

July 2019

# The Keys to Unlocking Private Equity Portfolio Assessment

Good Data, the Right Metrics, and the Appropriate Comparisons

## KEY ELEMENTS

- To help assess the performance of their private equity portfolios, institutional investors need to examine how the asset class and constituent managers are performing at the asset class-level compared to asset class-specific measures such as the relevant investment opportunity set and peer groups.
- Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities. Closed-end private equity vehicles are assessed using ratio analyses and internal rate of return (IRR) measures.
- Using performance metrics, private equity portfolios can be evaluated at the partnership level, at the vintage year level, and then at the total portfolio level.



“Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities.”

**Gary Robertson**  
Private Equity Consulting Group

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## Introduction

How can investors understand whether their private equity portfolios are performing well? How should they calculate performance for private equity, and against what metrics should that performance be measured? As with all asset classes, the evaluation process begins with calculating returns and then analyzing the results in two contexts:

1. How the asset class is adding or subtracting value at the total plan level relative to a policy benchmark
2. How the asset class and constituent managers are performing at the asset class-level compared to asset class-specific measures such as the relevant investment opportunity set and peer groups

Callan published a paper in 2014 on the first topic: [“Private Equity Policy Benchmarking and Performance Attribution.”](#)

This paper will address the second topic: performance evaluation at the private equity portfolio level. It will explain how to assess private equity performance and will describe the tools and techniques used to compare how an investor’s private equity holdings are performing relative to the opportunity set from which the specific portfolio was created. This asset class-level analysis helps answer the questions posed at the beginning of this paper.

## Private Equity Cash Flows

### Investment, Development, and Liquidation Periods

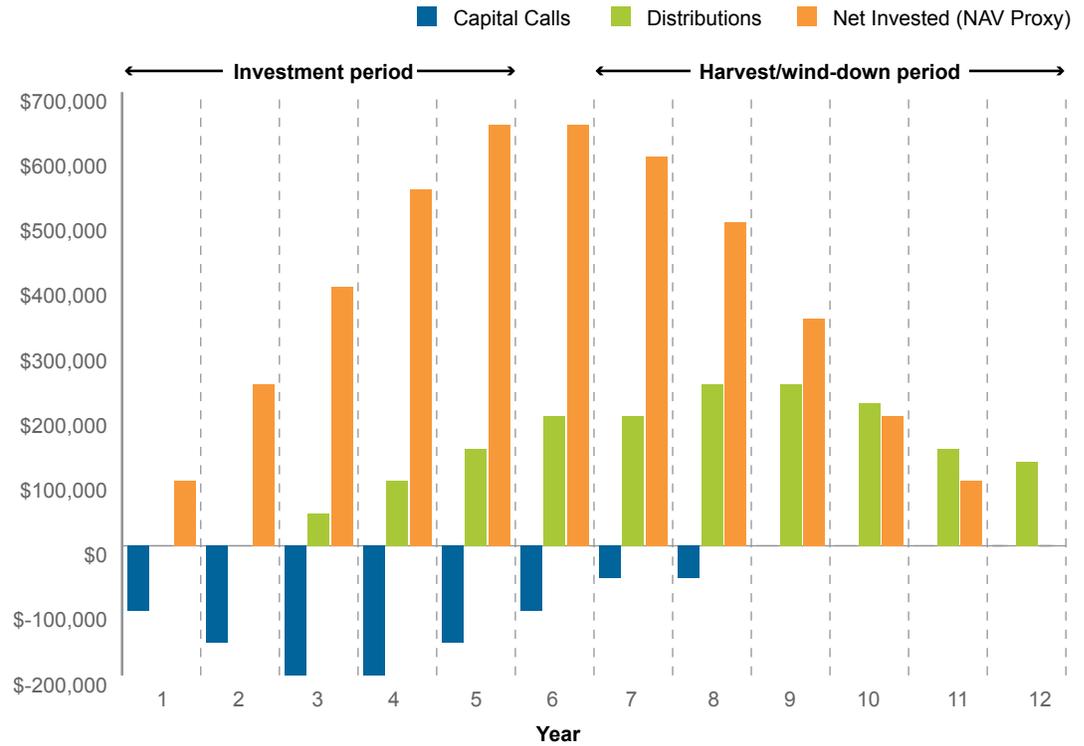
Before focusing on return calculation and benchmarking, we will review the cash flow dynamics of a private equity fund. Cash flows and asset values form the basis of return calculations, and private equity has unique cash-flow attributes compared to public equity investments.

To assess cash flows and performance, each private equity partnership can be viewed as a “project.” It has a beginning in which the portfolio investments of underlying companies are assembled gradually over about five years. In the first year or two of this period, start-up costs are frequently in excess of profits and returns are temporarily negative—known as the “J-curve” effect. The middle years of a partnership’s typical 10-year legal life constitute a development phase, during which the partnership’s general partner (i.e., its manager) works to improve the companies’ business lines, operations, and profitability to increase their economic value. Finally, there is a harvesting phase, when the companies are gradually sold and the closed-end partnership “project” becomes fully liquidated. If assets remain in the portfolio at the end of the legal life, a partnership can go into one or more annual extension periods.

**Exhibit 1** depicts a partnership’s lifecycle. The blue bars represent capital calls (inflows), or the investor

gradually contributing its commitment amount to the partnership as the general partner buys companies. The blue lines then translate cumulatively to the orange bars, which represent the unrealized invested net asset value<sup>1</sup> (NAV) of the portfolio's company holdings. The green bars (outflows) represent cash being distributed back to the investor when companies are sold, which results in a decline in the orange NAV bars as the holdings are liquidated.

**Exhibit 1**  
**The Lifecycle of a Partnership**



Source: Callan

Institutional investors' private equity portfolios consist of an ongoing series of partnership investments that are in various stages of this lifecycle. Because partnerships are self-liquidating, a steady pace of new partnership commitments must be made to maintain the desired private equity exposure.

