Cryptocurrency Medium Frequency High Capacity QIS

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Summary

We propose three high-capacity ($\leq$ \$100M) systematic strategies that are collectively market-neutral, and target a portfolio drawdown of $< 10\%$ with an expected annual return of $\sim 30\%$ (Sharpe Ratio ≈ 2.2).

Problem formulation & Business niche

Including Bitcoin in a portfolio, often via an ETF, has become a practical way to access new sources of alpha and diversification. Yet the asset's large drawdowns deter many allocators. Our aim is to reconcile this: participate in crypto upside while materially reducing downside. We approach this through three complementary QIS, offered standalone or in combination, depending on a client's existing exposure:

- **Long Only (LO):** A diversified basket across the top cryptocurrencies by market cap to mitigate idiosyncratic risk. Weekly re-balancing uses a hybrid risk-parity proxy (market cap blended with inverse rolling volatility).
- **Positive Skew (PS):** A portfolio of out-of-the-money options to capture convex payoffs and cushion stress periods. Conceptually, the idea is to buy puts. In practice however this strategy is both very expensive and also lacks liquidity. We solve this issue by structuring spreads of out of money puts (OTM) to reduce to a maximum from bleeding our alpha from the LO strategy. We also diversify across several underliers, several expires and several strikes.
- **Long/Short (L/S):** Relative-value exposure: long undervalued crypto assets, short over valued crypto assets (weaker long-term prospects). In crashes, all of these cryptocurrencies are positively correlated, the shorts are designed to absorb more of the move, adding defensive alpha.

What are Skew Types in QIS

Overview: a central design choice in Quantitative Investment Strategies (QIS) is the *shape* of the return distribution, not just its mean/vol. Many widely used premia are heavy-tailed and exhibit systematic skew: some earn carry most days but crash episodically (negative skew: see right distribution in figure 1 or left diagram of figure 2), others pay an insurance-like bleed for convex payoffs in dislocations (positive skew: see left distribution in figure 1 or right diagram of figure 2), while market-neutral L/S aims for an approximately symmetric distribution (see middle distribution in figure 1) around zero albeit with occasional tail events.

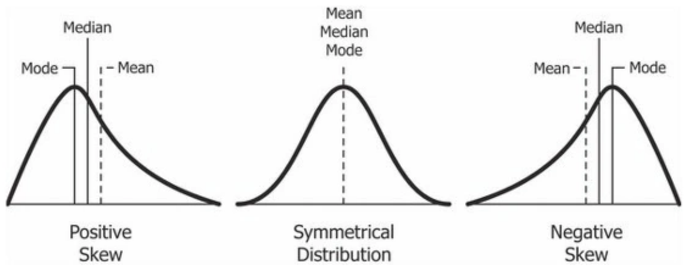

Figure 1: Skewness types: positive, symmetrical, and negative.

Implications for QIS portfolio design: blending *negative-skew* with *positive-skew* plus an *approximately symmetric L/S core* targets smoother and more consistent overall returns profiles as well as a significantly more attractive drawdown profile at the portfolio level. There are however many different types of distributions. The two others that we will discuss in this document are negative (eg: left distribution in figure 1) and positive skews (eg: right distribution in figure 1).

Figure 2: Simplified strategy skewness profiles: negative-skew strategy (left) are typically long only strategies and positive-skew strategy (right) rarer in the industry but typically involving being long OTM puts.

Examples: we give a few examples in the skew spectrum:

- **Long-Only (LO)** strategies are usually prone to negative skew when trends can compound, but reversals bite. Typically being long the S&P500 via an ETF is a negative skew strategy. However the issues associated to LO strategies are exacerbated in cryptocurrency markets as volatility is often much higher than other asset classes.
- **Positive Skew (PS):** Small, frequent costs with occasional large gains. Designed to pay off in stress and dislocation, at the expense of muted returns in calm regimes. Access to these types of strategies is done through the options market, more specifically put options. They can be expensive to run but methods exists in mitigating the cost without compromising too much of the gains obtained during stress periods. Buying a put on the S&P 500 would be considered a positive skew strategy that would usually control some of the drawdown involving a LO strategy of the same underlier.
- **Long/Short (L/S):** Closer to symmetry. Gains/losses cluster around the mean; alpha is sourced from relative value with low correlation to market beta. They are ideal for providing an orthogonal source of alpha.

About our Long/Short (L/S) Strategy

Lack of Sectors: classic low–to-medium frequency, fundamentals, sector-aware L/S playbooks from equities do not transfer cleanly to crypto as sectors do not exist in the cryptocurrency market. They don't exist because taxonomies are fuzzy and overlapping (see our article in the Journal of FDS).

