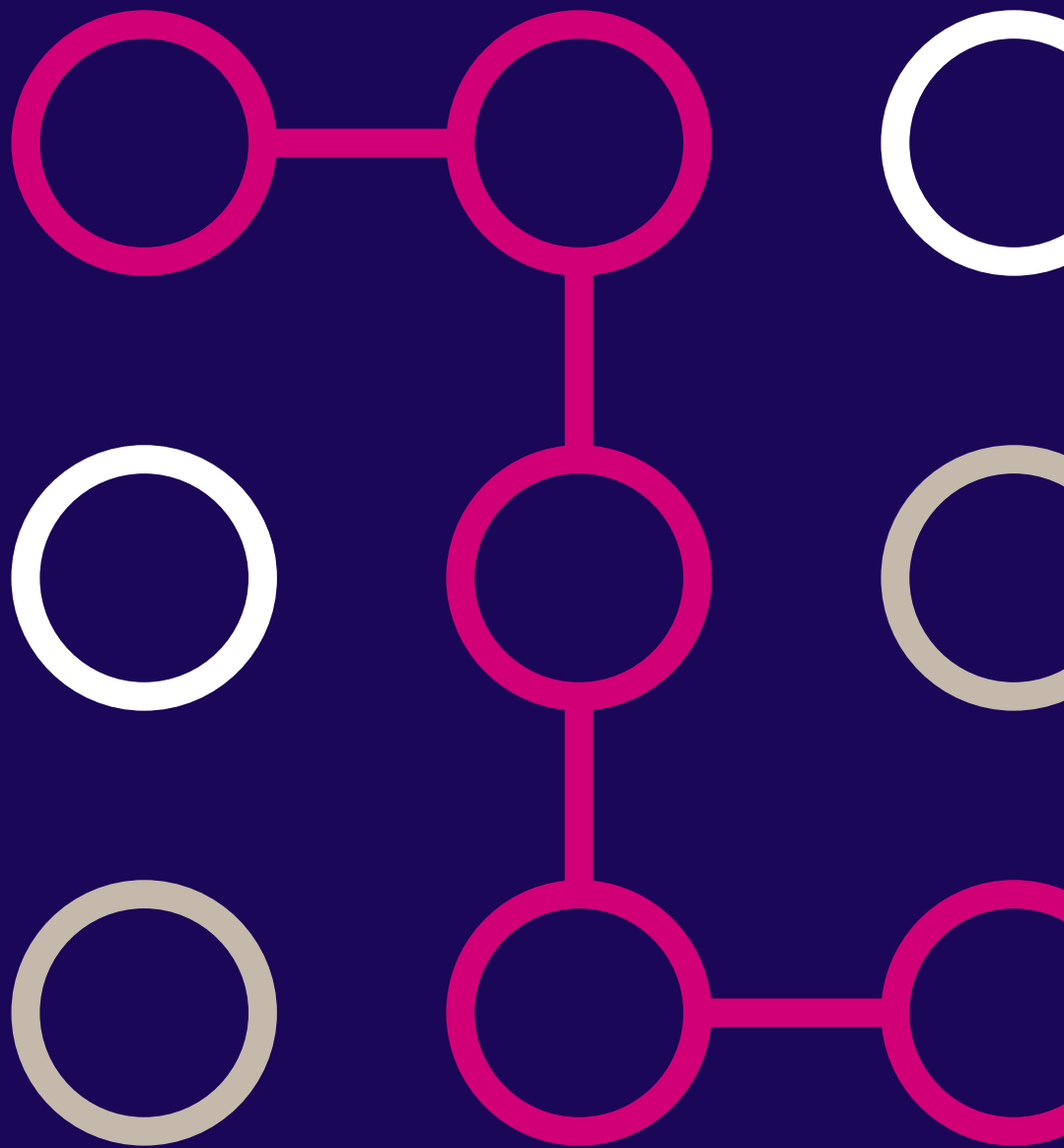


Preqin
Hedge Fund Performance
Data Guide



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| Introduction

Preqin was founded in 2003 and pioneered the use of the Freedom of Information Act (FOIA) to collect fund-level returns data from public pension funds with the goal of improving transparency and performance benchmarking within the private capital industry.

FOIA requests remain an important part of Preqin's performance data collection process; however, today these are combined with voluntary data submissions from more than 2,200 fund managers globally. This enables Preqin to offer the most extensive and transparent coverage of net-to-LP private capital fund performance data, with metrics for more than 10,500 vehicles.

The purpose of this document is to act as a useful guide to all aspects of Preqin's private capital performance data collection and validation, as well as insight into the different datasets and metrics available.

Should you have any questions or would like to discuss providing data to Preqin, please do not hesitate to contact us at teamperformance@preqin.com.

Reasons to contribute data



Be seen by investors and decision-makers

- Looking for new investors? Our clients use Preqin's databases for information and data on potential investment opportunities on a daily basis.
- 7,800+ investment professionals on Preqin Pro.
- 20,000+ total logins monthly from institutional investors.