How partnership valuations are determined is a critical question. Partnership valuations are based on preset policies and calculated quarterly by general partners, which are held to GAAP standards for mark-to-market valuations based on common appraisal techniques. Quarterly company valuations for partnership holdings are normally reviewed and approved by investor-members of the limited partners' advisory committee, formed to oversee each partnership. Partnership financial statements are audited annually, usually by a Big Four accounting firm.

<sup>1</sup> Net asset value (NAV) is the unrealized valuation of a company, partnership, or portfolio of partnerships.

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Partnership valuations are primarily a sum of the underlying company values and small amounts of cash, as well as the (usually minor) assets and liabilities of the partnership. The most used appraisal method is a multiple of company cash flow, with the multiple based on recent comparable private sale transactions or public company valuations. Methods such as discounted cash flow or replacement cost are not commonly applied. While there is a lot of latitude for valuations within this framework, values tend to be conservative since general partners prefer not to sell investments for less than recent valuations (or write-down investments after previously writing them up).

By private equity industry convention, funds less than four years old are considered too early in development for meaningful benchmarking (referred to as being “immature”). Most of the committed capital has not been invested, nor has there been enough time for the companies to show any economic gains from improvement initiatives.

### **The Vintage Year Concept**

Because partnerships have investment and harvesting phases, to evaluate the performance of partnerships against one another, or against a universe of partnerships, all of them must be of a similar age (i.e., a similar point in their lifecycles) for an “apples-to-apples” comparison. Evaluating a three-year-old partnership against one that is eight would be akin to comparing a second-grader to a high schooler—the development stage and capabilities will be markedly different. Partnerships that start at the same time not only have similar development curves but are also choosing from the same opportunity set of companies for sale, and are importantly subject to the same economic conditions. Economic conditions affect purchase prices, credit conditions, and the exit environment, each of which greatly affects returns.

To group partnerships by time period, the private equity industry and institutional investors have adopted the “vintage year” (VY) convention. For peer grouping and benchmarking purposes, partnerships are associated with the calendar year in which they are “activated” by their first cash-flow event—usually a capital call to make an investment.

Now we will review how private equity performance metrics are calculated.

## **Unique Private Equity Performance Calculations**

Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities.

### **Percentage Return Calculations**

All publicly traded asset classes (i.e., stocks and bonds) and private open-end vehicles (e.g., hedge funds and core real estate) use a time-weighted return calculation (TWR). However, the CFA Institute’s mandated Global Investment Presentation Standards (GIPS) calculation for closed-end private equity vehicles is internal rate of return (IRR):

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1. **TWR:** An equal-weighted return linking a series of individually calculated returns (e.g., quarterly) to provide a return over any cumulative period. When a new period's return is produced, it is appended to the existing series. With an equal-weighted return, an investor can have \$100 invested in the portfolio one quarter and \$1,000 the next, and the TWR will be as if the same amount were invested in each quarter.

The equal-weighted calculation is considered most appropriate for assessing public market managers, because the investor controls the dollar-weighting over time by having the freedom to make contributions and redemptions. Therefore, the manager can only be held responsible for the profitability of the return but not the amount of capital to which the return is applied.

2. **IRR:** A capital-weighted return that provides a single cumulative figure since inception. It is not a series of linked returns. When a new period's data (additional cash flows and a new ending value) are available, the entire return is recalculated from the inception date.

The dollar-weighted calculation is considered most appropriate for assessing private closed-end fund managers (and their portfolios), because after making the initial commitment the investor does not control when the capital is called or distributed, so the manager is held responsible for both the amount of capital at work and its profitability.

To elaborate a little more on the nature of the IRR calculation, it is the discount rate that sets the net present value of the cash flows equal to zero. It calculates an "implied interest rate" earned on a series of contributions and withdrawals (or purchases and sales) combined with current valuation (which could be zero). Because it is an effective interest rate calculation, the amount of money in the investment and the timing and amount of the cash flows will affect the magnitude of the return. To perhaps oversimplify using an analogy, the calculation is akin to how the effective interest rate, over time, on a bank account would be calculated.

All percentage return calculations can help estimate economic value creation, but each has drawbacks and should not be held as sacrosanct. For example, TWRs provide an indication of either a manager's or the portfolio's profitability, but not the actual investor's profitability, since capital weighting is not applied. IRRs also have weaknesses; for example, they are very sensitive to cash flows early in their calculation period. Large early cash outflows can permanently skew returns in an outsized positive manner; so one can have a high IRR even with an investment providing relatively low profitability. Conversely, as the IRR calculation timeframe extends, the calculation becomes static, varying little even with meaningful cash flow or valuation changes. Unfortunately, one cannot detect these effects by simply looking at the IRR on a standalone basis. Finally, the TWR and IRR returns tend to converge over time, which is reassuring, but the two will not be exactly the same.

To calculate the IRR, one needs every cash flow associated with an investment, which can be challenging to assemble. General partners typically "net" capital calls and distributions. For example, they might be calling \$5 million for a new investment, but distributing \$3 million from a partial realization, so they will only call \$2 million from the investors. Custodian banks will only capture the \$2 million cash flow, but the \$5 million and \$3 million cash flows would be needed for an accurate IRR.

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## Performance Ratios

The private equity industry also uses a set of three performance ratios to assess returns. All three compare interim performance relative to the amount of capital paid-in to a private equity partnership or portfolio:

- **DPI:** Distributions divided by Paid-In capital. This ratio measures relative liquidity by how much has been cumulatively distributed so far. Notionally, a DPI ratio of 0.60x means that 60 cents has been distributed to investors for every dollar contributed.
- **RVPI:** Residual Value (aka NAV) divided by Paid-In capital. This ratio measures how much unrealized value remains in the investment. A RVPI ratio of 0.70x means that the remaining investments are valued at 70 cents for every dollar contributed.
- **TVPI:** Total Value (Distributions + Net Asset Value) divided by Paid-In capital. This measures the total gain. A TVPI ratio of 1.30x means the investment has created a total gain of 30 cents for every dollar contributed. TVPI is composed of both returned capital and residual value (e.g., DPI of 0.60x + RVPI of 0.70x = TVPI of 1.30x).

