-level return. · Aggregation of IRR data is not unambiguous. · Cannot be used to rank mutually exclusive investments with different timing or that are of unequal amounts. · Not useful for absolute return or performance benchmarking.
MIRR	First discovered in the 18th century and rediscovered in the 1950s by Baldwin, R. H. in his 1959's article—How to assess investment proposals.	· Assumes that positive cash flows are reinvested at the reinvestment rate that corresponds to the firm's cost of capital. · Designed to generate one solution, eliminating the issue of multiple IRRs.	· Estimation of the financing rate to discount the capital calls. · Estimation of the cost of capital to compound all distributions to the valuation date. · Requires additional analysis to address the issue of investment options of different sizes.
Index Comparison Method (ICM), a.k.a. Public Market Equivalent (PME)	Long, Nickels	· Intuitive approach. · Defined as the IRR of public market investments.	· IRR spread is sensitive to terminal value and fund age. · IRR spread may be biased. · Not always defined, as large distributions may produce a negative PME NAV. · No exact solution.
Kaplan/Schoar Public Market Equivalent (KS PME)	Kaplan, Schoar	· Measures the wealth multiple effect of investing in a fund versus the index. · Can be interpreted as a market-adjusted equivalent of Total Value to Paid-In-Capital (TVPI). · Always defined.	· Timing of cash flows is ignored. · Not an annualized measure.
Public Market Equivalent Plus (PME+)	Rouvinez	· Identical residual values. · Liquidating reference portfolio.	· Cash flows are not perfectly matched. · Inflated/deflated IRR spreads. · Not always defined. · No exact solution.
Modified Public Market Equivalent (mPME)	Cambridge Associates	· Liquidating reference portfolio.	· Inflated/deflated IRR spreads. · Sensitive to pricing errors and under- or outperformance. · No exact solution.

Method	Authors	Advantages	Weaknesses
Direct Alpha	Gredil, Griffiths, and Stucke	· Rate of return of outperformance, defined as the IRR computed from the PE fund's cash flows discounted using the returns of a benchmark portfolio.	· Using alpha (annualized excess return) to calculate returns has its limitations—it cannot be used to compare different investment portfolios or asset types. · The definition of risk premium is neglected. · Benchmarking and computation of actual performance are not possible.
PERACs Alpha	Approach initially used by Phalippou and Gottschalg (2009) in a research paper to measure the performance of private equity funds and later referred to as the PERACs alpha.	· Return relative to the opportunity cost of not investing in the public market.	· Estimation of the duration. · Opportunity cost approximation. · Benchmarking and computation of actual performance are not possible.
Modified Dietz	The original Dietz method was introduced in 1966 and later revised by weighting the cash flows by the amount of time outstanding.	· Approximation of time- weighted return when intra-period pricing information is unavailable. · Well established metric and formally approved method recommended by the CFA Institute in its Global Investment Performance Standards (GIPS®) Handbook.	· Provides the return per unit of average cash outflow. · A linear approximation of IRR that does not ignore or reduce the effect of cash flows. · Modified Dietz's error increases as cash flows grow larger. · Geometric compounding of intra-period returns generates biased results.
DARC	Saccone	· Time-weighted return measure. · Formally correct, accurate, and always defined. · Meets the additivity properties to infer unbiased fund-level return. · Enables performance benchmarking at multi-asset class portfolio level.	· Modular approach with complex calculations to deliver return estimation accuracy. · Sensitivity to net duration is overcome when the fully diluted version of DARC measure is used.

Source: Saccone M. and A. Gentilini (2024).

DARC is the rate of return the invested capital produces over time for the net duration — the difference between the duration of Distributions (DurD) and the duration of Contributions (DurC) — while Horizon DARC is the actual since-inception annualized rate of return that investors earn for a given time horizon. As it is calculated taking into account the net duration, which may differ among private equity fund peers, any performance comparison across funds using DARC may be misleading. Conversely, Horizon DARC returns unbiased performance figures in a peer group analysis and across different asset classes.

Exhibit 5 below shows the individual and pooled, i.e. average, performance of three PE funds. DARC, Horizon DARC, IRR, and TVPI are all calculated as of the valuation date of December 31, 2022. In the table, negative figures for contributions are in blue and positive readings for distributions are in black.

