



HFRI 500 Low Beta Index

Defined Formulaic Methodology

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Table of Contents

METHODOLOGY	3
Eligibility Criteria.....	3
Definitions	5
Index Rebalance	5
HFRI 500 Low Beta Index	6
Additional Rebalance Considerations.....	7
Index NAV Calculation	8
Index Disruption Event	10
APPENDIX 1. STRATEGY DESCRIPTIONS	11
Primary Strategy Descriptions.....	11

Methodology

The HFRI 500 Low Beta Index consist of constituents of the HFRI 500 Fund Weighted Composite Index (“HFRI 500”) that satisfy the eligibility criteria. The Index is equal-weighted at rebalance time, which is performed on an annual basis. Funds are classified into 4 main strategies and over 20 sub-strategies following the hedge fund strategy classification of HFR.

Eligibility Criteria

Constituents included in the HFRI 500 Hedge Fund Indices must:

- Report performance net of all fees in USD
- Report performance directly, or through a third party such as a fund administrator, to HFR every month on or before the 3rd to last business day of each month
- Report the fund AUM to HFR
- Be open to new investments
- Provide quarterly liquidity or better
- Have a redemption notice period of 90 days or less
- Allow for Monthly subscriptions
- Have a subscription notice period of 30 days or less
- Have a redemption settlement period of 30 days or less
- Have no Investor-Level gates or have agreed to waive them
- Have no lock-ups or have agreed to waive them
- Accept both US tax-exempt and non-US capital
- Be managed by an investment company registered with the SEC or similar regulatory body
- Agree to the Submitter Code of Conduct (SCOC)
- Offer commercial terms consistent with market standards

The following formula is used to define the representative Hedge Fund Strategy Universe (“Strategy Universe”) derived from the Global Hedge Fund Universe. The Global Hedge Fund Universe is expressed as:

$$HFU = \bigcup HFS$$

where HFS is the set of funds classified by strategy according to the strategy structure of the HFR Hedge Fund Database.

The funds comprising the HFS are filtered using the following formula to create the Strategy Universe.

$$\delta(freq - 12) \cdot \delta(fees) \cdot \delta(open) \cdot \delta(liq) \cdot H(90 - red) \cdot H(30 - subs) \cdot H(30 - settle) \cdot \delta(l\&g) \cdot \delta(ISO - USD) \cdot \delta(reg - 1) \cdot \delta(SCOC - 1) \neq 0$$

where $H(x)$ is the step function defined as

$$H(x) = \begin{cases} 1 & x \geq 0 \\ 0 & x < 0 \end{cases}$$

$\delta(x)$ is the delta function defined as

$$\delta(x) = \begin{cases} 1 & x = 0 \\ 0 & x \neq 0 \end{cases}$$

and

- $freq$ is the reporting frequency (12=monthly, 4=quarterly)
- $fees$ is the returns net of all fees (0=yes, 1=no)
- $open$ corresponds to the fund being open to new investments (0=yes, 1=no)
- liq is the liquidity offered by the fund (0=quarterly or better, 1=otherwise)
- red is the redemption notice of the fund in days
- $subs$ is the subscription notice of the fund in days
- $settle$ is the redemption settlement period of the fund in days
- $l\&g$ is the lock-up or gates imposed by the fund (0=none, 1=otherwise)
- ISO is the reporting currency
- reg is the fund registration with the SEC or similar regulatory body (0=no, 1=yes)
- $SCOC$ is the agreement to the Submitter Code of Conduct (0=no, 1=yes)

In cases where a manager lists multiple funds with the same or similar investment profile, only one may be included in the HFRI 500 Index.

Definitions

For the clarity of the rebalance process we define:

- **Index Manager:** HFR, responsible for the calculation of the Index.
- **Rebalance Date:** the first business date of the calendar year.
- **Evaluation Date:** the month starting 1 quarter prior to the Rebalance Date.
- **Eligibility Criteria:** performance and assets under management reported monthly in USD, net of all fees, and with the required liquidity.
- **Estimated Index Values:** the index will first be published on the fifth US business day of the month with a value for the prior month based on the index constituents initial reporting. An updated estimate of index values for the prior month will be published again of the 15th of the month (or nearest US business day afterwards) as additional constituent funds report their performance to HFR.
- **Final Index Value:** the index value for a given month will become final on the third to last US business day of the month of its initial publication, after which it will not be subject to change. For example, December performance is finalized on the third to last US business day of the following January.

