Cointegration Z-score

Preprocessing

Johansen Cointegration Test : (Ideal lag = 1)

Hypothesis	Eigenvalue	Trace Statistic	Critical Value (Trace)	Max Eigenvalue Statistic	Critical Value (Max Eigenvalue)	Decision (Trace)	Decision (Max Eigenvalue)
H0	0.005376	7.714844	10.4741	7.040206	12.3212	Fail to Reject	Fail to Reject
H1	0.000516	0.674638	2.9762	0.674638	4.1296	Fail to Reject	Fail to Reject

** IF Trace Statistic > Critical Value AND Max Eigenvalue > Critical Value then Reject Null of at most r cointegrating relationships.(r=0 in first test)

ADF Test Results

Ticker	ADF Statistic	p-value	Critical Value (1%)	Critical Value (5%)	Critical Value (10%)	Stationarity
spread	-2.800209	0.058244	-3.435367	-2.863756	-2.56795	Non-Stationary

** IF p-value < 0.05 and/or statistic < statistic @ confidence interval, then REJECT the Null that the time series posses a unit root (non-stationary).

Phillips Perron Results

Ticker	PP Statistic	p-value	Critical Value (1%%)	Critical Value (5%%)	Critical Value (10%%)	Stationarity
spread	-2.792619	0.059336	-3.435367	-2.863756	-2.56795	Non-Stationary

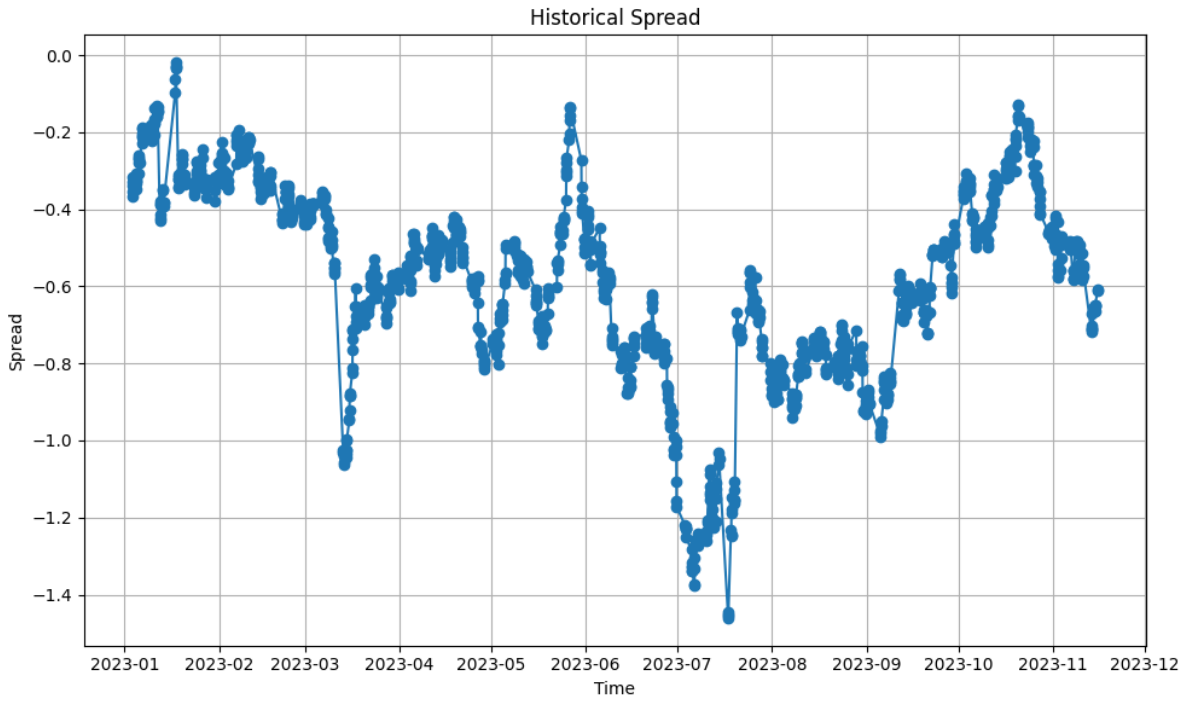
** IF p-value < 0.05, then REJECT the Null Hypothesis of a unit root (non-stationary time series).