All of the ratios are dynamic and will change with time. Generally, when an investment is getting toward full liquidation, a net-to-investor TVPI of 1.60x or more within a partnership's 10- to 13-year legal life will equate to a double-digit IRR return. Most private equity managers assert that they are trying to achieve a 2.0x return and an IRR of mid-teens or higher; however, returns at that level are less consistent than one might hope. A successful, broadly diversified portfolio that is mature (has a significant number of partnerships both ramping up and liquidating) will generally settle in at a TVPI in the range of 1.60x, which will equate to a low-teen IRR.

Callan prefers using TVPI for evaluating partnership performance, given that the key purpose of investing in private equity is to secure large dollar gains over time. With TVPIs, the underlying economics of the investment are more evident than with percentage returns. If the TVPI is 1.30x, the 30 cent profitability is understandable (you know how much food it can buy). Percentage calculations are less concrete, which is reflected in a well-worn private equity industry aphorism: "You can't eat IRR."

One other point to make: Unlike TWRs, IRRs and return ratios do not lend themselves to calculating statistical investment metrics such as standard deviations and correlations as measures of risk. In evaluating publicly traded asset classes, investors look to a combination of risk and return measures like the Sharpe ratio, information ratio, etc., to provide additional insight into the behavior of the assets. With private equity return measures that are cumulative in nature, those evaluations are not possible.

## Private Equity Benchmarks

Having reviewed private equity cash flows and return calculation metrics, we need to discuss available benchmarks. We will then be in a position to "put it all together."

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### Private Markets Data Limitations

A key challenge in benchmarking private equity is that partnership performance data are not generally made available by general partners to non-investors. Also, general partners hold their limited partners to non-disclosure agreements, to the degree they can by law. Investors themselves are not necessarily motivated to disclose returns since publicizing a high-returning general partner may reduce the limited partner's ability to invest in future funds if other investors discover the manager and try to participate in the capacity-constrained vehicles.

### Peer Group Database Providers

Private equity partnership peer group benchmarking information is available only from database providers that collect and resell the return data. The universe of providers is very small, and there are two categories: 1) "blinded" accounting-based databases, and 2) "look-through" Freedom of Information Act (FOIA) databases.

### Blinded Databases

Two well-recognized firms use accounting-based data (quarterly cash flows and values of the underlying partnerships) to calculate returns.

- **Refinitiv (previously a division of Thomson Reuters):** The company resells a database of returns maintained by Cambridge Associates. The returns are calculated by Cambridge primarily from general partner-provided financial data, so the accuracy is high. The database is one of the most robust available and has good coverage of older vintage years, with funds back to the 1980s.
- **The Burgiss Group:** This firm is a performance measurement software provider and sells a database of returns calculated by limited partners that use its system. If several investors in the same fund show varying returns, Burgiss uses a central tendency (averaging) calculation to arrive at the published figure, which may vary from those calculated from general partner financial statements. This is also a large database with a high fund count and good historical vintage year span.

A third, but not as widely adopted, provider is the custodian bank State Street, which resells a database of returns based on its private equity reporting clients. The dataset is not as large as Refinitiv/Cambridge or Burgiss.

In all instances the information is aggregated, so one cannot see what general partners or partnerships are in the database, or the returns for specific partnerships. This "blinding" is a condition of getting quality accounting data and not running afoul of non-disclosure requirements.

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### Look-Through Databases

Two well-recognized firms collect summary data via public records under FOIA or “Sunshine” laws, and by “scraping” other website information to compile return information. The returns are not calculated by the database firms but are simply transcribed from point-in-time information that investors report. If several investors in the same fund show varying returns, the firms use a central tendency calculation for the published figure, which may vary from those calculated directly from accounting data.

- **Preqin:** This London-based company provides alternative investments database information, including private equity return data. The firm’s information has a European and internationally focused emphasis compared to other providers.
- **PitchBook:** This U.S. firm offers services comparable to Preqin across a spectrum of alternative investments, including private equity return information.

Because the information in these databases is pulled from publicly available sources, the two firms provide transparency into individual funds and their reported returns. But fund information can be inconsistent or incomplete. For example, the information published is the latest available, so end-periods for return data will vary and information capture can be sporadic. Additionally, not all performance metrics may be available (e.g., an IRR, but not a TVPI).

For performance measurement benchmarking, Callan prefers the more rigorous calculation methodology employed by the accounting-based model. The look-through compilation return datasets can be useful but tend to be more valuable for other aspects of private equity portfolio management, such as general partner and partnership-specific preliminary screening and due diligence, rather than benchmarking. The return information provided by all the vendors is net of all underlying partnership management fees, carried interest, and expenses, so it reflects the actual economic return received by investors.

There is an adage from the early days of the industry: “You need to be in the first quartile in order to get true private equity returns.” At one time this was true, as the only private equity database available for general purchase was published by a company called Venture Economics. That database was composed of voluntarily reported returns from general partners. It reflected a random universe of partnership results (the good, the bad, and the ugly). Venture Economics was eventually purchased by Thomson Reuters (now Refinitiv), which closed the business in 2013 due to issues with dwindling self-reporting of returns, simultaneous with negotiating an arrangement to resell the Cambridge database.

