Investment Performance Analysis for Hedge Funds

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Fund Administration Leaders Program

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What are Hedge Funds

The term ‘hedge fund’ is loosely applied to many investment strategies

The hedge fund, in its purest form and original iteration, is comprised of a series of negatively correlated long and short positions aimed at protecting profit

The claim often used for a hedge fund is that they can capture market highs but protect investors from the downs in the market *(Buyer beware as this is not always the underlying investment strategy!)*

Hedging aims to limit risk by offsetting one security’s risk with another

Section 1 Benchmarking

Benchmarking – Differences between MF and HF

Mutual Funds

- Relative performance funds: returns evaluated with reference to the performance of the index
- Generally obligated to carry a fully invested portfolio. Cannot express a negative view on the market via a net short position
- Restrictions on usage of derivatives & leverage, market timing calls and concentration of positions

Hedge Funds

- Absolute returns funds: returns are evaluated largely on absolute basis
- Portfolio strategies vary significantly on risk levels depending upon usage of leverage and hedging philosophy
- Can take long and short positions
- Allowed significant freedom with respect to usage of derivatives and leverage

Common hedge fund strategies and their benchmarks

- Market neutral strategies
  - Example 50/50 or 100/100
- Directional strategies
  - Long bias: 40% net long bias
  - Enhanced Equity: example 130/30 or 150/50 (enhanced equity)
- Benchmark: Cash + spread/hurdle rate
  - MIBOR, 3 month T-Bill
- Benchmark: Blend of cash + equity index
  - Equity component based on funds market exposure (measured using fund beta to the index or based on net exposure mandate)
  - 60% cash + 40% equity index
  - 100% equity index

Peer benchmarking: Prominent Hedge Fund Indices

- Eurekahedge Hedge Fund Index:
  - The Eurekahedge Hedge Fund Index is an equally weighted index of 3261 constituent funds. The index is designed to provide a broad measure of the performance all underlying hedge fund managers irrespective of regional mandate.
- Barclay Hedge Fund Index
  - The Barclay Hedge Fund Index is a measure of the average return of all hedge funds (excepting Funds of Funds) in the Barclay database. The index is simply the arithmetic average of the net returns of all the funds that have reported that month.
- Morningstar Broad Hedge Fund Index
  - The index is a rules-based, asset-weighted index designed to capture the performance and behavior of the most investable hedge funds. The index seeks to leverage Morningstar's hedge fund database of approximately 5,000 single-strategy hedge funds.
- In India, as per SEBI guidelines, CRISIL computes peer benchmarks for AIFs
  - For Category III, CRISIL has created an asset-weighted index using quarterly returns and the respective assets under management
  - Benchmarks are available for two categories: Long-only and Long-Short

Section 2 Performance Measurement

Performance Measurement

Performance measures	Metrics	Purpose
Absolute Returns	CAGR (net/gross)	Expected returns, gross to net slippage
Risk Adjusted Returns	Beta	Measure of market exposure/market risk
	Sharpe Ratio	To compare performance of portfolios with different levels of risk
	Volatility	measure of risk
	Max. drawdown, max. monthly drawdown	Downside or tail risk
Skill	Alpha	Extra return above and beyond the market's return
	Up-market capture, down-market capture	Performance during bull and bear phases
	Hit rate	Ability to pick winners (number of winners in the portfolio as a percentage of the total number of observations)
	Win/Loss ratio	Ability to size positions (outperformance that comes from good decision making to the alpha lost from making poor decisions)

Performance Measurement

Below examples are used for illustration only

Parameter	Fund A	Fund B	Fund C	Fund D	Fund E	NIFTY	IN00O/N Index (Overnight Rates)
CAGR	9.9%	10.5%	1.3%	22.8%	16.1%	17.4%	4.1%
Beta	0.2	0.1	0.1	0.8	0.1	1.0	
Alpha	3.3%	5.5%	(4.4%)	8.1%	10.9%		
Volatility (Ann. St.Dev.)	6.5%	3.5%	7.2%	19.7%	5.0%	22.1%	
Sharpe Ratio	0.9	1.8	-0.4	1.0	2.4	0.6	

Particulars	Fund A	Fund B	Fund C	Fund D	Fund E	NIFTY
Max Monthly Drawdown	-3.0%	-1.0%	-6.5%	-19.1%	-2.3%	-23.3%
Max Drawdown (Peak to Trough)	-3.6%	-1.9%	-11.7%	-23.9%	-3.0%	-29.9%
Max Drawdown Month	May-20	Mar-20	Oct-20	Mar-20	Apr-20	Mar-20

Up-Market					
Fund A	Fund B	Fund C	Fund D	Fund E	NIFTY
21%	13%	5%	91%	22%	100%

Down-Market					
Fund A	Fund B	Fund C	Fund D	Fund E	NIFTY
6%	-20%	11%	70%	-22%	100%