Ensure your data is up to date

- Our dedicated teams of researchers are constantly updating the database from known, publicly available sources.
- Review and verify your profiles.
- Make sure we are showing your most up-to-date information and performance data.



Shed light on the industry

- Information surrounding the alternative assets industry is difficult to obtain, and not always up to date, accurate, or reliable.
- Help us to collect the most comprehensive and up-to-date intelligence in the alternatives industry.
- Help industry experts to use actual market data to further their own research in this area and make alternatives more transparent.



Stand out from your peers

- By contributing data to Preqin, your firm and funds will be ranked among the thousands of others already listed on the database.
- Feature in our league tables, which are published regularly in our books and reports.
- Preqin will provide personalized images for you to use in your marketing materials to display your rankings.



Contributing is free and simple

- It is free to be listed on Preqin Pro.
- There are many ways of contributing data, making it easy for you to share with us.
- Update and review your profiles as often as you like.



Join fund managers who regularly contribute data

- Join the growing number of fund managers who are contributing data to Preqin to stand out to potential investors
- Benchmark yourself against peers and several strategies
- Work towards improving research around the industry

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PREQIN

Overview of sourcing, validating, and updating performance data

Data sources

Preqin collects hedge fund performance data from a variety of sources to ensure a high degree of accuracy and confidence. Preqin collects a substantial proportion of its performance data from fund manager directly, with over 5,000 firms submitted to date. Regular contributors are reached out to every month to ensure we have the latest fund data available. Fund managers are increasingly recognizing the importance of providing the most recent and accurate data to us as Preqin subscriber. Many of whom are institutional investors, use the databases to search for new investment opportunities and view performance on a fund level.

Preqin also collects performance data from institutional investors through the Freedom of Information Act (FOIA). Some of these include the Teacher Retirement System of Texas and Ohio Public Employees' Retirement System among many others in both the US and the UK

Hedge fund performance data is also collected through online sources. These sources of data include periodic reports, firm websites, factsheets and public filings.

Data validation

Guidelines are provided to Fund Managers and FOIA sources when submitting performance data to us to ensure calculations are consistent with our methodologies. The data is then reviewed internally by our performance team and checked for outliers and potentially suspect data points. Our team of research analysts also conduct routine systematic analysis of the performance dataset to identify errors and ensure the accuracy of our data. Preqin's hedge fund performance profiles also incorporate automatic validation for data points such as trailing returns and volatility metrics. These metrics are calculated directly from the fund level monthly return data points that we have been provided thus ensuring consistency across the profiles. Should we feel that further verification is required to support metrics that have been provided we will reach out to the respective fund manager to clarify this information. Although very rare, there have historically been a handful of instances when we are not confident in the data provided to us and we have chosen to exclude the data from our database. Preqin aims to have all submitted hedge fund performance data available to subscribers and contributing towards industry benchmarks within a 24-hour turnaround time.

Updating performance data

Once collected and validated, all performance data is then made available to our subscribers via our range of online services. We also offer a range of performance related tools for subscribers to conduct benchmarking, competitor analysis, due diligence and market intelligence.

Compliance

We understand that fund managers are faced with an increasingly intensive regulatory environment. Preqin provides only factual data on its online products and never makes any explicit or implicit recommendations and/or facilitates transactions of any sort between investors and fund managers. Preqin positions itself as an impartial data provider, and therefore the information displayed on our products does not constitute marketing and/or promotional materials, nor constitute general advertising, solicitation or a public offer of securities and as such, is not a regulated activity.

In addition, all Preqin users are screened prior to being granted access to the database ensuring their eligibility to view such information within their local jurisdiction. Once being given access all data available within the database is password protected.

Quality of Data

All performance data sent through to Preqin is subject to rigorous quality checks to ensure that everything listed on our platform is accurate to our clients. It is a core responsibility of ours to ensure that the data we have is trustworthy as well as useful. Data analysts spend a considerable amount of time running statistical checks looking for outliers and suspect figures that may be on the platform. Alongside this research analysts regularly reach out to fund managers whom they have built relationships with to confirm the validity of figures sent through to us. We are under no obligation to present performance figures that we deem to be unrepresentative of the fund and may harm the integrity of our platform.

1 If you notice a quality issue in our data, contact our Client Services team.

2 Our Research team will review the submission and get back to you within 24 hours (Monday - Friday).

3 Each verified error earns you a \$50 Amazon gift card or we'll donate the equivalent amount to a local charity.

4 Preqin Pro is updated with the highest quality data.

How to contribute data

Contributing data to Preqin is completely free and simple! There are 3 ways to contribute data:

- Connect with the dedicated analyst (hf@preqin.com)
- Data Contribution Portal: www.preqin.com/data/contribute-data where you can request access
- Add hfperformance@preqin.com to your distribution list

The easiest method of reviewing and providing data is through Preqin's Data Contribution Portal. Hedge fund managers and fund of hedge fund managers are able to review all of the firm, fund and performance information that we currently hold on their profile. Updates that are submitted via the portal are then screened by our dedicated research team before being added to the database. This gives us the opportunity to review data submissions ensuring both its reliability and accuracy. To be granted access to Preqin's Data Contribution system to update any information relating to your firm and its funds please contact hf@preqin.com.