Secotorization with ML: organizing "sectors" requires more advanced technicas at the crossroad of ML and alternative data. For example hierarchical methods yield stable clusters (e.g., BTC/BCH proximity; ETH/ETC proximity; platform families; XRP distinct). Figure 3 represents the outcome of our bespoke methodology (the details are IP) we have used in order to create our sectors. The outcome is that we can classify these various cryptocurrencies based on how far they are from each other. For instance, we can see that Bitcoin and Bitcoin Cash or Ethereum and Ethereum Classic remain extremely close. We can also see that the decentralized platforms end up in the same green area. We can also see that Ripple, is in a different sector to the two mentioned above, which based on the fundamentals, makes a great deal of sense.

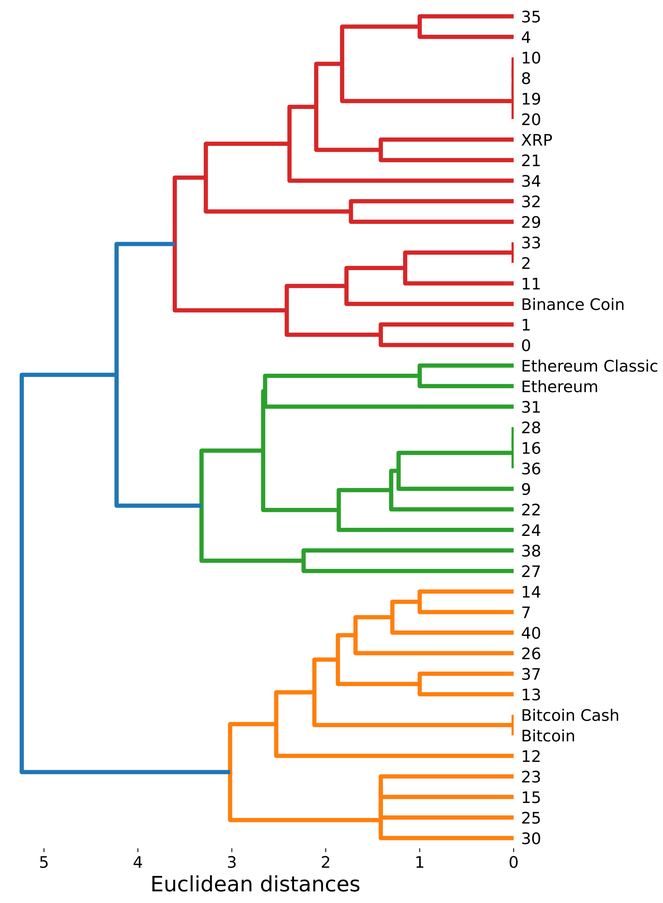

Figure 3: Partially labeled dendrogram of 40 Cryptocurrencies using various ML and scraping models.

Creating these kind of sectors allows us to study and exploit better relative value by going long undervalued and short overvalued exposures within the same "abstract" sectors. Figure 6 illustrates the performance of the strategy and table 1 gives details of its performance.

Few trading outcome:

- Highlights: consistent returns in constructive regimes (e.g., +93% in 2021; Sharpe 2.5); modest setback in choppier 2023.
- Risk profile: moderated drawdowns vs.LO; lower beta correlation.
- Portfolio role: steady alpha that balances the book across regimes.

About our Long Only Strategy

Finding the new bitcoin is often difficult as new cryptoccrencies are launched on a regular basis. The classic approach for such issues is to purchase a basket of cryptoccurencies hoping to gain exposure to the optimal market Beta. Though this is our simplest strategy, we believe optimal execution is key. And we also believe that building it our way provides the best possible diversification benefits to the Positive Skew strategy that we will present in the next section. In the meantime, we propose a long-only risk-parity strategy that allocates across N liquid cryptoassets (excluding stablecoins) so that each contributes roughly the same ex-ante risk. At each rebalancing period t (e.g., weekly), we estimate the rolling volatility over L days from hourly returns.We then calculate inverse-vol weights and normalize: Leveraging is then used to insure the risk contribution of this leg of the portfolio is matched optimally with its symmetric counterpart (the positive skew strategy). Figure 6 illustrates the performance of the strategy and table 1 gives details of its performance.

