PEI

Scientific Infra & Private Assets

SIPA KNOWLEDGE CERTIFICATION · REQUIRED READING

Level 3 — Advanced: Performance & Allocation Analytics

From IRR to Alpha: PME, the Private Market Equivalent, Direct Alpha, Persistence, and Allocation

LEVEL	FOCUS	PREREQUISITE	PRIMARY AUDIENCE
Advanced	**Performance & Allocation Analytics**	**A current Intermediate pass**	**LPs, fund selectors, allocators, risk teams**

How to use this reading

This document is the required curriculum for the Advanced level and presupposes the Entry and Intermediate readings. It concerns the measurement of private-fund performance and its use in portfolio construction: why the internal rate of return is an inadequate measure of skill; how benchmarking has progressed from peer groups to the Public Market Equivalent (PME) and thence to a Private Market Equivalent (PtME); the Direct Alpha method and the decomposition of fund alpha into allocation and selection; the assessment of alpha persistence; and the use of private-market indices for strategic asset allocation and capital-market assumptions. The treatment situates SIPA's methods within the academic literature on private-equity performance measurement. Worked examples use SIPA's fund analytics; sources are cited as (Author, Year) and listed in full in the References.

MODULE 3.1

The inadequacy of the internal rate of return

Limited partners (LPs) seek to identify skilled managers, yet by construction only a quarter of funds in any vintage can occupy the top performance quartile; an absolute-return or peer ranking cannot, of itself, distinguish skill from good fortune. The deeper problem is that the internal rate of return (IRR) conflates two economically distinct sources of return: the return earned because the relevant market rose (the systematic, or beta, component) and the return earned by superior selection, structuring and timing (the skill, or alpha, component). A fund that prospered because its market rose is, on IRR alone, indistinguishable from one that prospered through skill.

The IRR is additionally sensitive to two artefacts. First, because the residual NAV enters the IRR and appraised NAVs are smoothed, reported IRRs inherit the smoothing bias documented at the Entry and Intermediate levels; the incentive and opportunity to report conservative or stale interim marks are well documented in the private-equity literature. Second, the IRR is sensitive to the timing of cash flows and can be influenced by the use of subscription lines and the sequencing of distributions. For these reasons the academic literature has consistently held that reported private-equity returns must be risk- and market-adjusted before they can be read as evidence of skill (Kaplan & Schoar, 2005; Phalippou & Gottschalg, 2009; Harris, Jenkinson & Kaplan, 2014). The appropriate question is not the level of the IRR but the fund's performance relative to a representative market benchmark.

MODULE 3.2

Three benchmarking approaches

(1) Peer grouping. Peer grouping ranks funds against one another using reported returns and quartiles. As a benchmark it is an active-manager comparison that, like the IRR, conflates market and skill. It is also statistically fragile: typically fewer than a fifth of funds contribute cash-flow and NAV data, the contributing set changes over time, and the resulting samples are subject to selection and back-fill biases, so quartile assignments carry wide confidence intervals and are unreliable for manager selection. Empirical comparisons of commercial private-equity datasets find that they can disagree materially about the same market (Harris, Jenkinson & Kaplan, 2014).

(2) The Public Market Equivalent (PME). The PME compares a fund's cash flows against those that would have arisen from investing the same amounts, on the same dates, in a public-market index. It is a substantial advance on peer grouping because it separates market from skill and gains robustness through diversification. It also has a rigorous theoretical foundation: the Kaplan–Schoar PME can be interpreted as a valuation under the stochastic discount factor implied by an investor with log utility over the market return, so that a PME above one indicates value added relative to that benchmark investor (Sorensen & Jagannathan, 2015). Its limitation is the reference asset: a public-equity index does not represent private-market risk, because private companies differ in size, sector and the nature of their buyers and sellers. A PME can therefore tell an investor whether a private fund beat a cheaper listed alternative, but not how the fund compares with the private market or with its peers.

