

# HSCI Cross-Sectional Factor Research (Trend / Volatility / Liquidity)

**Universe:** HSCI constituents with eligibility filters (point-in-time):

- Market cap > **HKD 1bn** (approximated)
- 1-month average price > **HKD 1**
- Stock is in **HSCI universe** at the time

Unavailable / suspended / missing-data stocks are treated as **non-tradable** and excluded. “Unknown sector” names are primarily suspended stocks and therefore are typically excluded by the tradability filter.

**Objective:** Pure **alpha research** on Hong Kong equities via cross-sectional signals. No stop loss, no additional risk management overlays, and no explicit exposure constraints beyond the eligibility screen.

## 1) Data & Sources

- **OHLCV, Market Cap (approximated), Sector:** `yfinance`
- **HSCI component history (point-in-time membership):** Hang Seng Index website data
- **Note on market cap:** used as an **approximated** proxy for size; all size-related eligibility and neutralisation are interpreted under this approximation.

## 2) Portfolio Construction & Backtest Setup

- **Signal type:** cross-sectional ranking signals (three factor directions)
- **Rebalance / holding:** every **20 trading days** (monthly cadence), `entry_mode = next_close`
- **Long/Short construction:** **Long best 10% / Short worst 10%** (equal-weight within legs unless otherwise specified by implementation)
- **Costs:** trading fees included (per your backtest cost model)
- **Benchmark:** `^HSI` (Hang Seng Index)

## 3) Factor Directions (Formula Withheld)

To keep this report publicly shareable, the exact factor formulae are withheld. Factor directions align with common implementations described in **CICC Quant Handbook (HK)**:

1. **Trend (price trend):** captures the strength/stability of price trend formation.
2. **Volatility (high–low volatility structure):** captures volatility regime/structure differences derived from high–low dynamics.

3. **Liquidity (Amihud proxy)**: captures price-impact / liquidity characteristics consistent with Amihud-style illiquidity measures.

## 4) Neutralisation Framework (Sector + Size)

To separate “pure stock selection” effects from structural exposures, each signal is evaluated in two forms:

- **Unneutralised (Raw)**: original signal score.
- **Neutralised**: residual after controlling for:
  - **Sector effects** (industry neutralisation)
  - **Size effects** using **ln(approximated market cap)** as the size proxy

**Verification of neutralisation:**

- Per-date **Pearson corr(residual, ln(mcap))  $\approx 0$**  (linear orthogonality achieved)
- Per-sector **mean(residual)  $\approx 0$**  (sector neutrality achieved)

*Note*: rank-based correlations (e.g., Spearman) can remain non-zero even after linear neutralisation; this is expected and does not invalidate the neutralisation.

## 5) Empirical Results (Raw vs Neutralised)

### 5.1 Summary of performance

Using the fixed portfolio rule (L/S 10–10, monthly rebalance, costs included), the study finds:

- **Trend** and **Volatility** exhibit strong performance in the **raw** form.  
After **sector+size neutralisation**, both signals weaken materially but **remain positive** on IC and L/S performance, indicating:
  - a meaningful portion of the raw edge comes from **sector/size structure**, and
  - a remaining portion reflects **residual stock-selection information** within sector/size controls.
- **Liquidity (Amihud proxy)** shows positive raw performance, but **neutralised performance deteriorates sharply**:
  - neutralised IC becomes close to zero and L/S edge reduces substantially, suggesting the liquidity signal is primarily driven by **sector/size-linked structural effects** rather than independent residual alpha. In practice, this factor is more defensible as a **tradability/constraint** input (or risk proxy) than as a standalone neutralised alpha driver.

### 5.2 Raw vs Neutralised interpretation

- **Raw results** represent “total effect” (alpha + sector/size tilts embedded in the signal).
- **Neutralised results** represent a cleaner estimate of **residual alpha** (industry/size-controlled stock selection).

This distinction is important for model design:

- If the goal is a **pure stock-selection alpha** engine, neutralised variants are the appropriate inputs.
- If the goal is a **return-seeking portfolio** where structural tilts are acceptable, raw variants may be used, but should be paired with explicit exposure constraints in later stages.