Index Rebalance

The following rebalance methodology is applied on the HFRI 500 Low Beta Index:

- The eligible universe of constituents is determined at the Evaluation Date.
- The constituents are selected based on their liquidity and asset under management as of the Evaluation Date.

HFRI 500 Low Beta Index

The HFRI 500 Low Beta Index is constituted by a subset of the funds that are constituents of the HFRI 500 Index. Constituent funds are ranked by their return profile using the following measures:

- Absolute Value of Beta to a broad hedge fund strategy index (e.g., HFRI Fund Weighted Composite Index)
- Absolute Value of Beta to a broad equity index
- Absolute Value of Beta to a broad fixed income index
- Return volatility as measured by the standard deviation of the returns of the fund

The beta of fund i vs. benchmark B is defined as:

$$\beta_{i/B} = \rho_{i/B} \cdot \sigma_i / \sigma_B$$

where σ_i and σ_B are the standard deviation of fund i and the benchmark B , respectively, and $\rho_{i/B}$ is the Pearson correlation of fund i with the benchmark B defined as

$$\rho_{i/B} = \frac{\text{cov}(R_i, B)}{\sigma_i \sigma_B}$$

where R_i represents the returns of the fund and B the returns of the benchmark, and σ_i and σ_B are the standard deviation of fund i and the benchmark B , respectively.

Funds are ranked based on the Absolute Value of Beta against the benchmarks

$$\text{beta_rank}_{i/B} = \text{rank}(|\rho_{i/B}|)$$

and their volatility

$$\text{vol_rank}_i = \text{rank}(\sigma_i)$$

for each qualifying fund i and benchmarks $B = \{\text{Hedge Fund Index, Equity Index, Bond Index}\}$. The *Rank Score* for each fund is then defined as the average of the ranks as

$$\text{Rank_score}_i = \text{Avg} \left(\frac{1}{3} \sum_{B=1}^3 \text{beta_rank}_{i/B}, \text{vol_rank}_i \right)$$

Funds are ordered according to their *Rank Score* from low to high. The bottom 50 funds with the lowest *Rank Score* (i.e., the funds with the lowest absolute value betas and lowest volatility) are eligible to be selected as constituents of the HFRI 500 Low Beta Index. The constituent funds follow the same weighting and rebalance process as the HFRI 500 Index.

Additional Rebalance Considerations

- Additional changes to the pool of funds or their weights may be taken on a more frequent basis to address specific concerns of any fund such as risk, liquidity, due diligence, minimum investment size, subscription or redemption fees, non-market commercial terms, concentration or other issues which materially affect the Index, including regulatory issues. If a fund ceases to satisfy any of the Eligibility Criteria required for inclusion into the Index between rebalancing dates, HFR will remove the fund from the Index in a commercially reasonable time. If a fund is removed, HFR may replace it with another fund within the same strategy provided it satisfies the criteria for inclusion, or may re-weight the remaining funds in the same strategy.
- An Index constituent may be removed from the Index if it fails to meet the Eligibility Criteria on or before the Rebalance Date. In such a case, the NAV of the constituent will be allocated to the remaining constituents of the Index or allocated to a replacement prospective constituent. An Index constituent may be replaced or removed with another qualifying prospective constituent between rebalance dates as required under specific circumstances. Such events include without limitation, due diligence concerns, inability to maintain a constituent weight due to lockups, gates or other circumstances.
- If an Index constituent's weight cannot be maintained between Rebalance Dates, the constituent may remain in the Index at a reduced weight, its NAV may be reallocated equally to the remaining constituents or may be replaced with a similar qualifying prospective constituent as available.
- Under certain special circumstances certain constituents may remain in the Index on a limited or temporary basis. Examples of these include, but are not limited to, constituents subject to liquidation, closure to new investments, regulatory matters, or suspension of redemptions. The specific treatment of constituents under special circumstances includes:
 - Index Constituent enters liquidation process.