Performance updates can also be provided to our dedicated email (hfperformance@preqin.com). From here our team of research analysts and data assistants ensure your profiles are updated with the latest and historical performance information. Please do feel free to add this email to your distribution lists to ensure this stays up to date each month.

Preqin's Data Contribution Portal is also available to placement agents, law firms, investment consultants and fund administrators across the private equity, hedge fund, real estate and infrastructure industries. If you are interested in sharing data with Preqin, but your firm does not fit into one of the groups listed above, please contact us at feedback@preqin.com and our Research Team will be in touch. For more information, please visit: www.preqin.com/sharedata

Performance metrics definitions

Term	Equation	Definition
Monthly returns (%)	$MR_t = \left(\frac{NAV_t - NAV_{t-1}}{NAV_{t-1}} \right) \times 100$	The percentage change in the fund's month-end net asset value from the previous month-end net asset value, after fees have been deducted. Net-of-fees returns are used to provide an indication of fund performance from the perspective of investors.
NAV per unit	$\text{NAV per Unit} = \frac{\text{Total assets} - \text{total liabilities}}{\text{Number of shares outstanding}}$	The net asset value per share of a fund. This represents the market value of a fund's total net assets (total assets minus liabilities) divided by the number of shares outstanding. In many, but not all, cases this is the unit price or share price for new and existing investors in a fund.
Cumulative performance	$((1 + M_1) \times (1 + M_2) \times \dots \times (1 + M_n)) - 1$	The aggregate percentage increase or decrease in a fund's net asset value over a given period of time. This is calculated by geometrically linking the reported monthly returns (M) for the given time period. The cumulative performance is typically measured over trailing periods such as the last three months, one year, three years or five years. It is also commonly measured for individual years, the current calendar year (year to date) and the entire period since a fund's inception.
Annualized performance	$((1 + M_1) \times (1 + M_2) \times \dots \times (1 + M_n))^{\frac{12}{n}} - 1$	Annualized returns express a fund's rate of return on an annual basis, or a return per year, over a given time period. This is calculated as a geometric mean of the reported monthly returns (M) for the given time period (n). The annualized performance represents the rate of return that, if compounded each year, would produce the cumulative return for the same period. It is a measure that describes the change in a fund's net asset value as if it grew or declined at the same rate each year during the period. The annualized performance is normally measured over trailing periods greater than 12 months, such as three years, five years or 10 years. It is also commonly measured for the entire period since a fund's inception.

Average month	$\sum_1^n \frac{M_1 + M_2 + \dots + M_n}{n}$	The mean average of a fund's individual monthly returns. The average positive month provides an average of all months in which a return of zero or greater has been recorded. The average negative month is an average of all months in which a loss has been recorded.
Best month, worst month	M^{\max} M^{\min}	The best month represents the highest net return achieved by the fund in a single month. The worst month represents the lowest net return achieved by the fund in a single month.
Drawdown period	NAV _{peak} followed by subsequent fall to recover to NAV _{peak} again	A period in which the fund is considered to be in drawdown, which means the fund's net asset value has declined from a previous peak (highest level). The drawdown period ends when the fund's net asset value reaches its lowest point (before recovering to its previous peak). The lowest net asset value, and therefore the drawdown period, can only be determined once the fund has fully recovered to its previous peak net asset value.
Drawdown length	Time taken for = NAV _{peak} followed by subsequent fall to recover to NAV _{peak} again	The number of months between a fund's highest net asset value and its lowest net asset value (before recovering to its previous peak level).
Drawdown size	$\frac{NAV_{trough} - NAV_{peak}}{NAV_{peak}}$	The percentage loss that a fund incurs from its peak net asset value to its lowest net asset value (before recovering to its previous peak level).
Positive months	$\frac{\text{Number of positive monthly returns}}{\text{Total number of monthly returns}}$	The number of months that the fund has posted a net return that is greater than or equal to zero. This is also reported as a proportion of all monthly returns.
Negative months	$\frac{\text{Number of negative monthly returns}}{\text{Total number of monthly returns}}$	The number of months that the fund has posted a net return that is less than zero. This represents the number of months that the fund has seen its net asset value decline. It is also reported as a proportion of all monthly returns.
Recovery length	Number of months between Nav _{low} and Nav _{peak}	The number of months between a fund's lowest net asset value and its new peak (or recovery of its previous peak) net asset value.
Investment growth/VAMI	Previous VAMI x (1 + current return).	The growth of a hypothetical \$1,000 investment in a fund. It can be taken as a proxy for a fund's NAV to calculate other statistics, such as a fund's drawdowns.

