Strategy Spotlight

Decoding Long/Short Equity Hedge Funds

Long/Short (L/S) Equity Hedge Funds aim to generate alpha by selectively taking long positions in undervalued stocks and short positions in overvalued ones. By profiting from both rising and falling prices, they seek to reduce directional market exposure and enhance risk-adjusted returns. While the overall index tends to maintain a structural correlation to broad U.S. equity indices (≈ 80% over the long term), skilled managers actively manage downside risk through dynamic short exposure, and protective hedging strategies such as put options.

This paper introduces **Decoding**, a transparent, AI-powered replication of the HFRX Equity L/S Hedge Fund benchmark. Decoding captures the strategy’s core return drivers alongside a set of risk controls that reflect best practices observed among managers in the space.

Ai For Alpha

Building

1. **Equity Spread Factors:** A set of 11 relative value pairs mixing regions and styles (e.g., US vs Japan, US vs EUR, US Tech vs US Large 30, Large Cap US vs Small Cap US).

2. **Core Equity Beta**: A diversified long exposure to the U.S., Eurozone, U.K., Japan, and Emerging Markets, reflecting the structural long bias in many L/S equity portfolios.

3. **Long Credit**: Systematic shorts in credit indices (CDX High Yield and iTraxx Crossover) to reflect the economic and interest rates sensitivity typically embedded in L/S equity portfolios, particularly through allocations to small-cap.

4. **Hedging Factors**: Two overlay hedging strategies designed to cushion drawdowns during equity downturns:
   - *Tail Risk Volatility Factor*: A machine learning signal allocating across nearest and fourth VIX futures based on:
     - (i) 20-day volatility-adjusted momentum of VIX Futures, an indicator enabling the capture of short-term momentum-driven behavior in VIX Futures;
     - (ii) VIX Forward Curve Ratio, expressed as the ratio of the longer-term forward future to the nearest forward, reflecting backwardation (respectively contango) when the VIX Forward Curve anticipates bullish (respectively bearish) scenarios for VIX Futures:
     - (iii) the absolute VIX level, an indicator conveying the long-term mean-reverting behavior of the VIX.
   - *Risk-Off Momentum Factor*: A modified CTA replication design enhancing crisis alpha and serving as a proxy hedge for the portfolio (see previous spotlight).

Asymmetric Return Scaling

To reflect the risk management practices commonly employed by long/short equity managers, negative daily returns in the benchmark are scaled down to 90% of their original value. This adjustment mitigates drawdowns while preserving upside potential. By incorporating this asymmetry into the decoding process, the approach generates an augmented benchmark that enhances the orginal HFRX Equity Hedge Fund Index. This asymmetry replication is made possible through the integration of the Hedging Factors components within the global portfolio.

Dynamic Bayesian Network Engine: Graphical Model

This model implements the standard replication framework developed by Ai For Alpha. Allocation weights across the four sleeves — Equity Spreads Factors, Core Equity Beta, Long Credit, and Hedging Factors — are modeled as latent states in a state-space system. A Bayesian algorithm with maximum likelihood estimation updates weights daily. A Gaussian smoothness prior prevents abrupt shifts while allowing regime changes. Compared to a classic Kalman filter, **the Graphical Model** offers superior flexibility by modeling cross-asset interactions and adapting more robustly to regime shifts.

Key Advantages:

- **State-space integration**: Unifies allocation and return dynamics within a single coherent model.
- **Dynamic inference**: Enables continuous prediction-correction cycles, ensuring alignment with new data.
- **Cross-asset interactions**: Captures interdependencies between asset returns.
- **Continuity with agility**: Provides smooth weight adjustments, preserving stability while enabling portfolio response to macro shocks.