The pooled case is simply the arithmetic sum of the cash flows, i.e. contributions and distributions, of the three investments.

Although IRR and DARC readings appear to be quite similar, only DARC embeds the timespan tag as defined by the net duration (1,483 days or 4.06 years in the pooled example). DARC is a forward measure to the extent that the period as of an investor will start earning the PE return starts at a time in the future, as defined by the duration of the contribution. Then, the investor will be able to earn the PE return for the period given by the net duration, starting on the forward date of the duration of the contribution. In the pooled example in Exhibit 5, an IRR of 12.93%, which—it is worth stressing once again—is not an annualised return measure and is valid only at the time of calculation, corresponds to a since-inception annualized rate of return of 4.18%, as defined by Horizon DARC.

It is worth noting that, similar to IRR, DARC is sensitive to GPs' policies aimed at increasing debt-fueled dividend payments as it is influenced by debt financing techniques that postpone contributions and anticipate distributions.

Also, being a fully-diluted measure to the extent it factors in the committed capital including the undrawn capital, an unbiased benchmarking of DARC with public market indexes, which are fully invested, would require the creation of a diluted version of the public benchmark.

In the next sections, the performance measurement in a time-weighted context will be taken into consideration to see whether the various metrics used to compute private equity performance can play a role in working out both the risk premia conundrum and indexing in private equity.

Exhibit 5 – Individual and Pooled Performance of Three Sample PE Funds

Investments		Investment 1		Investment 2		Investment 3		Pooled
	2015-05-05	-10.00	2015-05-05		2015-05-05		2015-05-05	-10.00
	2016-02-08		2016-02-08	-20.00	2016-02-08		2016-02-08	-20.00
	2017-01-09	-10.00	2017-01-09		2017-01-09	-40.00	2017-01-09	-50.00
	2018-04-09	-5.00	2018-04-09		2018-04-09		2018-04-09	-5.00
	2019-05-07		2019-05-07	-10.00	2019-05-07		2019-05-07	-10.00
	2019-09-09	25.00	2019-09-09		2019-09-09		2019-09-09	25.00
	2020-03-09		2020-03-09		2020-03-09	10.00	2020-03-09	10.00
	2020-09-14	10.00	2020-09-14		2020-09-14		2020-09-14	10.00
	2020-11-17		2020-11-17	5.00	2020-11-17	30.00	2020-11-17	35.00
	2021-03-08		2021-03-08	43.00	2021-03-08		2021-03-08	43.00
	2021-10-19		2021-10-19		2021-10-19	5.00	2021-10-19	5.00
	2022-05-17		2022-05-17	23.00	2022-05-17	5.00	2022-05-17	28.00
Valuation Date	*2022-12-31*							
Weight		**26.38%**		**31.38%**		**42.24%**		**100%**
Duration C (days)		2,409.00		2,615.00		2,566.00		
Duration D (days)		3,645.00		4,218.00		4,012.00		
Net Duration (days)		1,236.00		1,603.00		1,446.00		1,483.00
Synth Contr @DurC	2016-08-05	-24.93	2017-02-27	-29.75	2017-01-09	-40.00	2016-12-14	-94.66
Synth Distr @DurD	2019-12-24	35.08	2021-07-19	70.98	2020-12-25	50.00	2021-01-05	156.18
Horizon DaRC		**2.93%**		**7.18%**		**1.98%**		**4.18%**
Annualised since inception								
DaRC		**10.61%**		**21.90%**		**5.79%**		**13.12%**
IRR		10.30%		20.90%		5.81%		12.93%
TVPI (x)		1.40		2.37		1.25		1.64

Source: Saccone M. and A. Gentilini (2024).

3. Beta vs. alpha: the risk premia conundrum

Private equity is generally considered an asset class delivering superior returns compared with public equity markets. The empirical evidence is mixed, with most recent research suggesting that PE performance is broadly in line with public markets.

Alpha estimation from PE cash flows remains methodologically challenging, due to a lack of good quality data and smoothed returns, often calculated in a biased money-weighted computational framework. Further, the estimation of PE alpha would require, first, the computation of PE funds beta, i.e., the sensitivity of returns relative to the systematic risk of the market portfolio. However, among academics and practitioners there is a lack of consensus on the appropriate public market benchmarks to consider for the analysis, with performance findings remaining highly sensitive to the underlying index selected for the different measurement periods. Also, private equity investing is highly leveraged, while that is not the case for public market benchmarks. Further, private equity smoothed returns minimize the true economic risk of the investment. Since private equity funds are illiquid, there is a lack of mark-to-market in absence of daily market prices, resulting in muted volatility readings of the returns of a private equity fund.