Volatility metrics

Term	Equation	Definition
Volatility	$\sqrt{\frac{\sum^t (M - \bar{M})^2}{n - 1}} \times \sqrt{12}$	<p>Measured by the annualized standard deviation of monthly returns during the specified period. An annualized figure is approximated by multiplying the standard deviation of monthly returns by the square root of 12 (for the number of periods in a year). Volatility is typically measured over trailing periods such as the last year, three years, five years or since inception. It is also available as one-, two-, three- and five-year rolling periods to show how the volatility of a fund's monthly returns has changed over time.</p> <p>M is the monthly return M is the mean (average) monthly return n is the number of periods in a year</p>
Sharpe ratio	$\frac{\text{Annualized period return} - \text{risk free rate (RFR)}}{\text{Volatility over period}}$	<p>Provides an indication of a fund's returns relative to its level of risk. The ratio is calculated by first subtracting a predetermined risk-free rate from the annualized period return to generate the fund's excess return. This is then divided by the fund's volatility for the same period. According to this measure, more volatile returns are not necessarily undesirable, provided they are accompanied by a proportionally higher return. In general, the higher the Sharpe ratio, the better the risk/reward characteristics of a fund. The exception to this is a negative Sharpe ratio. In cases where the excess return (the numerator in the equation) is negative, a higher amount of risk will have a positive influence on the ratio. Therefore, negative Sharpe ratios are difficult to interpret. It should be enough to know that a Sharpe ratio is negative, without knowing its magnitude, as this indicates the fund has not generated additional returns by taking on extra risk. The Sharpe ratio is typically measured over trailing periods such as the last year, three years, five years or since inception. It is also available as one-, two-, three- and five-year rolling periods to show how the risk-return profile of a fund's monthly returns has changed over time.</p>

Sortino ratio	$\frac{\text{Annualized period return} - \text{MAR}^1}{\text{Volatility of negative returns over period}}$	<p>Provides an indication of a fund's returns relative to its level of downside risk. It is similar to the Sharpe ratio but the Sharpe ratio can be negatively effected by volatility on the upside (positive returns), as well as on the downside. In contrast, the Sortino ratio assumes that investors are tolerant of volatile returns if gains are being made. A fund's excess return (annualized return minus a pre-determined minimum acceptable return) is divided by its downside deviation below the minimum acceptable return. The Sortino ratio is typically measured over trailing periods such as the last year, three years, five years or since inception.</p>
Excess return	<p>Excess Return = Annualised Period Return - Predetermined Rate of Return</p> <p>MAR¹ - Minimum Acceptable Rate of Return</p>	<p>This is calculated by subtracting a predetermined rate of return (such as a risk-free rate, minimum acceptable return or benchmark return) from the net return of a fund over a specified period. It is used in the calculation of statistics such as the Sharpe and Sortino ratios and provides an indication of the degree to which the fund has been successful at adding value or meeting a hurdle rate.</p>
Risk-free rate (RFR)	<p>R_f</p> <p>Note: Preqin takes 2.00% risk-free rate as a default standard. However, ability on the fund performance profile to adjust this rate and re-calculate ratios.</p>	<p>The theoretical return of an investment with no risk. This is subtracted from a fund's actual returns to generate the excess return. It is factored into statistics such as the Sharpe ratio to account for the assumption that any investment with a degree of risk attached should deliver greater returns than the risk-free rate.</p>
Distribution of monthly returns	<p>(Calculation Example 3)</p>	<p>An overview of the frequency distribution of a fund's monthly returns. This provides an insight into the number of a fund's monthly returns that are close to the average return and the number that are extreme values (outliers).</p>
Skew	$\frac{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^3}{\left[\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2 \right]^{\frac{3}{2}}}$	<p>The skewness of a fund's returns provides an indication of whether or not the returns are normally distributed. It is a measure of the asymmetry of a distribution about the mean return. A positively skewed distribution is characterized by many low returns or losses and a few large returns. It is said to have a long right tail. A negatively skewed distribution is characterized by many high returns and a few low returns or losses. It is said to have a long-left tail. A normal distribution is an important assumption of statistics such as the Sharpe ratio.</p>
Kurtosis	$\frac{1}{n} \sum_{i=1}^n \left(\frac{x_i - \bar{x}}{SD(x)} \right)^4$	<p>A measure of the peakedness or flatness of a fund's returns distribution, relative to a normal distribution. Positive kurtosis indicates a peaked distribution, with returns close to the mean and higher frequency of outliers (in the shape of very high returns or significant losses). Negative kurtosis indicates a flatter distribution, with frequent and moderate deviations from the mean. The kurtosis measure used is adjusted to give excess kurtosis, which represents the level of kurtosis in relation to a normal distribution. A normal distribution is an important assumption of statistics such as the Sharpe ratio.</p>