Index Constituents subject to liquidation are kept in the Index until liquidation is completed. The weighting of the constituents is adjusted in the Index to reflect its

liquidity and redemption schedule. The NAV of the constituent that becomes available through this process is then allocated to the remaining constituents of the Index within the same strategy or replaced by a qualifying fund.

- Index Constituent becomes closed to new investments.

Index Constituents that become closed to new investment before the Rebalance Date may remain in the Index with a weight that can only increase due to the performance of the constituent and does not increase during the Index rebalance.

If the Index Administrator receives notification of, and can verify that, an Index Constituent significant adverse circumstances or due diligence concerns such as: large investor redemptions, critical personnel loss, an audit holdback, a side pocket implemented, redemptions suspended / gate activated, reduced liquidity of liquidating constituent, money laundering charges, cyber security breach / damaging client info leaked or stolen, fraud, breach of any law, regulation or rule, major reputation damaging story or any similar intervening circumstance, may be subject to removal from the Index before the Rebalance Date. The removal from the Index will follow the liquidity and redemption terms of the constituent whereby the constituent weight will be reduced until its full Index removal. The weight of the constituent that becomes available through this process is then allocated to the remaining constituents of the Index within the same strategy.

Index NAV Calculation

HFRI 500 Low Beta Index (the “Index” and collectively, “Indices”) are total return indices and are published by HFR at www.hfr.com and on Bloomberg. Computation of the Index NAV uses the performance of constituent funds as reported to HFR. HFR will seek to use the most timely and accurate performance information provided.

The Index NAV is 1000 at inception where “ $t=0$ ”. The NAV changes are driven by the Index performance, which is defined as the percentage change in the value of the Index from a previous date “ $t-1$ ” to current date “ t ”.

At rebalance time “ t_0 ”, constituents are equal weighted so the NAV of the HFRI FOF (S) Index is defined as

$$NAV_{t_0} = NAV_{t_0-1} \times (1 + ROR_{t_0})$$

where ROR_{t_0} is the percentage change in the total value of the Index from “ t_0-1 ” to “ t_0 ” computed as:

$$ROR_{t_0} = \frac{1}{n} \sum_{i=1}^n ROR_{t_0}^i - F$$

where $ROR_{t_0}^i$ is the rate of return of constituent i at time “ t_0 ”, F corresponds to an index adjustment of 6 bps/month plus an additional fund of funds index adjustment of 100 bps per annum and n is the number of constituents in the Index.

The NAV of the HFRI FOF (S) Index at any other times “ t ” is computed as

$$NAV_t = NAV_{t-1} \times (1 + ROR_t)$$

where ROR_t is the percentage change in the total value of the Index from “ $t-1$ ” to “ t ” as follows:

$$ROR_t = \sum_{i=1}^n w_t^i \times ROR_t^i - F$$

where ROR_t^i is the total return of constituent i at time “ t ”, n is the number of constituents in the Index and w_t^i is the weight of constituent i at the beginning of month “ t ” computed as

$$w_t^i = \frac{(1 + R_{t-1}^i)}{\sum_{j=1}^n (1 + R_{t-1}^j)}$$

where R_{t-1}^i is the cumulative total return of constituent i between the rebalance date “ t_0 ” and time “ $t-1$ ”:

$$1 + R_{t-1}^i = \prod_{t'=t_0}^{t-1} (1 + ROR_{t'}^i)$$

If a constituent k ceases to be a constituent of the Index at given time t' before the rebalance date, its weight is then equally distributed to the remaining constituents in the Index; the new constituent weights are given by

$$w_{t'}^j = w_{t'}^j + \frac{1}{n-1} \cdot w_{t'}^k$$

with $i \neq k$.