Two strands of the literature refine the PME. The Generalized PME relaxes the log-utility restriction, estimating the risk adjustment from the data and thereby correcting biases that arise when private returns load on priced factors beyond the market (Korteweg & Nagel, 2016). Complementary work recovers a time-varying private-equity risk premium directly from limited-partner cash flows, finding systematic exposures not spanned by traded factors (Ang, Chen, Goetzmann & Phalippou, 2018). The methodological sensitivity of these risk adjustments — to method, period and data source — is itself the subject of a dedicated survey (Korteweg, 2019).

(3) The Private Market Equivalent (PtME). The PtME retains the mechanics of a Direct Alpha PME but replaces the public index with a representative private-market index — private2000 for private equity, infra300 for infrastructure. Because the benchmark now embodies private-market risk, the PtME measures a fund's beta and alpha against the correct market and, with a second strategy-specific benchmark, resolves the alpha into an allocation component and a selection component. SIPA's benchmarking research sets out the PtME and its results in full (SIPA, 2025).

> *The reference indices are ESMA-registered, IOSCO-aligned benchmarks, recalculated monthly with fixed constituents managed by an Index Committee. Decisively for their use as benchmarks, they capture aggregate private-asset price movements only and contain no manager selection or timing — they measure the market, not any manager — which is what makes them valid market references rather than an active-manager comparison.*

MODULE 3.3

The Direct Alpha method

Direct Alpha converts the PME comparison into a precise annualised excess return (Gredil, Griffiths & Stucke, 2023). The index return is pushed inside the fund's cash flows before any return is computed, so that timing is preserved and no assumption is made that distributions are reinvested in the benchmark; the excess return is then obtained as an internal rate of return on the benchmark-adjusted flows. The two exact methods in the literature — Direct Alpha and the Kaplan–Schoar PME — are closely related, and Direct Alpha is the one that yields a rate directly comparable to an IRR.

- **Input.** Every contribution (negative) and distribution (positive) with its date, plus the terminal NAV treated as a final positive flow; and the level series of the chosen market index.
- **Adjust.** Scale each cash flow by the index level at the end of the period divided by the index level on the flow's date: adjusted flow = fund flow × (index at period end / index at flow date).
- **Compute.** Direct Alpha is the internal rate of return of the adjusted flows. Because the index return is now carried inside the cash flows, this rate is the fund's annualised excess return over its market index.

The decomposition is exact and additive: market return + alpha = fund IRR, with nothing lost. Measured against the broad-market index the excess return is the fund's Total Alpha; measured instead against a strategy (style) benchmark it is the fund's Pure (selection) Alpha; and the difference between the two is the Allocation Alpha. Operationally the calculation is performed from the privateMetrics or infraMetrics application programming interface and a spreadsheet template in three steps: select the broad-market and strategy benchmarks; supply the fund's cash flows and NAV; and compute Total, Allocation and Pure alpha.

MODULE 3.4

Decomposing alpha

Measure	Benchmark	Interpretation
Total (fund) alpha	Broad-market index (private2000 / infra300)	Annualised excess return over the whole market
Pure (selection) alpha	Bespoke style benchmark matching the fund's TICCS/PECCS mix	Value from selecting, structuring and timing individual investments
Allocation (style) alpha	Total alpha minus pure alpha	Value from tilting toward segments that differ from the broad market

A bespoke style benchmark is a weighted combination of segments and geographies constructed to mirror a fund's stated strategy; measuring alpha against it isolates selection skill, leaving the residual as the return from allocating differently from the market. Managers add value through three broad channels — asset allocation (sector and geographic tilts), asset selection and timing, and structuration (leverage and exit design) — and the decomposition attributes realised performance across them. Because alpha is an

excess return over a risk-matched benchmark, it is comparable across vintages, strategies and regions once those dimensions have been controlled for through the choice of benchmark.