1. Monthly return calculation example

Previous Month-End Net Asset Value per Unit = 100

Recent Month-End Net Asset Value per Unit = 101

Calculation: Monthly Return (%) = $\frac{101 - 100}{100} \times 100$

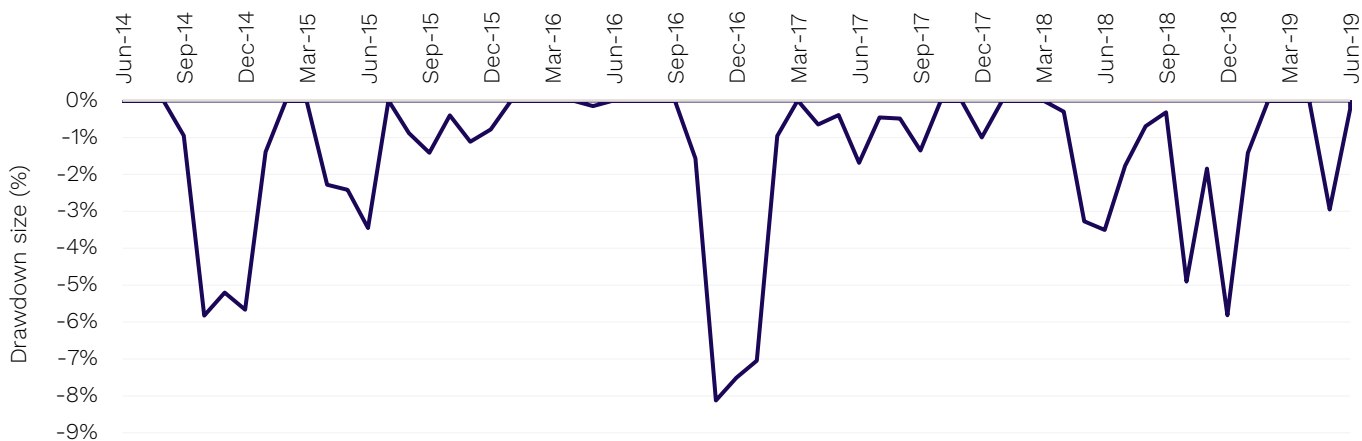
2. Drawdown calculation example

Low Net Asset Value per unit = 50

High Net Asset Value per unit = 100

Calculation: Drawdown Size (%) = $\frac{50 - 100}{100} \times 100 = -50\%$

Fund drawdowns



Source: Preqin Pro

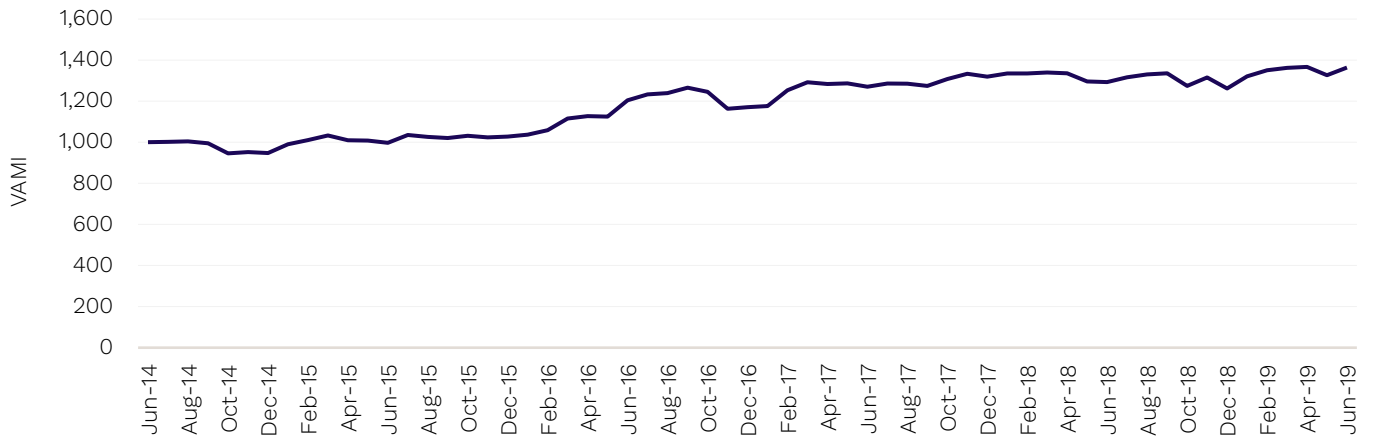
3. VAMI calculation example

In this example assumed an initial investment of \$1,000 as at 01.01.2015

VAMI

Date	MR	VAMI	YTD
0		1,000	
Jan-15	1.00%	1,010	1.00%
Feb-15	2.00%	1,030.2	3.02%
Mar-15	-1.00%	1,019.9	1.99%
Apr-15	2.50%	1,045.4	4.54%
May-15	1.50%	1,061.08	6.11%
Jun-15	-0.50%	1,055.77	5.58%
Jul-15	2.50%	1,082.17	8.22%
Aug-15	3.00%	1,114.63	11.46%
Sep-15	-2.00%	1,092.34	9.23%