Index Disruption Event

“Index Disruption Event” means:

- (1) where, in the determination of HFR, it is not possible, or it is not reasonably practicable for it to determine the price or value of a constituent; or
- (2) a value for a constituent is not announced or is otherwise unavailable when such announcement or availability would normally be scheduled; or
- (3) the occurrence of an event or circumstance (including, without limitation, a major market disruption, a systems failure, natural or man-made disaster, act of God, armed conflict, act of terrorism, riot or labor disruption or any similar intervening circumstance) that HFR determines affects the Index.
- (4) the occurrence of other event or circumstance (including, without limitation, a personnel loss, a significant client(s) redemption, an audit holdback, a side pocket implemented, redemptions suspended / Gate activated, reduced liquidity of liquidating constituent, money laundering charges, Cyber security breach / Client info leaked or stolen, Fraud, breach of any law, regulation or rule, Market specific short bans or suspensions, Major reputation hurting story or any similar intervening circumstance) that HFR determines affects the Index.

If, in the determination of HFR, any of the foregoing is material.

Upon the occurrence of an Index Disruption Event on any day on which the official closing level of the Index is scheduled to be published, HFR (i) shall not calculate and publish the Index Level and/or (ii) if relevant, may make such adjustments to the provisions of the Index to account for such Index Disruption Event as it determines appropriate, including, without limitation, delaying the application of any procedures or requirements of the Index.

Appendix 1.

Strategy Descriptions

HFR seeks to maintain a representative, relevant, robust and contemporaneous Strategy Classification System for all investment funds in the HFR Database. The classifications reflect the evolution of strategic trends in the hedge fund industry, cognizant of the reality that over market cycles the classification system is likely to continue to evolve, as new opportunities attract investor capital.

Primary Strategy Descriptions

Strategy: In completing a fund profile for inclusion in HFR subscriber database, an investment manager qualitatively chooses one of four primary strategies, as defined below:

Equity Hedge: Equity Hedge strategies maintain positions both long and short in primarily equity and equity derivative securities. A wide variety of investment processes can be employed to arrive at an investment decision, including both quantitative and fundamental techniques; strategies can be broadly diversified or narrowly focused on specific sectors and can range broadly in terms of levels of net exposure, leverage employed, holding period, concentrations of market capitalizations and valuation ranges of typical portfolios. Equity Hedge managers would typically maintain at least 50%, and may in some cases be substantially entirely invested in equities, both long and short.

Event-Driven: Investment Managers who maintain positions in securities of companies currently or prospectively involved in corporate transactions of a wide variety, including but not limited to: mergers, restructurings, financial distress, tender offers, shareholder buybacks, debt exchanges, security issuance or other capital structure adjustments. Security types can range from most senior in the capital structure to most junior or subordinated, and frequently involve additional derivative securities. ED exposure contains a combination of sensitivities to equity markets, credit markets and idiosyncratic, company specific developments. Investment theses are typically predicated on fundamental characteristics (as opposed to quantitative), with the realization of the thesis predicated on a specific development exogenous to the existing capital structure.

Macro: Investment Managers which execute a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the

impact these have on equity, fixed income, currency and commodity markets. Managers employ a variety of techniques, both discretionary and systematic analysis, combinations of top down and bottom up theses, quantitative and fundamental approaches and long and short term holding periods. Although some strategies employ RV techniques, Macro strategies are distinct from RV strategies in that the primary investment thesis is predicated on future movements in the underlying instruments, rather than realization of a valuation discrepancy between securities. In a similar way, while both Macro and equity hedge managers may hold equity securities, the overriding investment thesis is predicated on the impact movements in underlying macroeconomic variables may have on security prices, as opposes to EH, in which the fundamental characteristics on the company are the most significant and integral to investment thesis.

Relative Value: Investment Managers who maintain positions in which the investment thesis is predicated on realization of a valuation discrepancy in the relationship between multiple securities Manager employ a variety of fundamental and quantitative techniques to establish investment theses, and security types range broadly across equity, fixed income, derivative or other security types. RVA position may be involved in corporate transactions also, but as opposed to ED exposures, the investment thesis is predicated on realization of a pricing discrepancy between related securities, as opposed to the outcome of the corporate transaction.

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HFR
110 North Wacker Drive, 25th Floor
Chicago, IL 60606
(312) 658-0955
indices@hfr.com
www.hfr.com

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Addendum – Revisions to the Methodology

Date	Revision	Process