Most importantly, it should be recognized that the partnerships contained in the currently available databases have gone through professional screening and due diligence, so the comparisons are against professionally selected partnerships. The databases are not a random opportunity set representing the broadly available private equity universe, and a large number of weaker general partners’ funds have been culled from the data sample. Therefore, the databases present a “higher bar” to surpass than a random universe, so above-median returns should be considered a strong result, historically outperforming public equities.

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## Benchmark Customization and Limitations

The databases can be sorted, and returns calculated, by various measures:

- **Vintage Year:** By a single year or set of years through any quarterly ending period
- **Strategy Type:** Such as venture capital (early-, multi-, and late-stage), growth equity, buyouts, distressed/restructuring, mezzanine, energy, etc., or a combination
- **Geography:** Global or specific regions, such as U.S., Europe, developed markets, emerging markets, Asia Pacific, Latin America, etc., or a combination
- **Capitalization:** Maximum and minimum fund sizes by total commitments

The accounting-based databases can calculate cumulative and composite returns; the FOIA databases will not.

These and other parameters allow users to assemble database subsets to make relevant comparisons, but they are not completely customizable. For example, specific weightings cannot be applied to strategies (e.g., 10% venture, 50% buyouts); a strategy is weighted in accordance with the database's weighting across the vintage years selected for the calculation. Similarly, individual characteristics (strategies, geographies, capitalizations) cannot be specified for each vintage year (e.g., mezzanine only in 2012 and Europe only in 2015). If a characteristic is applied, it is weighted according to the database holdings across the time period analyzed. The database weighting will likely be different from the investor's portfolio weightings.

Since accounting-based databases are composed of flow and value information, they can perform a number of other useful calculations, such as:

- **Pooled Returns:** This calculation treats the database as if it were a single investment; that is, as if an investor bought every partnership in the database in proportion to its weightings. It is essentially a "cap-weighted index" employing an IRR calculation.
- **Horizon Returns:** This return calculates performance for the database from any beginning period to any ending period. The first cash flow into the IRR calculation is the NAV of every partnership in the database involved in the calculation, then the subsequent cash flows for the relevant holdings are factored in, and the ending value is the NAV of the database. The horizon method is generally used to calculate period returns such as 3 years, 5 years, etc., used in representations of private equity industry returns.
- **Time-Weighted Returns:** While not generally used for peer benchmarking for reasons previously discussed, the database can calculate time-weighted returns. The individual period IRRs are calculated (e.g., a quarter), and these are linked using a TWR calculation. These can be used for observing equal-weighted linked statistics, such as standard deviation. However, because private equity uses quarterly appraisal valuations that are less volatile than daily auction-valued public stock prices, most risk statistics will appear unusually low and be of little utility when applied to private equity, although they are an observable data point.

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## Putting It All Together: Examples of Benchmarking

We will now proceed with a few examples of how private equity portfolios are benchmarked and evaluated. We will start with the basic component of every portfolio: a private equity partnership; then look at the next logical grouping of partnerships: a vintage year; and finally assemble a series of vintage years into a portfolio.

In examining the comparisons, a “stop-light” color coding pattern will be used to highlight where the returns fall within the database’s quartiles. Dark green means the return achieved upper-quartile performance. Light green represents second quartile, and orange is below median. More green, of course, is preferable!

### A Partnership

**Exhibit 2** shows a traditional presentation of a single private equity fund’s performance, typically referred to as a “top-line” presentation. It includes the fund’s name; the vintage year; the amount committed; the cumulative flows paid-in, uncalled, and distributed; the NAV; and four performance calculations through a specified end date (in this instance 2Q18).

#### Exhibit 2

#### One Fund’s Performance

| Fund       | VY   | Committed  | Paid-In    | % P-I | Uncalled | Distributed | NAV        | DPI   | RVPI  | TVPI  | IRR   |
|------------|------|------------|------------|-------|----------|-------------|------------|-------|-------|-------|-------|
| ABC Fund V | 2010 | 25,000,000 | 24,309,251 | 97%   | 690,749  | 33,789,858  | 16,773,383 | 1.39x | 0.69x | 2.08x | 17.8% |

To determine how this investment performed relative to other partnerships formed during the same time period, it can be benchmarked against other 2010 vintage year funds. If the opportunity set for selecting the fund was the broadest available (global, all private equity strategies), one could query a database to assess how ABC Fund V ranks within that year’s global opportunity set.<sup>2</sup> The database’s 2010 peer group metrics, along with ABC V’s returns, are shown in **Exhibit 3**. All return figures are net of partnership fees, expenses, and carried interest, and represent the limited partners’ return.

**DPI:** Comparing ABC Fund V to other 2010 funds in the global database, we can see that the DPI of 1.39x well exceeds the benchmark upper quartile measure of 1.34x by 5 cents. This tells us that the general partner has done an admirable job of returning capital to investors versus other funds formed in 2010.

**TVPI:** ABC V’s ratio just makes the upper quartile by exactly matching the 2.08x TVPI breakpoint, again representing strong results.