> **Worked example — two infrastructure funds of the same vintage**
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> SIPA analysed two private-infrastructure equity funds of the same vintage with a PtME against infra300 and a matching style benchmark. Fund 1 reported a strong IRR of 17.64%, but almost all of it was market return: its Total Alpha against the market was -0.6%. Fund 2 reported an IRR of 21.37% and a positive Total Alpha of +4.81%, of which allocation contributed about +0.8% and the remainder came from investment selection.
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> The implication for an LP is decisive. Ranked by IRR, the two funds differ by less than four points and both look creditable. Ranked by alpha, one essentially replicated the market while the other genuinely outperformed. IRR alone would have obscured that distinction; the PtME reveals it (SIPA product presentations).

Empirical findings

- On average, private-asset funds generate approximately zero alpha net of fees — the same conclusion long established for active managers in public markets (Fama & French, 2010). If the index represents the average market, roughly half of investors beat it and half do not.
- Most of a fund's return derives from market exposure (beta); alpha is highly dispersed across funds, strongly positive for some and negative for others (Robinson & Sensoy, 2016).
- What outperformance exists tends to come from allocation — selecting segments that outperform the broad market — rather than from selection: average net Pure Alpha is negative, and close to zero before fees.
- Pure Alpha is strongly predictive of a fund's IRR, whereas Allocation Alpha is not, and some funds post a positive IRR while carrying negative alpha — a direct demonstration that IRR and skill are distinct.

> *The "zero net alpha" finding should be handled with care in investor-facing work. It is a statement about the average fund, net of fees — not a claim that no manager possesses skill. Its true import is that skill is scarce and difficult to identify in advance, and that allocation, more than selection, explains most measured outperformance. This is consistent with, not contrary to, the evidence that a minority of managers do add value.*

Alpha persistence. Whether a manager repeats positive alpha is modelled as a probability of success updated as each successive fund is observed, using a Beta-Binomial (Bayesian) scheme. The prior is theta ~ Beta(2,2), which has a mean of 0.5 — an informed starting point, since the average manager has an even chance of adding alpha. After S funds with positive alpha and F without, the posterior is theta | S,F ~ Beta(2+S, 2+F); the expected probability of delivering alpha on the next fund is (2+S)/(4+S+F), and a 95% credible interval is read from the Beta quantiles.

> **Worked example — updating a manager's probability of adding alpha**
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> Begin from the prior Beta(2,2), expected probability 0.50. Suppose a manager has delivered positive alpha in five of six funds (S = 5, F = 1). The posterior is Beta(7,3), with expected probability 7/10 = 0.70: the evidence has raised the estimate from 50% to 70%, but the credible interval remains wide because ten effective observations is still a short record.

Across all managers SIPA finds the average sits near 50% — a coin toss — while a small number persist in delivering alpha with a probability approaching 90%. Because private track records are short, the

credible intervals are wide, which is a further reason that quartile-persistence claims are statistically weak. The finding of some genuine persistence is consistent with the classic evidence that private-equity returns persist across a partnership's successive funds (Kaplan & Schoar, 2005), even as later work stresses how much depends on method and data (Korteweg, 2019).

MODULE 3.5

Strategic asset allocation and capital-market assumptions

Because the market indices are marked-to-market and recalculated monthly, they can furnish the inputs that institutional investors require for strategic asset allocation (SAA) and capital-market assumptions (CMAs): expected returns, volatilities, drawdowns, Sharpe ratios, value-at-risk and cross-asset correlations. These are retrievable through the privateMetrics and infraMetrics application programming interfaces (Excel, Python or R) and can be combined across infrastructure and private-equity segments to build CMAs and conduct allocation studies. Crucially, because the indices are genuinely volatile and serially uncorrelated, the risk inputs they yield are realistic rather than flattering — unlike inputs derived from smoothed appraisal series.