## 6) Drawdowns & Regime Notes (Key Episodes: 2012 and 2022)

### 2012: early-history coverage / tradability constraints

A major drawdown occurs around **2012**, which coincides with the early period of the HSCI history:

- HSCI coverage in early years (from ~2008) contains **fewer constituents (~200+)** and a higher fraction of **non-tradable / suspended** names.
- This reduces the effective cross-sectional breadth and can amplify concentration and estimation noise, contributing to weaker and less stable performance.

### 2022: HK risk-off shock, policy + macro stress, liquidity deterioration

Another major drawdown occurs in **2022**, a period marked by:

- heightened policy pressure on major internet platform firms,
- property-sector stress and broader macro uncertainty,
- elevated geopolitical tensions (e.g., Russia–Ukraine conflict) with energy-price shocks,
- and a pronounced deterioration in Hong Kong risk sentiment and liquidity conditions.

These conditions can increase cross-asset and intra-market correlations, compress dispersion, and reduce the effectiveness of cross-sectional L/S strategies—particularly when liquidity worsens and crowding/forced de-risking dominates price action.

## 7) Conclusions

1. **Trend and Volatility** are the strongest and most robust directions in this study.  
Even after sector+size neutralisation, they retain meaningful residual alpha, though the edge is materially smaller than in raw form.
2. **Liquidity (Amihud proxy)** appears largely explained by sector/size structure under the approximated market-cap proxy; the neutralised signal carries limited residual predictive power.
3. The **raw vs neutralised** comparison provides a clear decomposition:
  - Raw performance = residual alpha + structural exposure effects
  - Neutralised performance = cleaner residual alpha estimate
4. The dominant drawdowns in **2012** and **2022** are consistent with (i) early-sample breadth and tradability constraints and (ii) major HK risk-off and liquidity-stress regimes.

# Appendix: Figures & Tables Included

## Figures

Figure 1 — Trend (Raw vs Neutralised): Equity Curve (L/S)