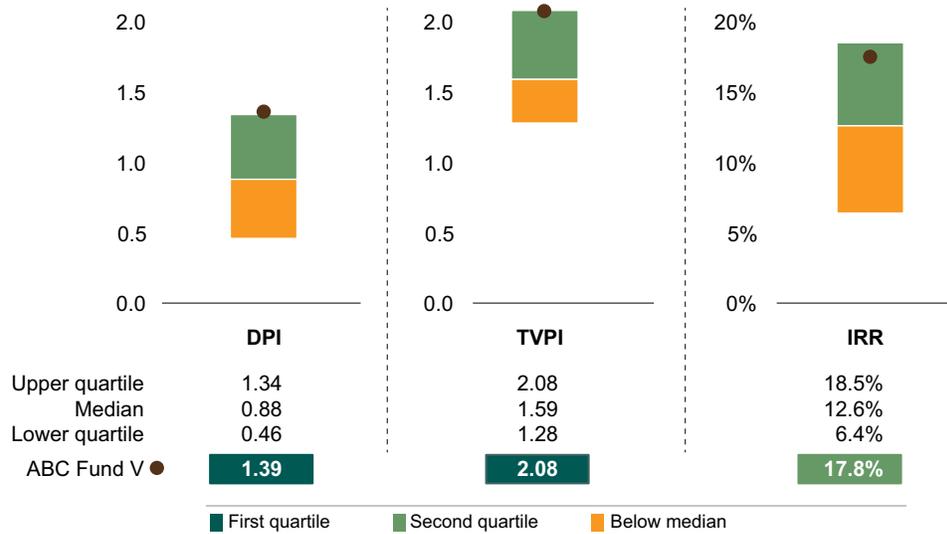
**IRR:** ABC V’s 17.8% return is in the second quartile versus the peer group’s 12.6% median and 18.5% upper quartile. This is counter-intuitive, given the first quartile DPI and TVPI. Since IRR factors in the timing of cash flows and ABC’s distributions have been relatively strong within the measurement period, the lower IRR ranking could potentially be caused by the larger distributions being later in time (due to a longer holding period) compared to the peer group.

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<sup>2</sup> The Refinitiv/Cambridge database will be used in the examples, but any reputable database provides valid comparisons.

**Exhibit 3**

**Comparing the Fund's Performance to All 2010 Vintage Year Funds**

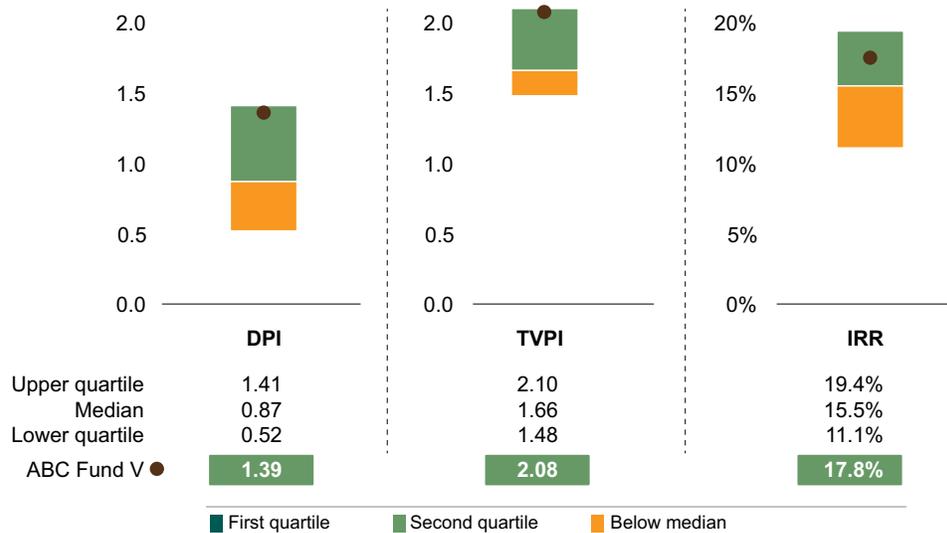


The RVPI ratio is typically calculated but not used for return assessment because it is simply a residual of TVPI and DPI, and is incorporated into TVPI. If a fund seems to be lagging in distributions, the RVPI can be used for supplemental analysis regarding its unrealized valuation.

If we knew that ABC V was a U.S. buyout fund, we could make a closer comparison with ABC's 2010 opportunity set, as seen in **Exhibit 4**.

**Exhibit 4**

**A Closer Comparison to 2010 U.S. Buyout Funds**



**DPI:** Since 2010, U.S. buyout funds have been more liquid relative to global private equity strategies, with a database upper quartile DPI of 1.41x versus 1.34x. ABC V's DPI falls from being first quartile versus the global private equity dataset into the second quartile (but well above median) compared to U.S. buyouts.

**TVPI:** The U.S. buyouts database quartiles' cutoffs also increase for TVPI. ABC V's TVPI ranking also falls from first to second quartile, but is still admirable.

**IRR:** The IRR ranking falls to a lower position in the second quartile (as is expected since the relative liquidity ranking (DPI) decreased versus the U.S. buyout dataset).

Generally, for individual investments it is most instructive to get as close a fit with the peer group as possible. However, for broader collections of investment there can be two philosophies. The first would be to apply a benchmark associated with the total eligible opportunity set (strategies, geographies, and other relevant characteristics) regardless of whether every type of investment was present in the portfolio. This would take into account conscious avoidance of a portion of the universe due to active implementation of the private equity strategy. The second approach is to only include the elements of the total opportunity set that have been specifically chosen. This approach attempts to more closely assess the quality of the portfolio and investment selections relative to other similar investments that were not selected. Either approach can be the most relevant depending on what is being measured.

### A Vintage Year

**Exhibit 5** shows the same “top-line” information for the investor’s complete set of 11 partnership investments made in the 2010 vintage year. The portfolio is multi-strategy, spanning small to large buyouts, growth equity, venture capital, and an industry-specific fund (energy), and partnerships span the U.S., Europe, and Asia regions.