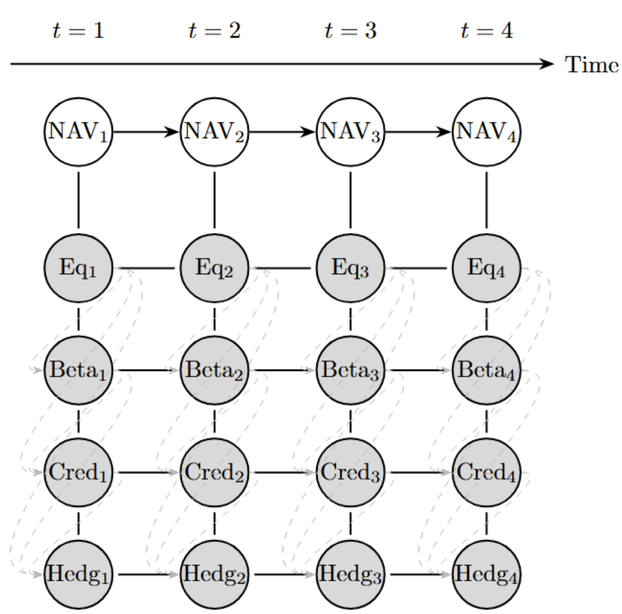

Figure 1: Simplified **Graphical Model** showing how the observed portfolio NAV at each time step relates to four latent allocation assets —Equity Spread (Eq), Beta (Beta), Credit (Cred) and Hedging overlay (Hedg). Solid arrows indicate the evolution of each asset over time, undirected lines link the NAV node to each latent layer in the column, and dashed arrows depict same-date feedback interactions between the assets.

Results

- Long-term correlation to HFRX Equity Hedge ≈ 80 %, indicating reliable strategy replication.
- The Sharpe ratio improves from 0.24 to 0.67 over the past decade, reflecting significantly enhanced risk-adjusted returns.Return / Max Drawdown improves markedly, underscoring the strategy's positive asymmetry and faster recovery profile.
- During the *Tariffs Turmoil* in April, long VIX and long Gold positions from the overlay sleeve provided timely protection.

LS Equity Advanced Decoding

2025-05-09

Excess Return | **Total Return USD**

Description | Allocation | Performance | Perf Attribution | **Statistics** | Download | Report

Decoding Accuracy

Accuracy
★★★ /5

Correlation
79.2%

Tracking error
4.7%

Turnover
7.82

Performance statistics

	AI 360	1Y	3Y	5Y	7Y	10Y
From	Dec-10	May-24	May-22	May-20	May-18	May-15
To	May-25	May-25	May-25	May-25	May-25	May-25
Annual Return	7.8%	6.9%	9.1%	8.4%	7.8%	7.2%
Vol	7.6%	8.6%	7.6%	7.5%	7.9%	7.6%
Sharpe Ratio	0.83	0.21	0.57	0.73	0.66	0.67
Max DD	14.7%	8.8%	8.8%	10.8%	14.7%	14.7%
Monthly MaxLoss	14.5%	6.2%	6.2%	6.2%	14.5%	14.5%
Return/maxDD	0.53	0.78	1.04	0.77	0.53	0.49
Annual Turnover	7.82	13.69	11.14	9.49	8.96	8.32
US Equities Correl	87.2%	91.4%	86.9%	87.0%	87.4%	87.6%
Benchmark Correl	82.0%	82.4%	76.7%	78.7%	79.9%	81.6%
Tracking Error	4.4%	5.2%	5.2%	4.8%	4.8%	4.4%
Information Ratio	1.27	0.34	0.71	0.06	0.79	0.88

	Benchmark	1Y	3Y	5Y	7Y	10Y
Annual Return	2.2%	5.1%	5.4%	8.1%	4.0%	3.3%
Vol	5.6%	5.2%	4.0%	4.6%	5.5%	5.6%
Sharpe Ratio	0.14	0.01	0.18	1.14	0.26	0.24
Max DD	21.4%	5.9%	5.9%	6.0%	18.4%	20.5%
Monthly MaxLoss	17.3%	4.0%	4.0%	4.0%	17.3%	17.3%
Return/maxDD	0.10	0.86	0.91	1.36	0.22	0.16
US Equities Correl	80.3%	86.6%	80.5%	80.1%	79.5%	80.7%

Performance Statistics of L/S Equity Hedge Funds Replication (source: Ai For Alpha Platform)

Performance Attribution

	Daily	MTD	YTD
Equities	0.3%	0.9%	-1.8%
Rates	-0.0%	-0.0%	-0.1%
Bonds	-0.0%	-0.0%	-0.2%
Commodities	-0.1%	-0.1%	0.7%
FX	-0.1%	-0.1%	-0.6%
VIX	-0.0%	-0.1%	0.1%
CdS Credit	0.0%	0.1%	-0.2%
Funding	0.0%	0.1%	1.5%
Total	**0.1%**	**0.8%**	**-0.6%**

Year to Date L/S Replication Strategy Performance Attribution (source: Ai For Alpha Platform)