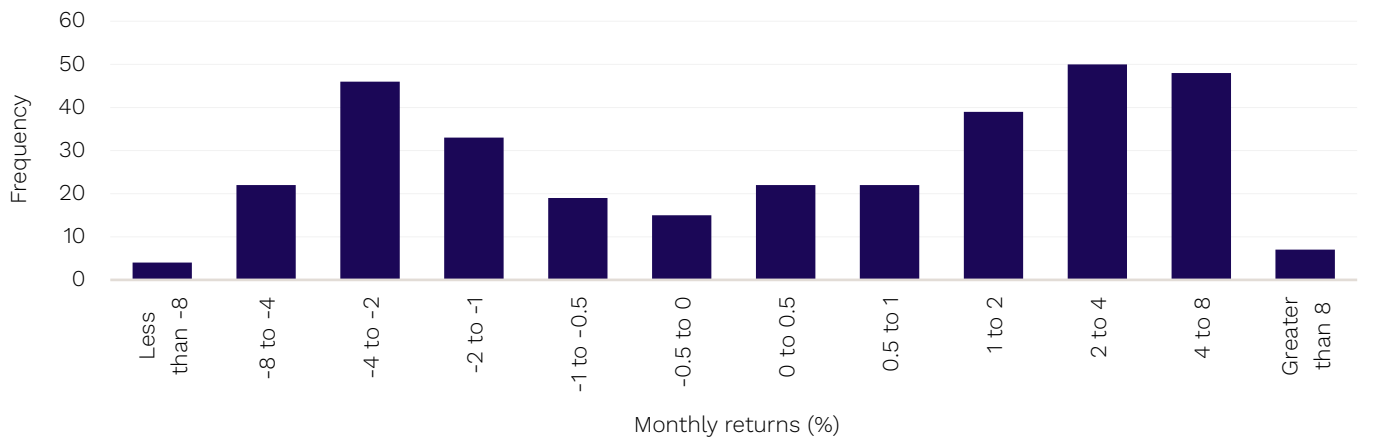
Investment growth (VAMI)