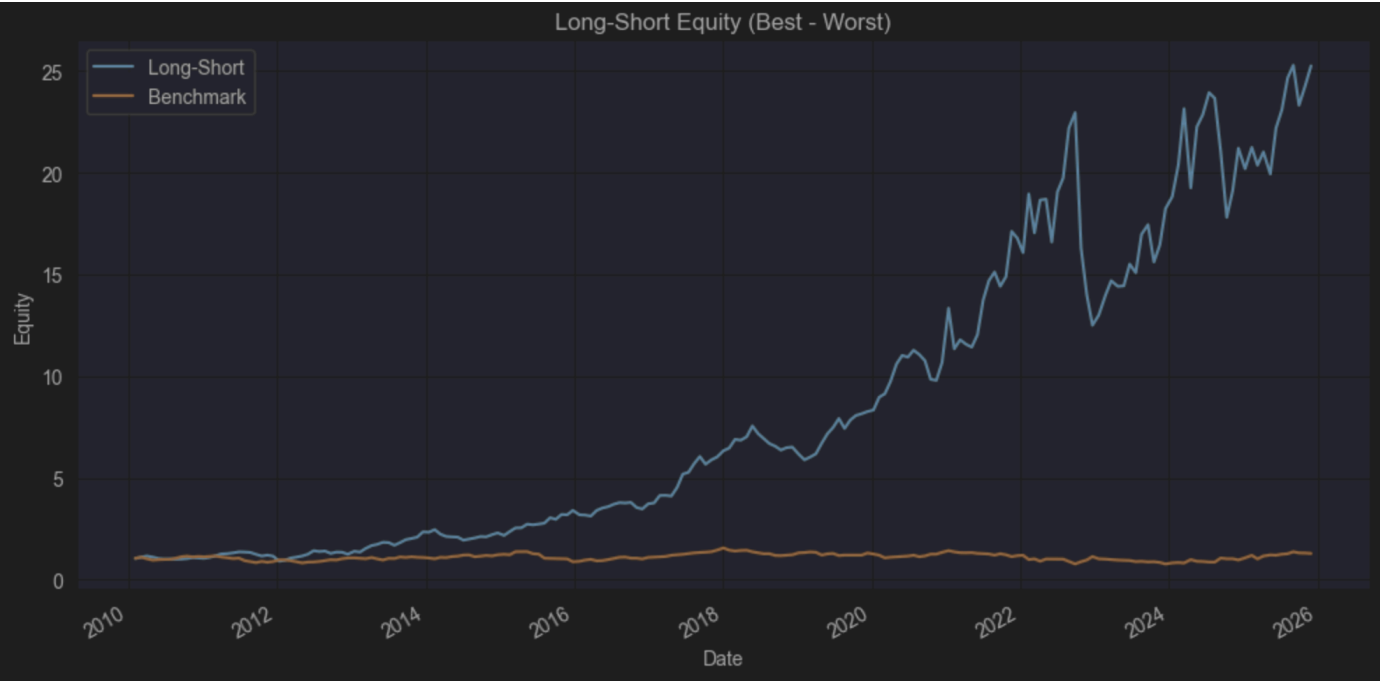


Figure 2 — Volatility (Raw vs Neutralised): Equity Curve (L/S)



Figure 3 — Liquidity (Raw vs Neutralised): Equity Curve (L/S)