The limitations of the PME methods but the direct alpha stem from the fact that they are unable to separate the alpha (the excess return of the PE fund) from the beta (i.e., the listed benchmark return, calculated with reference to the cash flows of the PE fund). At the same time, the claimed unbiasedness of the Direct Alpha method to get the IRR by converting the cash flows occurred in each year to a present value at the listed benchmark return and then considering these as having occurred at the year in question is questionable. Both PME and Direct Alpha metrics share the same limitation, i.e. their inability to compute the actual performance of a private equity invested portfolio.

Based on CAPM, the equation of alpha can be written as:

Alpha = PE Return - [Risk-free rate + (Market Benchmark Return - Risk-free rate) * Beta],

where:

Alpha = Skill (portfolio selection) + Illiquidity Premium + PE risk premia

We sustain the argument that the illiquidity premium, being an additional return component that is intended to compensate an investor for holding an asset that is not highly liquid, is hardly measurable and is strictly dependent on time, as represented by the duration. In fact, the capital invested in a private equity fund is generally "locked" for a typical period of 5 to 10 years, if not more.

What if, instead, the illiquidity premium turns into an illiquidity discount, meaning that investors give up a fraction of the expected return for much less liquid assets? In other terms, what's the next implication of extreme illiquidity and pricing opacity being a feature not a bug as AQR Capital Management's Cliff Asness has argued?[6] "*Well, you pay up in price (and give up in expected return) for features you value (not bugs you can't stand). Attractive smoothness of returns may not come for free. If illiquidity is more positive than negative to many investors, it could easily mean paying a higher price and accepting a somewhat lower return to obtain it… I think it's entirely possible that investors are accepting a discounted expected net return … for the privilege of not being told the prices. There really may be an illiquidity discount (in expected returns) with the opposite sign from the illiquidity premium we've always assumed.*"

How has private equity historically performed in institutional portfolios?

While Yale University endowment has stopped reporting returns on its private equity portfolio, CalPERS has disclosed as of December 31, 2024,

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6   Asness C. (2019).

a since-inception net IRR of 11.1% and a TVPI of 1.5x for its private equity program, indicating returns in line with public market readings. In mid-July, CalPERS reported a preliminary net investment return of 11.6% for the 12-month period ending June 30, 2025. Public equity investments, which comprise approximately 39% of the fund, outperformed all other asset classes with an estimated 16.8% return. Private equity earned a lower 14.3% return for the same period, with private debt delivering an estimated return of 12.8%.

It's a fallacy that private equity's historical performance computed with IRR outperformed public market indices' returns, as long as IRR is claimed to measure the aggregate annual compounded returns generated by a fund's investments over a holding period. As we highlighted above, IRR is not a time-weighted actual rate of return, even less it can be compounded.

A straightforward way to show that IRR is unlikely to represent a rate of return is to compute the amount of capital investors would earn at the end of the investment period if they had realized a rate of return equivalent to the IRR that is reported.

Amongst others, quoting from KKR's 10/K 2024 annual report filed on Feb. 28, 2025 (available at the link https://ir.kkr.com/sec-filings-annual-letters/sec-filings?page_no=2) "*From our inception in 1976 through December 31, 2024, our Private Equity and Real Assets investment funds with at least 24 months of investment activity generated a cumulative gross IRR of 25.5%, compared to the 12.2% and 9.5% 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.*" Through a simple computation, an initial investment of $100 million in KKR in 1976, without any additional contributions, at a 25.5% compounded return would have grown, over an investment period spanning 48 years, to an unrealistic $5.431 trillion at the beginning of 2025 [$100 mln. * (1+25.5%)^48], which is no less than the GDP of Japan.

The persistence of performance, which refers to the ability to consistently pick outperforming portfolio managers, has long been investigated in mutual funds that invest in public markets, with weak-to-negative results.