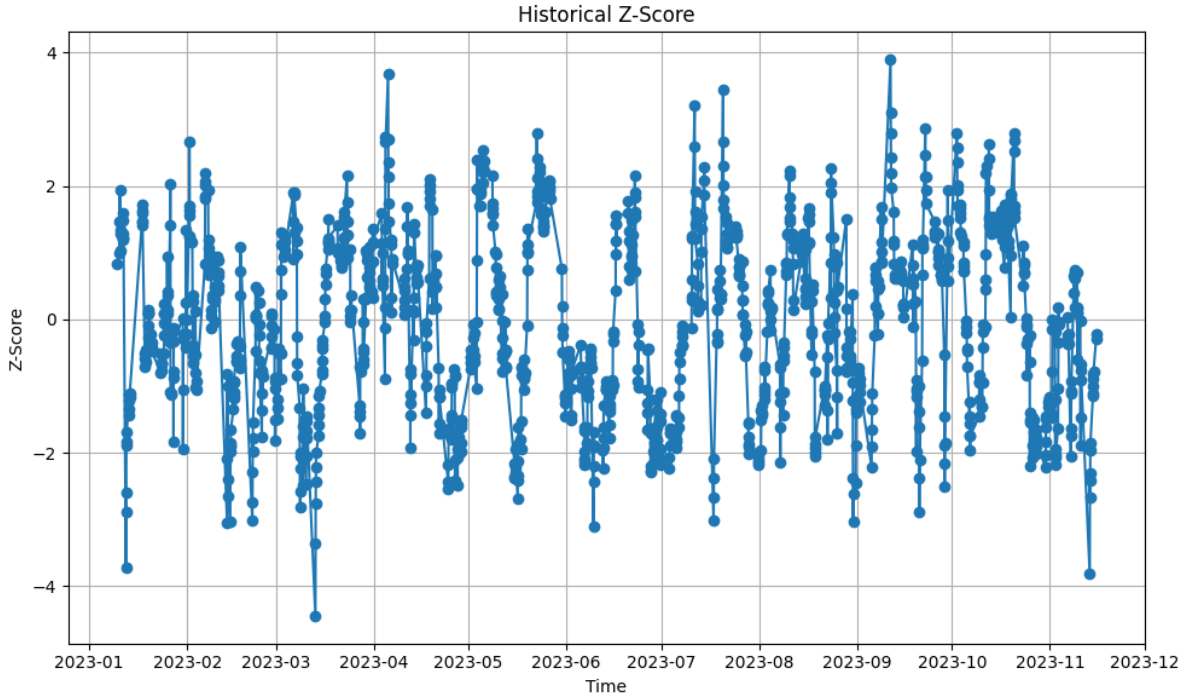
Cointegration Vector

	HE.n.0	ZC.n.0
cointegration vector	11.571898	-8.052704
standardized vector	-1.437020	1.000000
hedge ratios	-3.000000	2.000000