Few trading outcome:

- Highlights: exceptional trend capture (+1146% in 2021; Sharpe 2.7) but significant giveback in reversals (75% in 2022; max DD 77%).
- Risk profile: highest directional exposure; diversification benefits most from PS strategy.
- Portfolio role: growth engine; diversification is essential to smooth the path.

More About our LO & LS Strategies

More information can be found on our LO and original LS strategy in our paper in the journal or Financial Data Science downloadable from following the hyperlink of Figure 4.

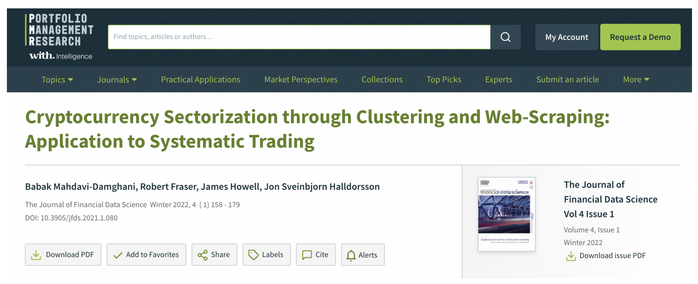

Figure 4: Clickable article for our Long only and LS strategy.

About our Positive Skew Strategy

A positive-skew sleeve is designed to buy convexity so the portfolio loses small amounts most of the time but makes outsized gains when markets break. It also offers an additional layer of security in **extreme ADL** (automatic deleveraging) scenarios. Practically, we implement this with **bear put spreads**: buy an out-of-the-money (OTM) put for downside protection and simultaneously sell a deeper OTM put on the same underlier to partially finance the purchase (see figure 5).

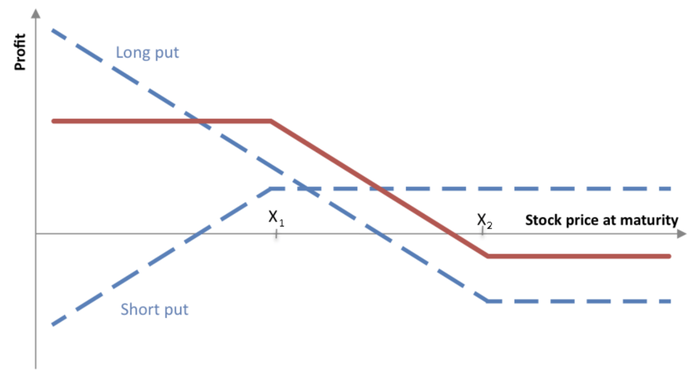

Figure 5: Illustration of a bear put spread option strategy.

The sold leg caps the payoff, but it also reduces the cost. We build this overlay as a **basket** across all crypto underliers with reasonably liquid listed options. To handle further liquidity and execution quality, we **spread across tenors** (ON and weekly) so protection rolls in a ladder rather than all at once. Day to day, the sleeve behaves as intended: in quiet markets it bleeds a small, controlled amount (the net debit after selling the lower strike), while in sharp selloffs it **pays nonlinearly** and helps offset losses from long-only beta and other negatively skewed exposures. Figure 6 illustrates the performance of the strategy and table 1 gives details of its performance.

Few trading outcome:

- Performance highlights: strong compounding in 2021–2022 (e.g., +101% in 2021, +128% in 2022) with limited drawdowns (as low as 1% in 2022).
- Downside-sensitive efficiency: High Sortino ratios (e.g., 11.1 in 2022) indicate resilience in adverse markets.
- Portfolio role: Diversifier that tends to thrive when traditional beta underperforms (works best with LO strategy).

Performance

Figure 6 below illustrates our three medium frequency strategies. In orange we have our unbiased LS strategy. In blue we have our Long Only optimized basket and in green we have our Positive Skew strategy. In red we have the sum of the three strategies.