Figure 4 — Drawdown Comparison: Neutralised Trend & Vol vs ^HSI

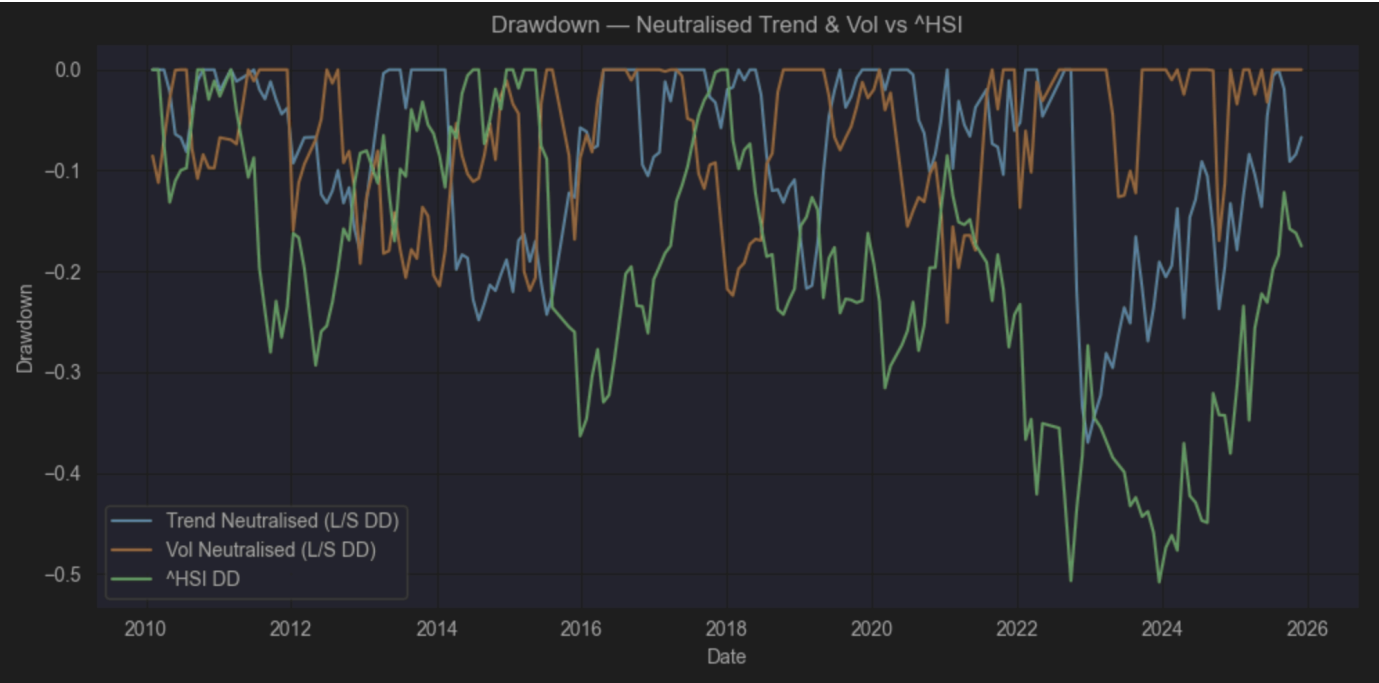


Figure 5 — Trend Signal: Bucket Equity (Deciles)