### Exhibit 5

#### Assessing a Single Vintage Year

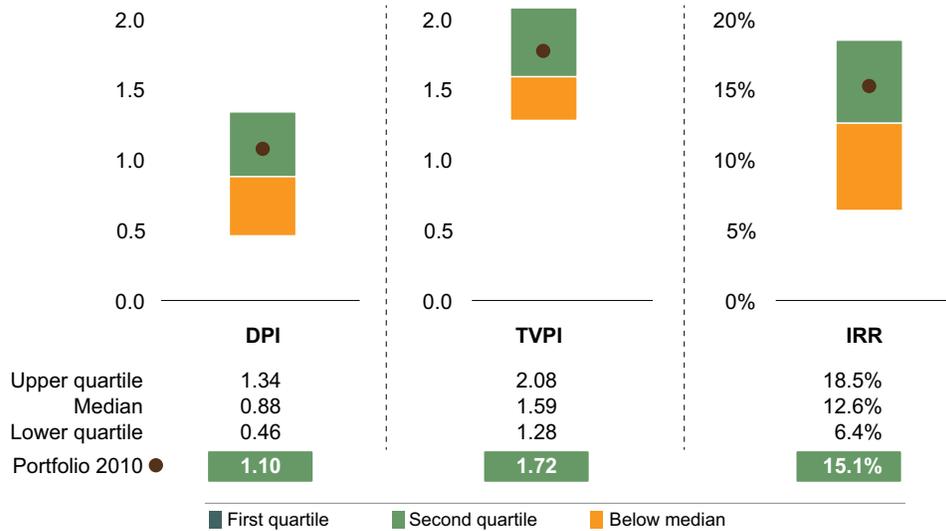
| Vintage Year | # Funds | Committed   | Paid-In     | % P-I | Uncalled  | Distributed | NAV         | DPI   | RVPI  | TVPI  | IRR   |
|--------------|---------|-------------|-------------|-------|-----------|-------------|-------------|-------|-------|-------|-------|
| 2010         | 11      | 271,346,154 | 266,353,258 | 98%   | 4,992,896 | 292,798,808 | 166,104,600 | 1.10x | 0.62x | 1.72x | 15.1% |

This portfolio was created the year following the trough of the Global Financial Crisis, when global M&A activity was low, but that activity gradually increased over the funds’ investment periods of five years. In other words, the portfolios were likely slow to develop, and most of the capital was deployed later in the funds’ investment period.

To determine how this investor’s vintage year performed relative to other partnerships formed during the time period, it can be benchmarked against other 2010 vintage year funds. Given that the opportunity set for selecting the funds was the broadest available (global, all private equity strategies), we will use the same database query used to assess the 2010 ABC Fund V. The database’s 2010 peer group metrics, along with the investors’ vintage year 2010 returns, are shown in **Exhibit 6**.

**Exhibit 6**

**Comparing at the Vintage Year Level**



**DPI:** Comparing the investor's 2010 vintage year portfolio holdings (Portfolio 2010) to other 2010 funds in the global database, the DPI of 1.10x is second quartile compared to the benchmark median of 0.88x, besting the median by 0.22x. The mid-point of the second quartile is 1.11x; the investor is almost exactly in the middle. The investor has done a good job with Portfolio 2010's fund selections within the 2010 opportunity set, as measured by return of capital.

**TVPI:** Portfolio 2010's ratio of 1.72x is also second quartile versus the benchmark median of 1.59x, besting the median by 0.13x. This would place Portfolio 2010's position in the second quartile a little over a quarter of the way to the upper quartile's 2.08x, so the return would be characterized as low in the second quartile. While being above median is nothing to complain about, the total return is not as strong as the distributed return. Since over 60% of the paid-in capital remains to be distributed, there is a chance the TVPI will improve, particularly since 2010 was a slow-to-develop vintage year due to capital market conditions after the Global Financial Crisis.

**IRR:** Portfolio 2010's 15.1% return is in the second quartile versus the peer group's 12.6% median and 18.5% upper quartile. Portfolio 2010's result is only 40 basis points below the second quartile's mid-point of 15.5%, so it should be considered mid-second quartile. This is to be expected given the relatively strong DPI and moderately strong TVPI. Since IRR factors in the timing of cash flows, Portfolio 2010 likely had some earlier cash flow activity relative to the peer group.

Overall, Portfolio 2010 is nicely above the database median and well-positioned in the second quartile versus the benchmarks. The portfolio manager's fund selections have outperformed the partnerships selected by other professional private equity investors captured in the database.

## Total Private Equity Portfolios

We can now assemble vintage years into a portfolio, which is the most relevant context for plan sponsors with private equity investment programs. In this final example (**Exhibit 7**), the plan sponsor began a private equity program 13 years ago; nine years are considered mature or maturing, and the earliest partnership investments (in VYs 2006-2008) that continue to have NAVs are in extension periods. The program began committing approximately \$200 million per year and gradually increased that to more than \$350 million annually. The number of investments has ranged from 6 to 12 per year. The average commitment in the earlier years was about \$25 million but has grown to \$35 million.

### Exhibit 7

#### The Complete Picture

| Vintage Year   | 2006    | 2007    | 2008    | 2009    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    | 2017    | 2Q18    | Cum.      |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
| # Partnerships | 9       | 9       | 10      | 9       | 11      | 6       | 7       | 12      | 10      | 12      | 11      | 10      | 5       | 120       |
| Committed      | 215,004 | 225,095 | 251,097 | 225,580 | 271,346 | 149,817 | 175,198 | 300,243 | 300,221 | 360,120 | 385,690 | 350,443 | 175,325 | 3,385,178 |
| Paid-In        | 208,427 | 226,587 | 235,521 | 213,404 | 266,353 | 147,962 | 156,848 | 242,698 | 232,854 | 262,460 | 173,820 | 94,353  | 7,809   | 2,469,095 |
| % P-I          | 97%     | 101%    | 94%     | 95%     | 98%     | 99%     | 90%     | 81%     | 78%     | 73%     | 45%     | 27%     | 4%      | 73%       |
| Uncalled       | 6,577   | (1,493) | 15,576  | 12,176  | 4,993   | 1,855   | 18,351  | 57,545  | 67,367  | 97,660  | 211,870 | 256,090 | 167,516 | 916,083   |
| Distributed    | 277,295 | 288,740 | 287,469 | 216,529 | 292,799 | 156,552 | 47,611  | 58,858  | 64,911  | 45,610  | 8,466   | 48      | 187     | 1,745,075 |
| NAV            | 49,765  | 100,220 | 169,885 | 151,456 | 166,105 | 127,486 | 242,708 | 263,844 | 282,437 | 295,279 | 192,271 | 96,543  | 6,473   | 2,144,472 |
| DPI            | 1.33    | 1.27    | 1.22    | 1.01    | 1.10    | 1.06    | 0.30    | 0.24    | 0.28    | 0.17    | 0.05    | 0.00    | 0.02    | 0.71      |
| TVPI           | 1.57    | 1.72    | 1.94    | 1.72    | 1.72    | 1.92    | 1.85    | 1.33    | 1.49    | 1.30    | 1.15    | 1.02    | 0.85    | 1.58      |
| IRR            | 7.7%    | 10.1%   | 14.0%   | 12.1%   | 15.1%   | 19.7%   | 17.9%   | 11.5%   | 18.7%   | 18.5%   | 15.1%   | 4.3%    | NM      | 14.1%     |