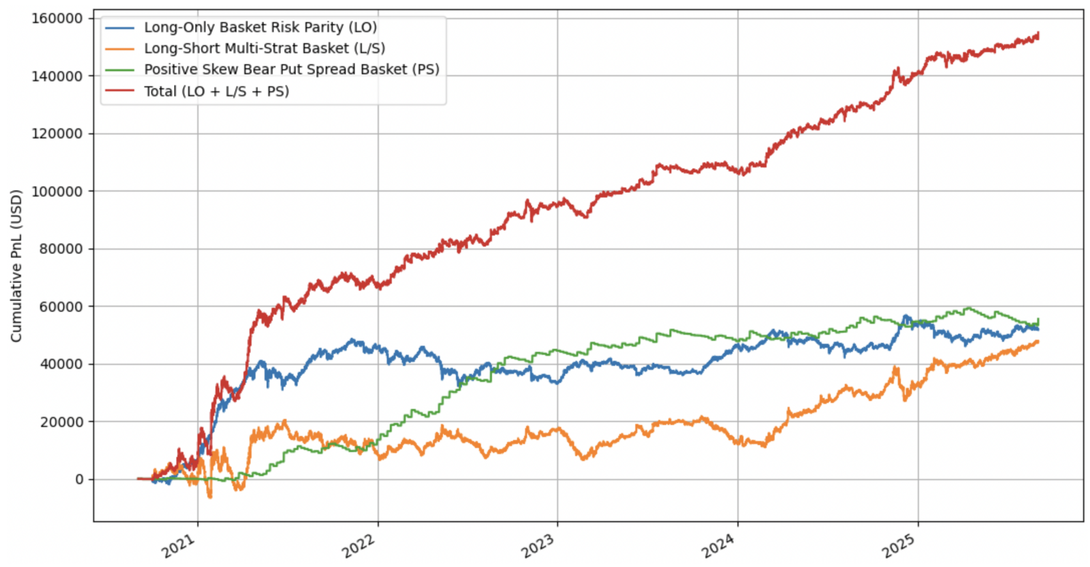

Figure 6: Cumulative P&L of strategies: LO in blue, PS in green & LS in orange, as well as their combination (in red).

Further evidence of the diversification benefits from including LO and PS in the same portfolio can be examined from table 1. For instance, in 2020, the PS Sharpe is low at 0.1 but compensated by the LO strategy at a Sharpe of 2.3. Reversely the LO strategy does poorly in 2022 with a Sharpe of -1.2 but this is largely compensated by the PS sharpe at 3.2. There are no examples of years in which both strategies are doing poorly at the same time but there is an example of a year in which both strategies did superbly well (see 2021). Another important point to note is that most of the volatility in the sharpe ratio is explained by the upward moves. The way to see this is to note that $Sortino \approx \sqrt{2} \times Sharpe$ which would bring the expected Sortino ratio to 3.1 with a sharpe of 2.2. However we find 3.4 supporting that the sharpe ratio, at 2.2, undervalues the quality of the strategy.

Table 1: Calendar-Year Metrics by Strategy (incl. Averages): Return, Max Drawdown, Sharpe, Sortino, MAR

Year	Strategy	Total Return	Max Drawdown	Sharpe	Sortino	MAR
2020	LS	-4%	-19%	-0.3	-0.5	-0.2
	LO	46%	-18%	2.3	2.4	2.6
	PS	0%	-1%	0.1	0.0	0.1
	Total	5%	-7%	1.4	1.9	0.7
2021	LS	16%	-32%	0.5	0.9	0.5
	LO	745%	-55%	2.7	3.1	13.5
	PS	34%	-6%	2.1	0.9	6.1
	Total	83%	-9%	3.2	5.2	9.0
2022	LS	20%	-26%	0.8	1.3	0.8
	LO	-65%	-68%	-1.2	-1.4	-1.0
	PS	94%	-5%	3.2	2.1	18.9
	Total	30%	-8%	2.0	3.6	4.0
2023	LS	-13%	-25%	-0.5	-0.8	-0.5
	LO	109%	-35%	1.8	2.0	3.1
	PS	7%	-8%	0.5	0.3	0.8
	Total	12%	-7%	1.2	2.1	1.7
2024	LS	62%	-26%	1.9	2.8	2.3
	LO	34%	-51%	0.8	0.9	0.7
	PS	15%	-7%	1.1	0.5	2.1
	Total	41%	-6%	3.2	4.8	6.6
2025*	LS	41%	-12%	2.5	3.7	3.3
	LO	-18%	-49%	-0.2	-0.3	-0.4
	PS	1%	-13%	0.2	0.2	0.1
	Total	15%	-5%	2.0	2.8	2.8
Average across years 2020–2025	LS	20%	-23%	0.8	1.2	1.0
	LO	142%	-46%	1.0	1.1	3.1
	PS	25%	-7%	1.2	0.7	4.7
	Total	31%	-7%	2.2	3.4	4.1

* 2025 is year-to-date.

Table 2, provides a summary of our monthly returns with a vol target such that the drawdow remains below 10%. We can observe exceptional returns especially in 2021 which was a great year for cryptocurrencies but we can also see positive return in 2023 which was a bad year for cryptocurrencies. So the strategy captures the upside while being responsible on the downside.