Source: Preqin Pro

4. Distribution of monthly returns example

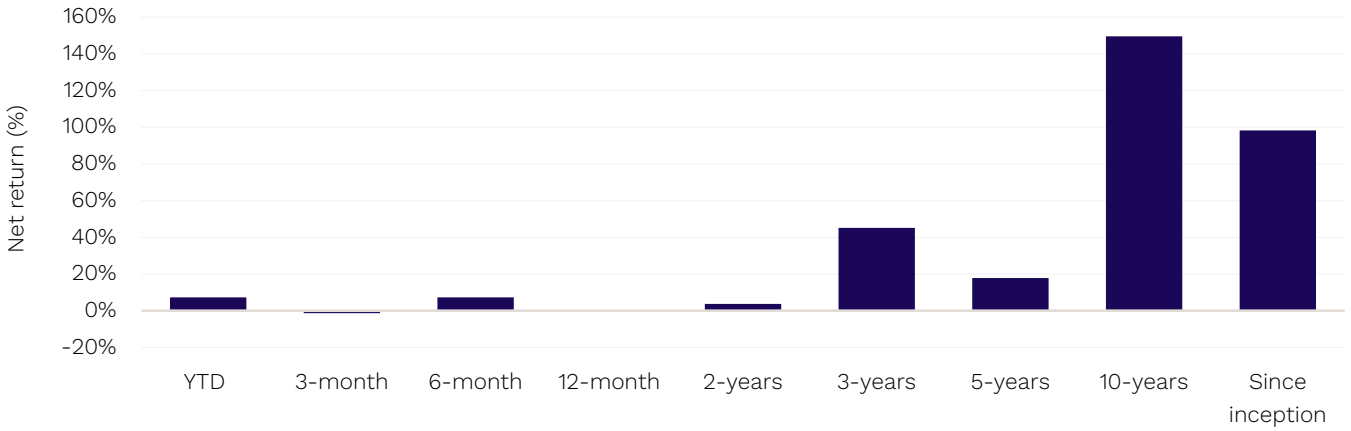
Monthly returns



Source: Preqin Pro

5. Cumulative returns

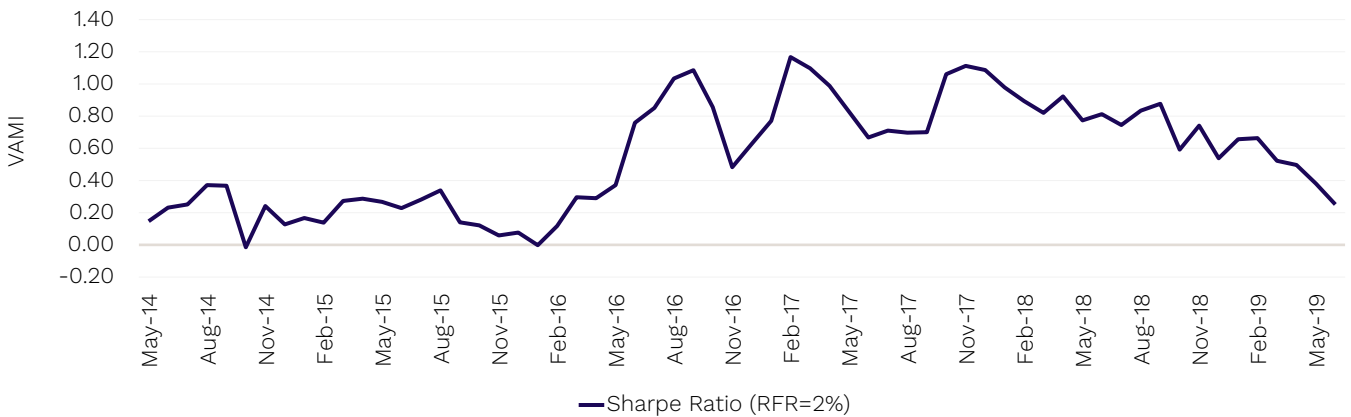
Cumulative performance



Source: Preqin Pro

6. Risk adjusted returns (Sharpe ratio)

Rolling Sharpe ratio (RFR 2.0%)



Source: Preqin Pro

Frequently Asked Questions

Do we collect gross performance figures?

All performance metrics are shown net of fees (%).

Do we calculate net performance figures?

Most net monthly return figures are reported to us directly from the fund manager or from an investor source. Preqin only calculate the net monthly return if we can collect NAV per unit figures for that fund – the source reporting such figures must be reliable and reporting every month.

Can you tell on the profile if the performance data has been collected from the Investor rather than Fund Manager themselves?

Yes, all performance data that has been collected via the investor through FOIA requests display a caveat on the performance profile making the user aware of the data source.

Are all returns in absolute figures?

Yes, if they are open ended vehicles and take some form of short positions, they will be reflected on the product.

Why is a Sharpe ratio and Volatility important?

They allow for comparisons of returns based on risk. They provide greater insight than absolute returns based on the amount of risk undertaken.

Assets under management (AUM) and asset flows

What is it?

Assets under Management (AUM) is a measure of the total market value of assets managed within a fund or an entire firm. These figures are displayed on a both firm and fund profiles on Preqin Pro. Assets under management is a function of both:

- Investments - Investors contributions and redemptions.
- Performance - Value of a fund’s investments

Preqin track fund and firm level AUM figures and also calculate estimates for the industry, regional locations and also top-level strategies. Assets under Management (AUM) is often used as a measure of the size and growth of the industry.

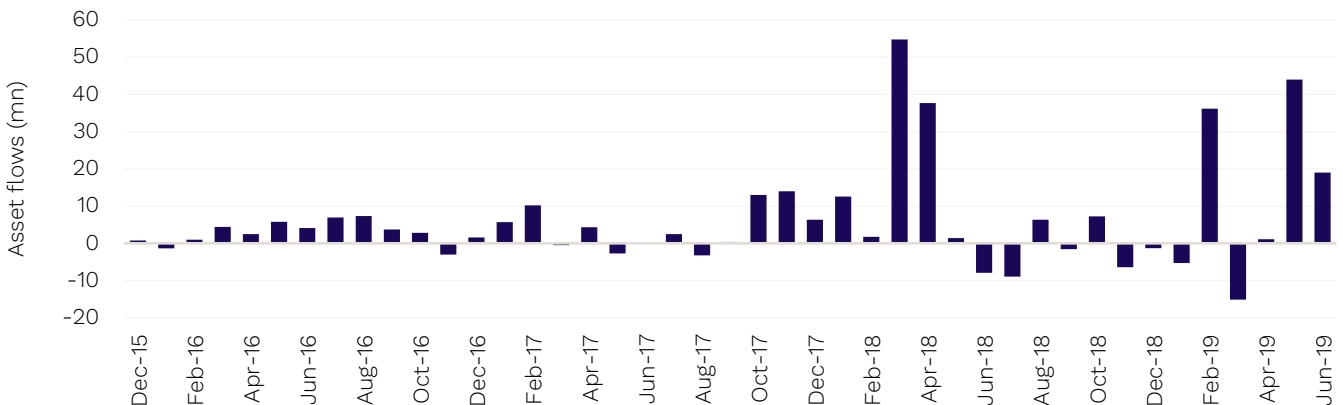
Preqin also use their comprehensive AUM and performance data to calculate asset flow figures that estimate the net of all cash inflows and outflows into the single manager hedge fund industry. Flow calculations do not take into account the performance of the asset class and attempt to estimate the movement of capital purely made by investors through contributions and redemptions. Such figures are often used to gauge investor sentiment towards the asset class.

Asset Flows

Preqin calculates assets flows at the fund level data on the performance profile. This a feature we have introduced on Preqin Pro. This fund level monthly asset flow data is calculated using the AUM at the start of the period, AUM at the end of the period and performance over that period. It is calculated like this:

$$AF_t = AUM_t - ((AUM_{t-1} \times MR_t) + AUM_{t-1})$$

Asset flows



Source: Preqin Pro

Frequently Asked Questions

What currency are the AUM and Asset Flows estimates reported in?

AUM is reported in USD. For funds denominated in non-USD currencies, conversions to USD are made using the exchange rate at the date of the reported AUM figure.