#### Database Peer Benchmarks as of June 30, 2018

| Vintage Year  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017   | 2Q18   | Cum.  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|
| DPI - Upper   | 1.66  | 1.59  | 1.48  | 1.51  | 1.34  | 0.98  | 0.71  | 0.48  | 0.29  | 0.15  | 0.03  | 0.00   | 0.00   | 1.09  |
| DPI - Median  | 1.26  | 1.14  | 1.08  | 1.11  | 0.87  | 0.53  | 0.41  | 0.23  | 0.08  | 0.01  | 0.00  | 0.00   | 0.00   | 0.39  |
| DPI - Lower   | 0.79  | 0.66  | 0.58  | 0.67  | 0.46  | 0.15  | 0.14  | 0.03  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.01  |
| TVPI - Upper  | 1.97  | 1.95  | 1.93  | 2.16  | 2.08  | 2.05  | 1.84  | 1.63  | 1.58  | 1.42  | 1.22  | 1.08   | 0.98   | 1.76  |
| TVPI - Median | 1.48  | 1.57  | 1.52  | 1.76  | 1.57  | 1.58  | 1.48  | 1.38  | 1.33  | 1.22  | 1.10  | 0.99   | 0.91   | 1.35  |
| TVPI - Lower  | 1.10  | 1.19  | 1.20  | 1.42  | 1.28  | 1.29  | 1.24  | 1.21  | 1.19  | 1.09  | 1.00  | 0.90   | 0.80   | 1.08  |
| IRR - Upper   | 13.0% | 14.4% | 16.5% | 21.0% | 18.4% | 20.3% | 19.9% | 18.7% | 22.1% | 23.0% | 21.6% | 12.1%  | -2.1%  | 18.3% |
| IRR - Median  | 7.7%  | 9.1%  | 9.1%  | 14.0% | 12.3% | 13.6% | 13.1% | 12.1% | 14.1% | 13.2% | 9.0%  | -2.1%  | -12.1% | 10.3% |
| IRR - Lower   | 1.7%  | 3.3%  | 4.1%  | 8.5%  | 6.4%  | 6.9%  | 6.0%  | 7.9%  | 8.3%  | 6.4%  | -0.3% | -15.5% | -22.9% | 3.5%  |

Color Key for Quartiles:

First Second >Median

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The returns in Exhibit 7 are from institutional investment programs, so the outcomes reflect those of well-run private equity investment practices. The portfolio and benchmarks represent a core global program, meaning that all private equity strategies are in the opportunity set, and all regions are included (U.S., non-U.S. developed, and emerging markets).

The investor's "top line" portfolio information is shown in the upper section of the table. The vintage year information is now displayed vertically, rather than horizontally. Each of the return metrics is color-coded according to its benchmark quartile ranking. The benchmark upper quartile and median quartile cut-offs are shown in the lower section of the table so that individual comparisons can be made (e.g., whether a year's second quartile return is closer to the median or the first quartile, or if a third quartile ranking just missed or is notably below the median).

The cumulative returns in the right hand column are benchmarked as if the investor started investing in the database in 2006 in proportion to the database's "opportunity set" of strategy, geography, and partnership size weightings, rather than in the portfolio's holdings.

One important nuance in this evaluation: the investor's portfolio consists of the return of a combined group of investments and is being compared to individual security returns in the database that are divided into quartiles. In a vintage year and at the total portfolio level, the investor is combining different fund returns into a single metric, creating an averaging effect. However, the database's quartile cut-off points (by vintage year and in aggregate) are based on a single partnership return. The difference can make it very difficult for a diversified portfolio to frequently be first quartile because one is comparing a bundle of varying returns against a single-partnership return breakpoint in the database.

From Exhibit 7, a number of key points can be gleaned:

#### **Individual Vintage Years**

- The vintage years are well-diversified by partnership with 6 to 12 investments in each full year; no one partnership will overly influence the result.
- By TVPI, of the nine mature vintage years, seven are above median, including two that are first quartile.
- By TVPI, only two of the nine mature years are below median (2009 and 2013), and those years are much closer to median than the lower quartile cut-off. Because 2009 is within 4 cents of median and 2013 is within 5 cents of median, they are not impacting the cumulative performance to a worrisome degree.
- 2013 is only 81% paid-in and has significant NAV remaining. The vintage year is just beginning to hit its distribution stride at 24 cent on the dollar, so its ranking could easily improve.
- By DPI, the return rankings closely mirror those of TVPI, ranking well above the peer group median, with the exception of two years (2009 and 2012).
- By IRR, except for 2006, which one can see was a difficult year for private equity overall, all the developed vintage year IRRs are double digit, again with two slightly below-median years (2009 and 2013).

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- The most recent four “immature” vintage years are developing nicely compared to peer funds, and all but the recent six-month period have positive returns (the portfolio is exhibiting a minimal J-curve effect).