As for private equity, Kaplan and Schoar[7] found that "*On average, buyout (LBO) fund returns net of fees are slightly less than those of the S&P 500; venture capital (VC) fund returns are lower than the S&P 500 on an equal-weighted basis, but higher than the S&P 500 on a capital weighted basis.*" The authors documented a substantial persistence in LBO and VC fund performance. "*General partners (GPs) whose funds outperform the industry in one fund are likely to outperform the industry in the next and vice versa. We find persistence not only between two consecutive funds, but also between the current fund and the second previous fund.*"

Analysing a sample of 1,400 U.S. buyout and venture capital funds using a new data set from Burgiss, R. Harris, T. Jenkinson and S. Kaplan[8] find that for private equity, "*the outperformance versus the S&P 500 averages 20% to 27% over the total life of the fund and more than 3% annually. Venture capital funds outperformed public equities in the 1990s, but underperformed in the 2000s.*"

Working on high quality cash-flow data from Burgiss's large sample of institutional investors (as of December 2020), a more recent study[9] indicates that the persistence of buyout funds performance is weakening, and since 2000 there is "*little evidence*" of it. Conversely, the authors "*continue to find persistence for VC funds though it declines post-2000.*"

Illmanen, Chandra and McQuinn[10] found very similar results. In their analysis, the authors suggest that

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7   Kaplan, S. N., A. Schoar (2005).
8   Harris, R. S., T. Jenkinson, and S. Kaplan (2014).
9   Harris, R.S., T. Jenkinson, S. N. Kaplan, and R. Stucke (2023).
10   Illmanen, A, S. Chandra, and N. McQuinn (2020).

"private equity does not seem to offer as attractive a net-of-fee return edge over public market counterparts as it did 15–20 years ago, from either a historical or forward-looking perspective." And *"Our estimates display a decreasing trend over time, which does not seem to have slowed the institutional demand for private equity. We conjecture that this is due to investors' preference for the return-smoothing properties of illiquid assets in general."*

In a recent paper, using a comprehensive MSCI Burgiss dataset, focusing on 2000–2019 vintage funds Phalippou[11] argues that the PME stands at 0.99—identical to that reported in in a previous study[12]—implying that, on average, private capital funds performed in line with the S&P 500 over the same period. The author advocates a standardisation and transparency of benchmarking practices since the argument of a persistent outperformance is largely a construct, sustained by selective benchmarking, and data filtering.

4. Will indexing foster private equity democratization, paving the way for investability?

The definition of "benchmark" is deeply rooted in the global standards set out in the *IOSCO Principles for Financial Benchmarks*[13], which were published in July 2013.

The broad definition of benchmark set out in the EU Benchmark Regulation (Regulation (EU) 2016/1011) refers to *"Any index by reference to which the amount payable under a financial instrument or a financial contract, or the value of a financial instrument, is determined, or an index that is used to measure the performance of an investment fund with the purpose of tracking the return of such index or of defining the asset allocation of a portfolio or of computing the performance fees."* By virtue of the application of a rules-based, robust, and accurate methodology, which is transparent and capable of validation, allowing calculation of the benchmark

in the widest set of possible circumstances, the resulting benchmark should be *"reliable and representative of the market or economic reality that the benchmark is intended to measure."*

Benchmarking reflects a statement of transparency, product governance and investor protection, accuracy, and representativeness. The adoption of unbiased benchmarking standards for private market investments within pension plans and institutional investors' portfolios allow unbiased comparability with public market assets. That has become increasingly critical within institutional investors' allocations, since private equity is one of the several alternative assets gaining relative share in pension plans' portfolio allocations since early 2000.

A question arises here, given the clear direction in which the regulation is heading. Do existing benchmarks represent either the market or the economic reality of private market investments for Limited Partners (LPs)? Certainly not. Existing benchmarks that track unlisted private market assets build upon money-weighted metrics, which are atemporal by construction, imply unrealistic reinvestment or refinancing assumptions, and do not conform with financial market standards of additivity and averaging.

Very often, in the private equity space, the term 'benchmarks' is used in a broader sense to include peer group analyses and ratios that are constructed to allow intra and cross-asset class comparisons of various performance metrics. This is the case of certain ratios or metrics, like the so-called Public Market Equivalent or Alpha measures, or the most traditionally referenced since-inception IRRs (or Horizon IRR), which has been compounded in the design of the index. In particular, Horizon IRRs cannot be averaged out and geometrically compounded to derive annualised returns.