When do the latest quarter-end AUM and Asset Flow estimates become available?

There is a lag of 6-week lag for the latest quarter-end estimates to become available. This is to ensure we have as a complete dataset as possible used when estimating the latest AUM figures.

Are AUM and Asset Flow estimates available on the Preqin Pro?

No, however they are available upon request. Please feel free to contact: clientservices@peqin.com

Do Preqin provide AUM and Asset Flow estimates by sub-strategy or regional strategy.

Currently AUM and Asset Flows can only be provided by Top-Level Strategy and Fund Manager Headquarters. We do not provide estimates by sub-strategy or a cross section of both region and strategy such as: European Event Driven strategies.

Do Preqin disclose the methodology behind their asset flow and AUM calculations?

The methodology behind our asset flow model and AUM calculations is all proprietary information that is not disclosed to our clients.

Do Hedge Fund firm AUM include all assets or only reflective of hedge fund vehicles?

Firm AUMs only include the AUM based on the hedge fund vehicles that the firm employs.

What is the most granular we can go with industry AUM?

We can give quarterly AUM by country and strategy.

What kind of fund structure do we take into consideration when calculating AUM?

Comprises commingled, listed and managed accounts.

Market benchmarks

What is it?

Preqin benchmarks provide an indication of industry and sub-sector performance in individual months and over longer periods. Funds are grouped based on their type (hedge funds, funds of hedge funds, CTAs, UCITS hedge funds, Alternative mutual funds), key strategy (equity, event driven, relative value, macro, multi-strategy), sub-strategies, geographic scope and currency denomination. Benchmark returns comprise unweighted averages of constituent fund returns.

Methodology

Preqin calculates industry benchmark returns using monthly return data for over 20,000 funds and share classes. For each benchmark on a given date an average (mean) is taken of the returns recorded for the constituent funds against that date. These averages represent the benchmark return for that month. Important to note that Preqin's hedge fund benchmark is equally weighted i.e. regardless of fund size each constituent fund return will have an equal impact on the overall calculation.

Using the benchmark monthly returns, additional statistics are also calculated using a similar methodology to those at a fund and share class level. Such metrics include trailing returns, annualised returns, volatility and Sharpe Ratio.

Frequently Asked Questions

How many constituent funds are required to generate a monthly benchmark return?

Each of Preqin's industry benchmarks require a minimum of 10 unique funds or share classes. When using the custom benchmark feature that is available on the Preqin Pro platform, only a minimum of 5 unique funds or share classes are required to construct a benchmark.

When does the latest monthly return become available through the benchmark page?

Once the number of constituents of a benchmark exceeds or meets the minimum requirement of 10 unique funds or share classes with the latest monthly return a benchmark figure will be generated on Preqin Pro.

Can I create my own benchmark with more specific criteria?

Yes, by using the custom benchmark functionality available on Preqin Pro users can construct their own benchmark matrix using an advanced search that allows users to identify funds they would wish to conduct peer analysis against.

Do Preqin provide Hedge Fund Benchmark information without a subscription to online products?

Yes, Preqin provide monthly hedge fund benchmark updates through Preqin Insights.

Market benchmark - do we only include funds with performance since inception?

No only funds that have performance figures in that time frame, so for a May 2019 benchmark the funds have reported to us May 2019 figures.

Market benchmark – do we include liquidated funds?

Liquidated funds are included to mitigate survivorship bias.

Top performing tables

What is it?

Top Performing Funds: Ranking individual funds and share classes by their trailing and annualised returns.

Most Consistent Top Performing Funds: Ranking individual funds and share classes by their consistency across the following metrics: annualized return, annualized volatility, Sharpe Ratio and Sortino Ratio.

Top Performing Funds Methodology

Top Performing funds are determined based on a ranking by net returns over trailing and annualized time periods. In order for a fund to be eligible to be listed in our one-year, three-year or five-year league tables, funds must report a full 12-month, 36-month or 60-month track record respectively. Although fund rankings published on Preqin Pro and within reports are not expected to alter significantly, final performance tables are subject to change as more data becomes available.

Most Consistent Top Performing Funds Methodology

Most consistent top performing funds are determined using a percentile ranking methodology, whereby each of the four metrics – annualized return, annualized volatility, Sharpe ratio and Sortino ratio – are representatively graded in a universe of hedge funds with matching strategy criteria and performance data up on Preqin's online platform. The 'average score' of each fund is then derived through an average of the four percentile values and solely used to determine fund consistency. Where a Sortino ratio cannot be calculated due to the fund not generating a negative return in the sample period, the fund was given a percentile score of 100 for its Sortino ratio metric. Most Consistent Top-Performing Fund table analysis are produced over 3 & 5-year annualized time periods. Although fund rankings published within reports are not expected to alter significantly, final performance tables are subject to change as more data becomes available.

Frequently Asked Question

Do Preqin provide 'Most Consistent Top Performing Funds' tables on Preqin Pro?

No, these are only available through reports on Preqin Insights.