Why listed proxies distort allocation inputs

- **Wrong beta.** A listed index carries the risk of listed equity rather than of the private assets, and so captures only the equity-market risk premium instead of the cash-flow risk specific to these companies; formal spanning tests confirm that listed portfolios do not span the unlisted class (Blanc-Brude, Whittaker & Wilde, 2017).
- **Upward alpha bias.** Benchmarking a private fund against a public proxy overstates apparent skill, because the proxy omits private-market beta.
- **Compositional mismatch.** Sector, size and structure differ from the private universe — a listed-infrastructure index overweight in transport and empty of renewables, for example — which distorts expected returns and correlations and, through them, the whole allocation.

Regulatory and prudential reporting. Monthly, unsmoothed indices support fair-value-based reporting under several regimes: pension-fund stress testing and fair-value requirements; the PRIIPs Key Information Document, whose Market Risk Measure (a 1–7 scale) and performance scenarios require a return-space (Cornish–Fisher) value-at-risk; and AIFMD-related reporting. Wealth indices (cumulative returns) and maximum drawdowns from the index series are used to gauge resilience to shocks. In each case the realism of the underlying risk statistics — secured by the absence of smoothing — is what makes the reported figures fit for regulatory purpose.

References

SIPA / Scientific Infra & Private Assets research

Scientific Infra & Private Assets (2025). Benchmarking private market performance (the Private Market Equivalent and privateAlpha). https://publishing.sipametrics.com/papers/2025_benchmarking_private_market_performance.pdf

Scientific Infra & Private Assets. Performance and Benchmarking Research; Strategic Allocation and CMA Use Cases; Product Presentations; privateMetrics technical documentation. 2024–2025. https://docs.sipametrics.com/docs

Blanc-Brude, F., Whittaker, T., & Wilde, S. (2017). Searching for a listed infrastructure asset class using mean–variance spanning. Financial Markets and Portfolio Management, 31(2), 137–179. https://doi.org/10.1007/s11408-017-0286-z

Peer-reviewed literature

Gredil, O. R., Griffiths, B. E., & Stucke, R. (2023). Benchmarking private equity: the direct alpha method. Journal of Corporate Finance, 81, 102360. https://doi.org/10.1016/j.jcorpfin.2023.102360

Kaplan, S. N., & Schoar, A. (2005). Private equity performance: returns, persistence, and capital flows. The Journal of Finance, 60(4), 1791–1823. https://doi.org/10.1111/j.1540-6261.2005.00780.x

Phalippou, L., & Gottschalg, O. (2009). The performance of private equity funds. The Review of Financial Studies, 22(4), 1747–1776. https://doi.org/10.1093/rfs/hhn014

Harris, R. S., Jenkinson, T., & Kaplan, S. N. (2014). Private equity performance: what do we know? The Journal of Finance, 69(5), 1851–1882. https://doi.org/10.1111/jofi.12154

Sorensen, M., & Jagannathan, R. (2015). The public market equivalent and private equity performance. Financial Analysts Journal, 71(4), 43–50. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2347972

Korteweg, A., & Nagel, S. (2016). Risk-adjusting the returns to venture capital. The Journal of Finance, 71(3), 1437–1470. https://doi.org/10.1111/jofi.12390

Ang, A., Chen, B., Goetzmann, W. N., & Phalippou, L. (2018). Estimating private equity returns from limited partner cash flows. The Journal of Finance, 73(4), 1751–1783. https://doi.org/10.1111/jofi.12688

Robinson, D. T., & Sensoy, B. A. (2016). Cyclicality, performance measurement, and cash flow liquidity in private equity. Journal of Financial Economics, 122(3), 521–543. https://doi.org/10.1016/j.jfineco.2016.09.008

Korteweg, A. (2019). Risk adjustment in private equity returns. Annual Review of Financial Economics, 11, 131–152. https://doi.org/10.1146/annurev-financial-110118-123057

Fama, E. F., & French, K. R. (2010). Luck versus skill in the cross-section of mutual fund returns. The Journal of Finance, 65(5), 1915–1947. https://doi.org/10.1111/j.1540-6261.2010.01598.x