In many instances, performance measures such as quartiles, averages or annualised measures of IRRs are derived from calculations that do not

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11   Phalippou, L. (2025).
12   Phalippou, L. (2022).
13   https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf

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fulfil mathematical and statistical accuracy. Generally speaking, those metrics, which are money-weighted and do not reflect the best practices for the construction of indices in a time-weighted fashion, underlie the construction of benchmarks.

In other cases, such as the MSCI's Burgiss Private Capital Indexes, benchmarks' design relies on the Modified Dietz (MDietz) method. As we highlighted earlier in the exhibit summarising advantages and weaknesses of various private equity valuation metrics, MDietz is an approximation of time-weighted return that does not ignore or reduce the effect of cash flows. MDietz delivers the return (per unit) of the time-weighted average of cash flows, assuming a linear movement of asset prices during the measurement period. As a result, Modified Dietz's error increases as cash flows grow larger, with geometric compounding of intra-period returns generating biased results.

In the construction of private market indexes, the input cash flows (contributions and distributions) and net asset values data used to process private equity valuations should be the same official data published in the quarterly unaudited and annual audited fund financial statements produced by the GPs for their LPs. In order to ensure data accuracy and comprehensiveness, input data could be provided by the custodian or the depositary bank of the private equity fund assets. Regulatory filings, Freedom of Information Act (FOIA) requests, manager surveys, or press "scrapings" should not be used to gather information.

A potential bias in matters of fact arises from GPs' reported NAVs, which is a key data element in private equity performance measurement, since those may well be only estimates of true NAVs, leading to understated risk and overstated risk-adjusted returns[14]. In fact, among practitioners, it is generally acknowledged that illiquidity and incentive considerations can lead reported NAVs to be smoothed versions of true NAVs.

For the reasons noted above, nowcasted NAVs that adjust for NAV smoothing should be taken into account in index construction to lower autocorrelation in returns and compute unbiased performance readings.

As it fosters valuation transparency, rules-based and regulatory compliance indexing, with full disclosure of the index constituents, paves the way for increased market access by retail investors. A daily nowcasting of private fund valuations, which is only possible in a context of time-weighted performance measurement, underpins the robustness of the benchmarks' design. By that way, indexing contributes to eliminate private market information asymmetries and deliver a bridge of trust between GPs and institutional and retail investors.

Accurate and unbiased benchmarking can unlock the full potential of a secondary digital marketplace facilitating price discovery by LPs and investors, risk transfer transactions, and improving platform efficiency via an increased liquidity pool of assets.

At the same time, indexing fosters the adoption of unbiased benchmarking standards within asset owners' global portfolios, paving the way for the launch of passive investment solutions pegged to benchmarks that fulfil regulatory standards of accuracy, representativeness and unbiasedness. The relentless drive to new regulatory requirements is expected to underpin a progressive democratization wave in private markets, where benchmarking is expected to constitute a critical element of the private asset market infrastructure.

5. Secondaries market efficiency: challenges and opportunities

Secondary deal activity in private markets surged in 1H 2025, eclipsing the prior record of $67.71bn in the same period last year[15]. Transaction volume climbed to an estimated $102.23bn at the end of June 2025, with a 51% increase year-on-year.

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14 For a thorough discussion on the topic please refer to Getmansky, M., A. W. Lo, and I. Makarov (2004) and Couts, S., A. S. Gonçalves, and A. Rossi (2024).
15 Setter Capital 1H 2025 Survey, UBS Private Funds Group 1H 2025 Secondary Market Report.

The projected full-year 2025 volume stands at $176.25bn. Fund secondaries led the way in 1H 2025, rising 56.3% year-over-year to $59.49bn, while direct secondaries increased 44.1% to $42.74bn. The market is expected to maintain a near-even split over the next three years, with 55.7% in fund secondaries and 44.3% in directs.

LP-led transactions were fuelled by persistent liquidity pressures and portfolio rebalancing needs amid budgetary constraints and regulatory shift.

As the LPs' pendulum has swung in recent years, progressively focusing on DPIs, with GPs in turn focusing on exits, NAV loans and continuation vehicles are PE fund managers' response to appease investors.