*Alpha = (Returns – risk free rate) – Beta * (NIFTY returns – risk free rate)*
Sharpe ratio = (Returns – risk free rate)/(volatility of returns)
Drawdown = Current NAV(T)/MAX(NAV till T)-1
Up-capture = returns of fund during up market months (CAGR)/returns of index during up market months (CAGR)

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Skill and Consistency

Below examples are used for illustration only

	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021
Hit Rate	59	68	77	88	70	97	75
	45	48	60	48	51	55	50
	76%	**71%**	**78%**	**55%**	**73%**	**57%**	**67%**

		CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021
Win / Loss Ratio	Win	0.4	0.3	0.3	0.3	0.4	0.4	0.5
	Loss	(0.3)	(0.2)	(0.3)	(0.3)	(0.3)	(0.4)	(0.3)
	Ratio	1.5	1.6	1.2	1.3	1.5	1.1	1.7

Section 3 Performance Attribution

Performance Attribution

Below examples are used for illustration only

	Port. Average Weight	Port. Contrib. To Return
Total	**100.0**	**2.84**
Communication Services	**0.4**	**-0.1**
Consumer Discretionary	**1.5**	**-1.2**
Consumer Staples	**1.6**	**-0.1**
Energy	**-1.3**	**-0.2**
Financials	**21.6**	**3.8**
Health Care	**9.3**	**0.4**
Industrials	**-0.2**	**0.5**
Information Technology	**1.1**	**0.2**
Materials	**4.5**	**-0.0**
Real Estate	**1.2**	**0.1**
Utilities	**0.1**	**0.1**
[Cash]	**60.2**	**0.8**
Hedges	**0.0**	**-1.4**

	Port. Average Weight	Port. Total Return	Port. Contrib. To Return
Long	**85.7**	**3.4**	**4.3**
Axis Bank Limited	6.4	29.5	1.6
Bank of Baroda	2.4	38.7	0.8
HDFC Limited	4.1	18.0	0.7
HDFC Bank Limited	2.8	14.9	0.5
UltraTech Cement	3.0	13.4	0.3
Power Finance Co Ltd	1.1	20.0	0.3
Hindalco Ind. Ltd.	1.8	16.9	0.3
Titan Company Ltd	2.7	-8.1	-0.2
Short	**-45.9**	**4.9**	**-2.3**
ICICI Prudential Life Ins.	-1.7	-13.5	0.3
Jubilant Foodworks	-1.1	-16.4	0.2
Shriram Finance Ltd	-1.4	16.3	-0.2
REC Ltd	-1.1	11.3	-0.2
Balkrishna Industries Ltd	-1.8	13.9	-0.3
Shree Cement Ltd	-2.3	12.5	-0.3
Bharat Forge Ltd	-1.4	29.3	-0.4

	Port. Average Weight	Port. Contrib. To Return
Total	**100.00**	**2.84**
Long	**85.7**	**4.3**
Short	**-45.9**	**-2.3**
[Cash]	**60.2**	**0.8**

*Contribution = Weight * Returns.*
Can be easily computed using analytics software such as Bloomberg PORT, FactSet, Barra etc.

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Performance Attribution

Below examples are used for illustration only

- Deep dive into drivers and detractors of returns – by strategy
  - Long Alpha = Long book returns – (long exposure * market index returns)
  - 5.7%-(50%*5.4%)
  - Short Alpha = Short book returns – (short exposure * - market index returns)
  - 1.7%-(15%*-5.4%)
  - Relative value/Spread trades alpha = RV book returns – (RV exposure * cash returns)
  - 3.5%-(20%*5%)

	Gross Exposure break-up						Contribution to returns by strategy					Benchmark		Alpha by strategy		
CY	LONG	SHORT	RELATIVE VALUE	CASH	GROSS EXPOSURE	LEVERAGE	LONG	SHORT	RELATIVE VALUE	OTHERS	TOTAL	INDEX RETURN	Cash returns	LONG ALPHA	SHORT ALPHA	RELATIVE VALUE
CY 2016	50%	15%	20%	20%	85%	0.85	5.7%	1.7%	3.5%	1.0%	11.9%	5.4%	5%	3.0%	2.5%	2.5%
CY 2017	70%	10%	30%	20%	110%	1.10	14.8%	-0.3%	1.3%	1.0%	16.8%	35.0%	5%	-9.7%	3.2%	-0.2%
CY 2018	55%	20%	30%	20%	105%	1.05	0.7%	2.2%	2.1%	1.0%	6.0%	0.8%	5%	0.2%	2.4%	0.6%
CY 2019	60%	10%	40%	20%	110%	1.10	14.5%	-1.0%	2.1%	1.0%	16.5%	10.4%	5%	8.3%	0.0%	0.1%