Table 2: Monthly returns for the combined strategy

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2020									0%	3%	6%	-4%	5%
2021	19%	8%	-1%	25%	2%	5%	0%	5%	0%	2%	-2%	0%	83%
2022	3%	7%	-1%	3%	3%	-2%	1%	3%	7%	4%	-1%	-1%	30%
2023	0%	-4%	7%	1%	2%	1%	6%	0%	-2%	3%	0%	-3%	12%
2024	3%	3%	5%	2%	2%	2%	4%	1%	0%	5%	5%	2%	41%
2025	5%	-1%	0%	2%	2%	1%	2%	1%	2%				15%

2025 is year-to-date.

Below few additional related thoughts:

- **Diversification:** PS hedges bearish scenarios; LS sources relative-value alpha; LO scales beta in favorable trends.
- **Improved risk-adjusted returns:** Historically smoother compounding with higher Sharpe/Sortino and reduced drawdowns versus any strategy in isolation.
- **Cycle robustness:** Captures rallies (LO), monetizes dislocations (LS), and protects tails (PS) for an all-weather profile.
- **Benchmark excess return:** combined strategy obliterates the industry benchmark (see figure 7).

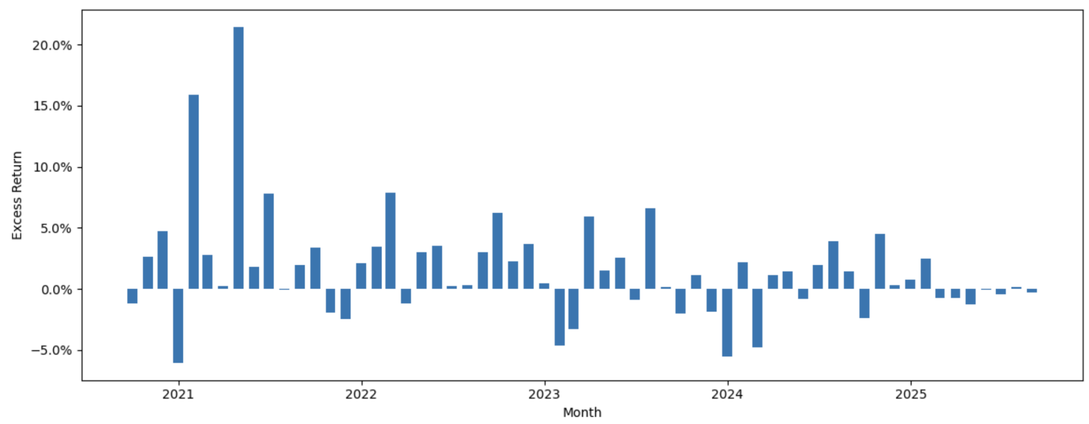

Figure 7: Illustration of our excess return when compared to the NilssonHedge Crypto Market Neutral hedge fund index.

About us

Elite Quantitative Research Consulting, rebranded into EQRC in 2025, is Dr. Mahdavi-Damghani's limited company, founded in 2014 for quantitative finance consulting. In recent years, EQRC has focused on incubating proprietary trading strategies and partnering with selected non-exclusive allocators (e.g., Geneva Trading Asset Management, Nickel Digital Asset Management). We reinvest a meaningful share of profits into R&D, with a core emphasis on QIS and complementary, high-impact fintech AI initiatives.

Team

Dr. **Babak Mahdavi-Damghani** (BMD), is the portfolio manager of the advertised team. He completed his PhD in Machine Learning for Quantitative Finance at the University of Oxford. He has a broad range of work experiences in the financial industry notably having worked for Citigroup, Socgen, GAM Systematic, Credit Suisse, Andurand Capital and the LSEG. He is the author of publications including mathematical models currently taught at the CQF: his CV.

The **quant team** (QT), is selected through a rigorous process involving, technical expertise and integrity. All the members of the QT have postgraduate diplomas from top tier Universities. The requirements are a specialised MSc in Quantitative Finance or a PhD in a Quantitative field with relevant work experience.

Fees and rationale to invest

We pair technical depth with institutional execution. Historically we operated on a 2&20 (2% management and 20% performance fees) model but also on a 1&30 to a 0&50 performance fees depending on the strategy. Our commitment is to deliver durable, risk-adjusted returns, supported by transparent process and ongoing R&D.

Disclaimer

In order to abide by the regulations laid out by the SEC & FCA, we take this opportunity to remind the reader, that although done in good faith, this document cannot be interpreted as financial advice and that historical returns are not a reliable measure of future performance.

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