Private equity fund liquidity can be hardly planned using traditional secondaries, which are procyclical. When distributions become uncertain, liquidity is costlier for the seller and riskier for the buyer. Buyers potentially face adverse selection and sellers may well enter the market at penalizing discounts.

In the academic literature two main explanations are found for secondary market discounts: 1) compensation for liquidity provisions: when funding liquidity is low, LPs may be forced to sell their stakes for cash while potential buyers are also strapped of cash or constrained to borrow; 2) compensation for asymmetric information: expecting that incumbent LPs will accept bids that are close to NAV values because they privately discover that their fund's reported NAV is too high, bidders respond with discounted bids.
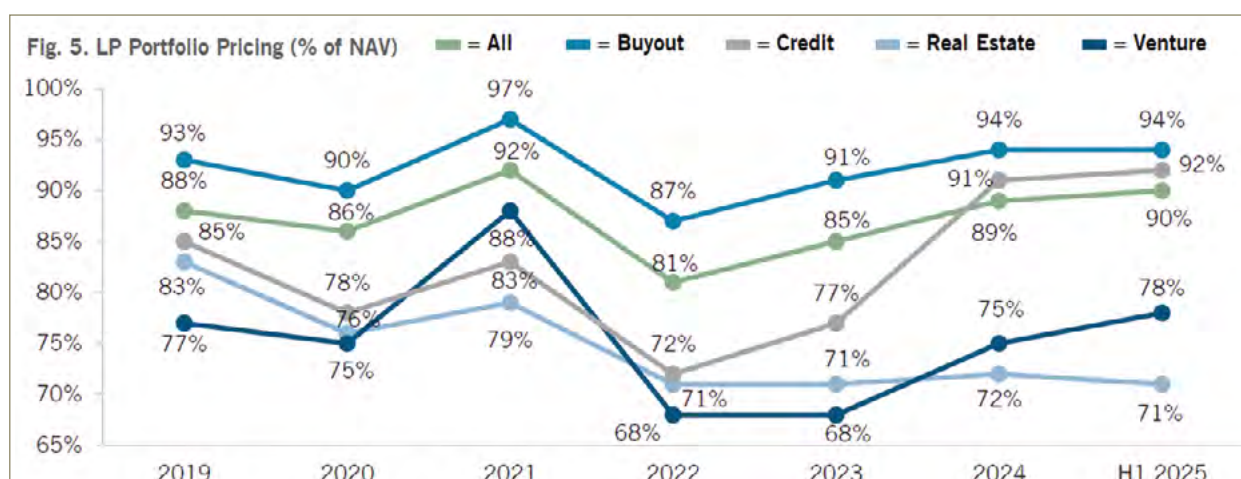
According to Jefferies H1 2025 Global Secondary Market Review, despite volatility in H1 2025 — particularly following the imposition of tariffs and subsequent market disruption around "Liberation Day"— pricing continued its upward trajectory, with average pricing reaching 90% of NAV (or 10% discount) for all strategies and approaching levels last seen in 2021.

(Graphic, Exhibit, 6)

In the current market scenario, a robust time-weighted measure in line with the one reviewed earlier in the article, which computes an actual rate of return for unlisted private equity funds, is the only metric that makes the calculation of daily nowcasted NAVs and drawdowns possible.

Nowcasted NAVs overcome the limitations of quarterly valuation standards, stale NAVs, and muted volatility readings, facilitating price discovery while adding objectivity to NAVs discount calculations, allowing fair fund valuations, and decreasing the risk of adverse selection. Also, nowcasted NAVs

Exhibit 6 – Secondaries Market – LP Portfolio Pricing (% NAV)

Source: Jefferies H1 2025 Global Secondary Market Review

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allow the testing of the accuracy of the marked-to-market NAV in real time, with a view to fostering greater transparency and increased market access to both institutional and retail investors.

At the same time, nowcasted NAVs pave the way for an efficient secondaries market where common standards and unbiased performance measurement in a time-weighted context facilitate seamless transferability of illiquid assets across diverse spot and forward product solutions, reflecting broader investor confidence in private market valuations.

In perspective, an ecosystem where DLT (Distributed Ledger Technology) Registry Operators, which enable the tokenization of financial instruments, interact with GPs, LPs, financial intermediaries, and regulators under the umbrella of a digital infrastructure fosters the development of a blockchain-enabled private equity secondaries market.

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