### Cumulative Performance

- The portfolio is second quartile against the database’s peer group set of partnerships by all measures.
- The TVPI of 1.58x is three cents above the second quartile’s mid-point of 1.55x (between 1.35x and 1.76x), so would be considered in the upper half of the second quartile and well above median.
- The IRR of 14.1% bests the median of 10.3% by 3.8 percentage points, and is just 0.2 percentage points shy of the quartile’s mid-point of 14.3%.
- The DPI of 0.71x is significantly above the median of 0.39x, and is 0.03x below the second quartile’s mid-point. It is not quite as strong on a relative basis as the total return measures (TVPI and IRR), but is still quite good. There can be a number of reasons for less liquidity in a portfolio. In recent years, a higher exposure to venture capital or non-U.S. (particularly emerging market) funds could be influences.
- Overall, the portfolio exhibits respectable outperformance to the pool of institutional investors and the partnership opportunity set in the database.

A plan trustee or chief investment officer considering this analysis should be pleased with the portfolio’s selected investments’ performance compared to the peer group.

### Public Market Equivalent

A final topic to comment on before concluding is the public market equivalent (PME) calculation. It is a technique that is used to compare private equity to public equity at both the partnership and portfolio level. Of note, this performance comparison method differs from the peer group comparison discussed above, but frequently arises in discussions of performance benchmarking. The calculation can be done on either a TVPI or IRR basis:

**PME TVPI:** This figure is intended to evaluate the investor’s total value if it had moved money in and out of the chosen public security benchmark instead of the private equity partnership or portfolio. A TVPI is calculated by applying the called capital and distributed capital of the private equity investment as an equivalent purchase and sale of the chosen benchmark (Russell 3000, S&P 500, MSCI ACWI, etc.). The private equity cash flow-adjusted public index NAV is then used as the benchmark’s RVPI, which is subsequently added to the investor’s actual DPI to get a benchmark TVPI.

**PME IRR:** This figure is intended to evaluate the investor’s return if it had moved money in and out of the chosen public security benchmark instead of the private equity partnership. An IRR is calculated by applying the called capital and distributed capital of the private equity investment as an equivalent purchase and sale of the chosen benchmark. The private equity cash flow-adjusted public index NAV is then used in the benchmark’s IRR calculation.

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Callan finds that the PME can be a useful and informative data point but it has a fatal flaw that makes it unadvisable for use as a long-term formal investment policy methodology for benchmarking. The issue is that if the private equity portfolio is successful, the strong distributions eventually entirely deplete the public security benchmark's NAV. At that point, when the public benchmark's NAV becomes non-existent, the calculation no longer works—a negative terminal value usually does not produce an IRR or sensible TVPI. There are also other long-term distortions that can result from growing differences in the NAVs associated with the private equity holding and the reference benchmark.

The two calculations above describe the original Long-Nickels PME (LN-PME) methodology. A number of other variants have been developed that seek to address the “over-distributed” problem of the LN-PME calculation: Kaplan-Schoar PME, Capital Dynamics PME+, Cambridge mPME, Direct Alpha, and Excess IRR. Discussing each is beyond the intent of this paper, and they are well documented on the Internet.

Callan's observation is that each is a “derivative” of the original calculation that carries its own complexities and caveats. For, example PME+ rescales the public index NAV so that it never fully depletes, and KS-PME returns a ratio where above or below “the number one” indicates private equity over- or underperformance. Aside from the LN-PME, unless one is an aficionado of a specific PME calculation, the results would not be understood by most people (non-mathematicians) in the same context as a straightforward return calculation.

## Conclusion

Private equity performance measurement and peer group benchmarking focuses on making an assessment of return results specifically within the confines of the private equity marketplace. At the outset, we highlighted the difference between policy benchmarking and attribution analysis at the total plan level, and private equity portfolio-specific evaluation. We then discussed private equity cash flows, the vintage year concept, return calculation, and peer database construction and key vendors. Finally, we provided examples of benchmarking analyses using individual partnerships, vintage years, and an entire portfolio, including how to interpret the resulting performance information.

Private equity return evaluation does differ from that applied to public security portfolios, and is frequently referred to as a “complexity” of the asset class in educational seminars. However, the IRR and three ratios' calculation are relatively easy to grasp and become quickly familiar. Callan would posit that closed-end fund performance evaluation, whether private equity, private debt, infrastructure, or real estate, is a fun and interesting vacation from the usual “well-worn path” of public markets performance reviews. As private market assets become larger and more important allocations in plan sponsor portfolios, we expect that these benchmarking techniques will become well-known within the institutional investment community.

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### About the Author



**Gary W. Robertson** is a senior vice president in Callan's Private Equity Consulting group. He is responsible for alternative investments consulting services at Callan. Gary is a member of Callan's Alternatives Review Committee and is a shareholder of the firm.

Prior to joining Callan in 1991, Gary spent five years as a vice president with Robertson & Co., a San Francisco-based, family-owned investment bank engaging in mergers and acquisitions. Prior to joining Robertson & Co., he was a financial analyst with Atherton Advisory, a Silicon Valley-based financial services firm. He has also worked with Morgan Stanley & Co. Inc. in San Francisco in the operations and administration areas, and with Spear, Leeds & Kellogg and A. G. Becker, members of the Pacific Stock Exchange.

Gary earned an MBA from Golden Gate University and a BA in Economics from the University of Colorado.

*If you have any questions or comments, please email [institute@callan.com](mailto:institute@callan.com).*

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# Callan

## Corporate Headquarters

600 Montgomery Street  
Suite 800  
San Francisco, CA 94111  
800.227.3288  
415.974.5060

[www.callan.com](http://www.callan.com)

## Regional Offices

Atlanta  
800.522.9782  
  
Chicago  
800.999.3536

Denver  
855.864.3377  
  
New Jersey  
800.274.5878

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800.227.3288

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