Sharpe's Ratio (Risk Adjusted Return)

The Sharpe Ratio Meaning

How well the return of an asset compensates the investor for the risk taken. When comparing two assets against a common benchmark, the one with a higher Sharpe ratio provides a better return for the same risk (or, equivalently, the same return for lower risk). The Sharpe ratio is defined as the average return earned in excess of the risk-free rate per unit of volatility or total risk i.e., standard deviation. The Sharpe ratio has become the most widely used method for calculating risk-adjusted returns; however, it can only be accurate if the data has a normal distribution

Risk Adjusted Return - Sharpe Ratio

Sharpe Ratio = (Rx – Rf) / StdDev Rx

Where:

Rx = Expected portfolio return

Rf = Risk-free rate of return

StdDev Rx = Standard deviation of portfolio return (or, volatility)

Sharpe Ratio Example

Let's assume that the 10-year annual return

For the S&P 500 (market portfolio) is 10%, while the average annual return on Treasury bills (a good proxy for the risk-free rate) is 5%. The standard deviation is 15% over a 10-year period

Manager	Average Annual Return	Portfolio Standard Deviation	Rank
Fund A	10%	0.95	III
Fund B	12%	0.30	I
Fund C	8%	0.28	II

Market = (.10-.05)/0.15 =0.33
(Fund A) = (0.10-.05)/0.95= 0.052
(Fund B) = (0.12-.05)/0.30 = 0.233
(Fund C) = (.08-.05)/0.28 = .0.107

Treynor Ratio (Risk Adjusted Return)

Treynor Ratio (Risk Adjusted Return)

Treynor is a measurement of the returns earned in excess of that which could have been earned on an investment that has no diversifiable risk.In short, it is also a reward-volatility ratio, just like the Sharpe's ratio, but with just one difference. It uses a beta coefficient in place of standard deviations.

Risk Adjusted Return - Treynor Ratio

Sharpe Ratio = (Rp – Rf) / B(p)

Where:

Rp = Expected Portfolio Return

Rf – Risk Free Rate

Beta(p) = Portfolio Beta

This ratio developed determines how successful an investment is in providing investors compensation, with consideration for the investment's inherent level of risk. The Treynor ratio depends upon Beta which depicts the sensitivity of an investment to movements in the market – to evaluate the risk

Treynor Ratio Example

Let's assume that the 10-year annual return

for the S&P 500 (market portfolio) is 10%, while the average annual return on Treasury bills (a good proxy for the risk-free rate) is 5%.

Manager	Average Annual Return	Beta	Rank
Fund A	12%	0.95	II
Fund B	15%	1.05	I
Fund C	10%	1.10	III

Market = (.10-.05)/1 = .05
(Fund A) = (.12-.05)/0.95 = .073
(Fund B) = (.15-.05)/1.05 = .095
(Fund C) = (.10-.05)/1.10 = .045

Other Key Ratios

Jensen's Alpha (Risk Adjusted Return)	Sortino Ratio (Risk Adjusted Return)	Return Over Maximum Drawdown	Up Market Capture Ratio	Down Market Capture Ratio	Capture ratio
The Jensen's measure, or Jensen's alpha, is a risk-adjusted performance measure that represents the average return on a portfolio or investment, above or below that predicted by the capital asset pricing model (CAPM), given the portfolio's or investment's beta and the average market return. This metric is also commonly referred to as simply alpha	Sortino Ratio differentiates harmful volatility from total overall volatility by using the asset's standard deviation of negative portfolio returns—downside deviation—instead of the total standard deviation of portfolio returns. The Sortino ratio takes an asset or portfolio's return and subtracts the risk-free rate, and then divides that amount by the asset's downside deviation	Return over maximum drawdown (RoMaD) is a risk-adjusted return metric used as an alternative to the Sharpe Ratio or Sortino Ratio. Return over maximum drawdown is used mainly when analyzing hedge funds. It can be expressed as:	It is used to evaluate how well an investment manager performed relative to an index during periods when that index has risen. The up-market capture ratio is calculated by dividing the manager's returns by the returns of the index during the up-market and multiplying that factor by 100.	It is used to evaluate how well an investment manager performed relative to an index during periods when that index has dropped. The ratio is calculated by dividing the manager's returns by the returns of the index during the down-market and multiplying that factor by 100.	Upside/Downside Capture Ratio = (Investment's Upside / Benchmark's Upside) / (Investment's Downside / Benchmark's Downside) *100 Capture ratios have an analytical structure which indicates the intrinsic strength of a mutual fund to face market turbulence. It reveals such information which trailing returns are unable to disclose

Thank You

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