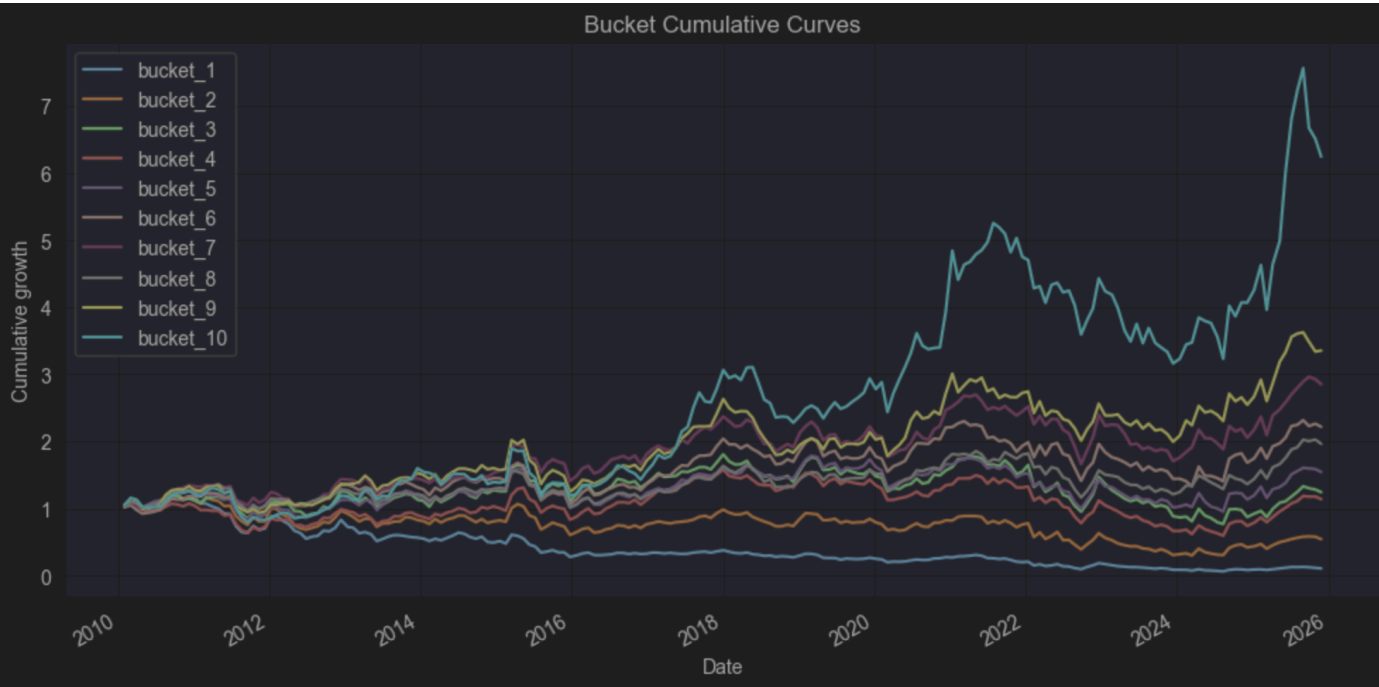


Figure 6 — Trend Signal: Bucket Monotonicity

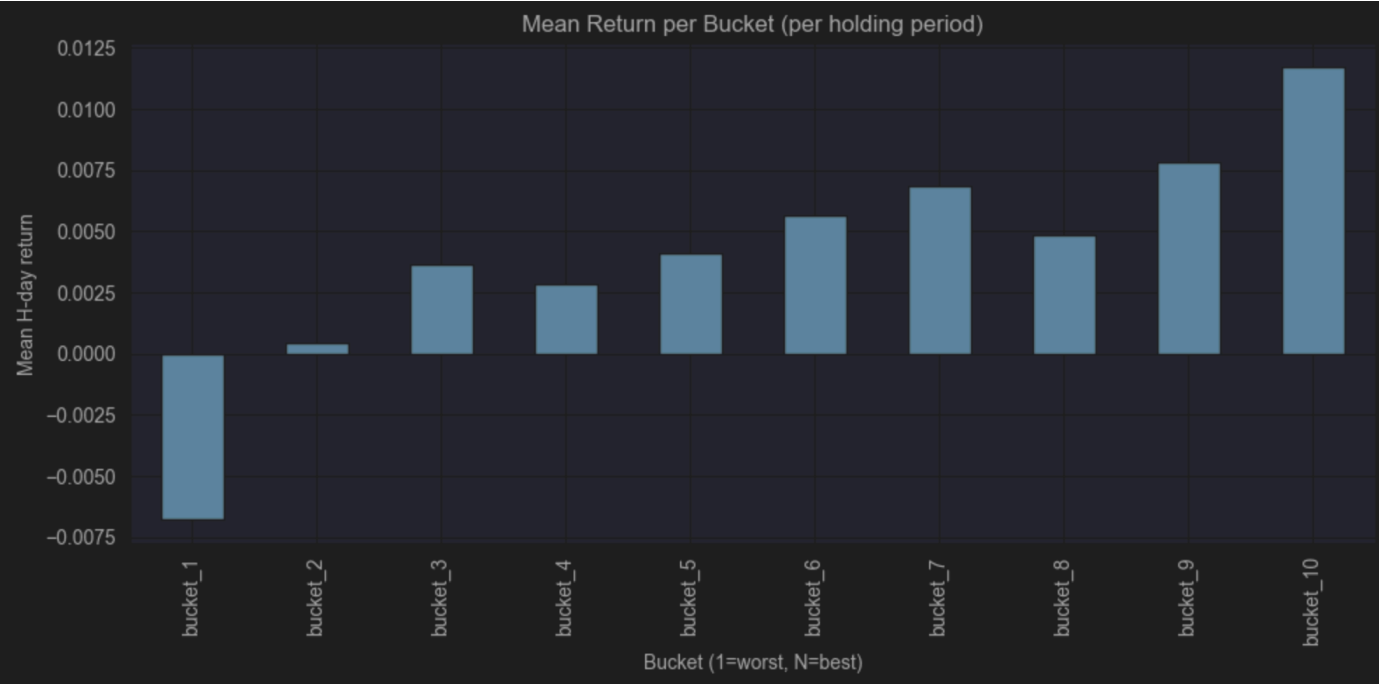


Figure 7 — Trend Signal: Cumulative IC



Figure 8 — Trend Signal: Yearly Returns

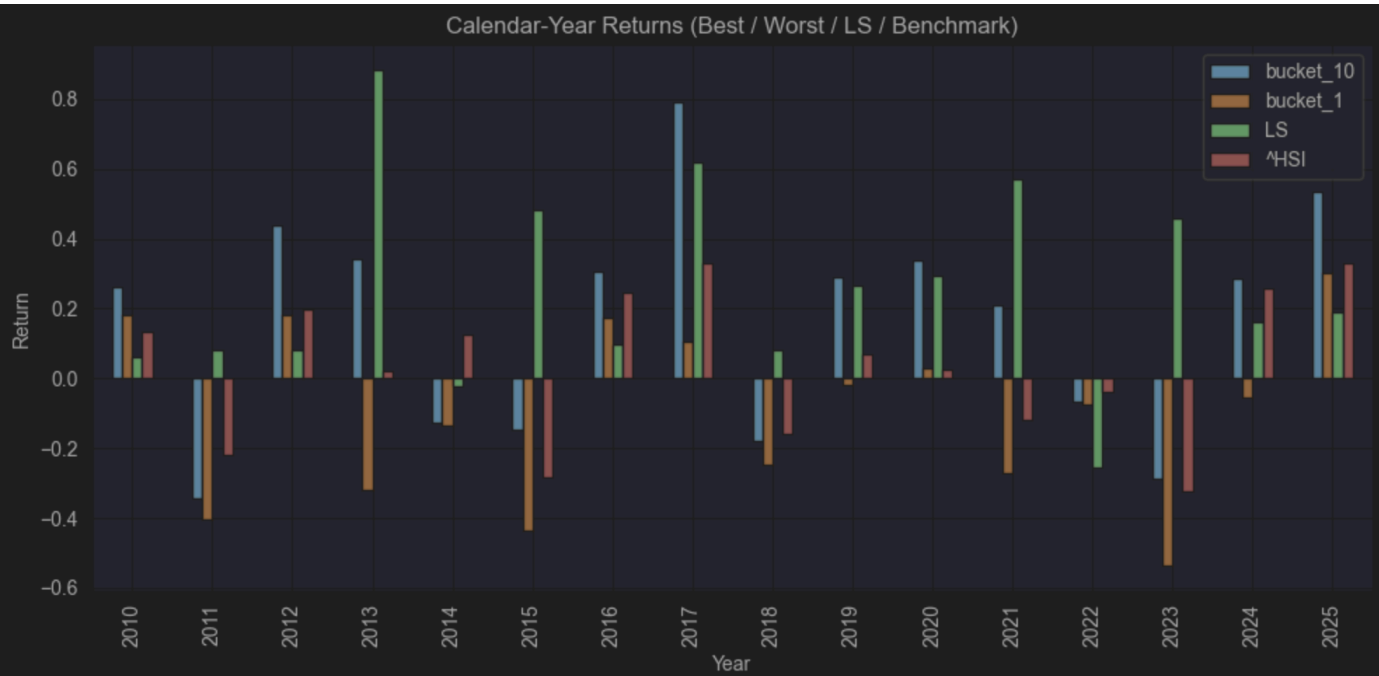


Table 1: Summary statistics (IC metrics + L/S performance + benchmark performance)

Series	IC Mean	ICIR	L/S Ann Return	L/S Ann Vol	L/S Sharpe	L/S Max DD
Liquidity Raw (L/S)	0.0295	0.252	12.96	14.33	0.925	-30.80
Liquidity Neutralised (L/S)	0.0013	0.013	7.87	14.91	0.584	-30.82
Trend Raw (L/S)	0.0677	0.481	22.19	24.92	0.938	-45.54

Series	IC Mean	ICIR	L/S Ann Return	L/S Ann Vol	L/S Sharpe	L/S Max DD
Trend Neutralised (L/S)	0.0333	0.257	13.20	18.72	0.760	-36.98
Vol Raw (L/S)	0.0774	0.528	20.54	25.70	0.863	-37.37
Vol Neutralised (L/S)	0.0384	0.275	14.45	19.89	0.781	-25.08

**Table 2:** Drawdown event summary for 2012 and 2022

Series	Year	Max Drawdown	Start	Trough	Recovery	Days to Recovery
Trend Neutralised (L/S)	2012	-18.06	2011-06-27	2012-12-13	2013-05-07	680
Vol Neutralised (L/S)	2012	-19.23	2012-08-23	2012-12-13	2015-07-09	1050
^HSI Benchmark	2012	-29.32	2011-03-04	2012-05-03	2014-07-04	1218
Trend Neutralised (L/S)	2022	-36.98	2022-09-26	2022-12-20	2025-08-05	1044
Vol Neutralised (L/S)	2022	-13.69	2021-12-16	2022-01-13	2022-07-01	197
^HSI Benchmark	2022	-50.69	2018-01-02	2022-09-26	—	—