Spread Statistics

Half-life	Hurst Exponent
0.978197	59.097051

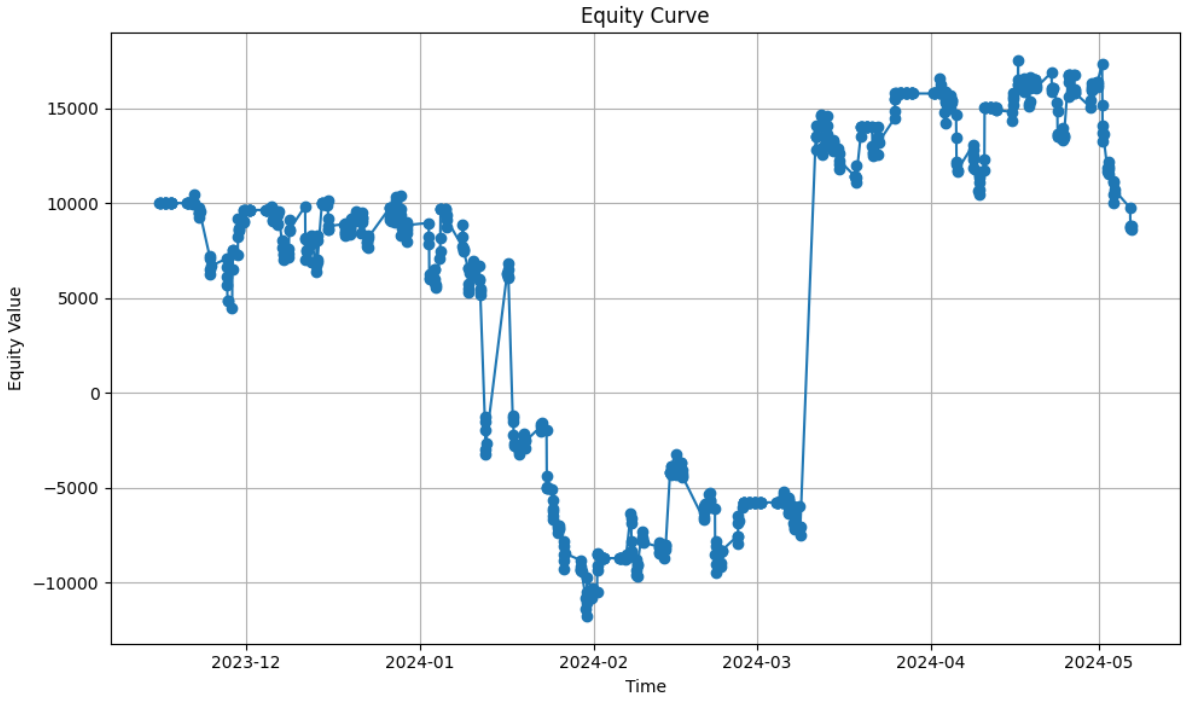


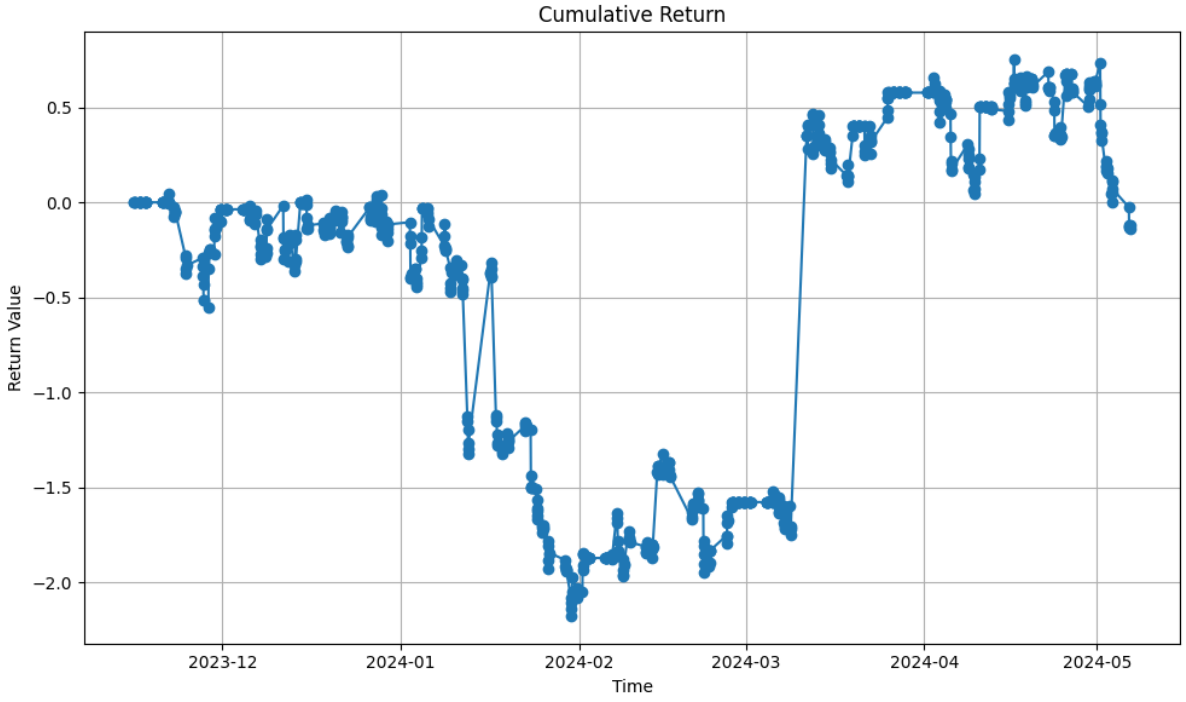


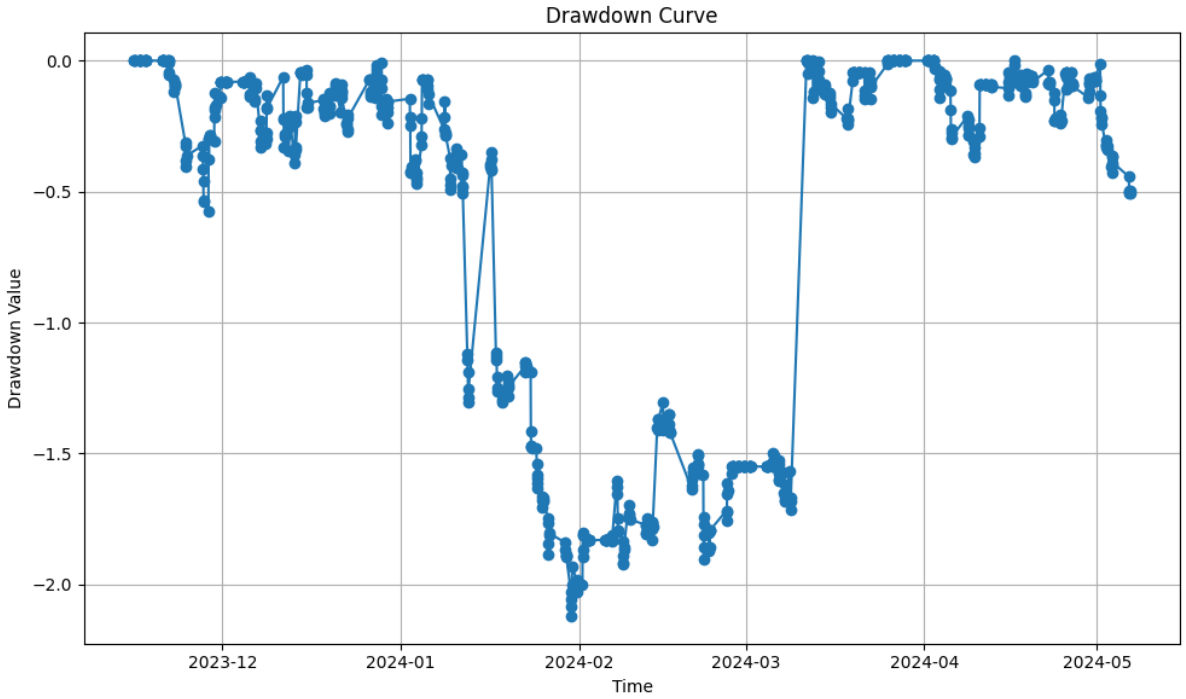
Performance Metrics

Summary Stats

	Value
annual_standard_deviation	3.2644
sharpe_ratio	-0.5325
max_drawdown	-2.1202
sortino_ratio	-0.0234
ending_equity	8770.0000


Equity Curve
Equity Value
15000
10000
5000
0
−5000
−10000
2023-12
2024-01
2024-02
2024-03
2024-04
2024-05
Time


Cumulative Return
Return Value
0.5
0.0
−0.5
−1.0
−1.5
−2.0
2023-12
2024-01
2024-02
2024-03
2024-04
2024-05
Time



Regression Analysis

OLS Regression Results

Dep. Variable:	equity_value	**R-squared:**	0.002
Model:	OLS	**Adj. R-squared:**	-0.007
Method:	Least Squares	**F-statistic:**	0.2192
Date:	Sat, 25 May 2024	**Prob (F-statistic):**	0.641
Time:	12:21:12	**Log-Likelihood:**	-86.773
No. Observations:	117	**AIC:**	177.5
Df Residuals:	115	**BIC:**	183.1
Df Model:	1		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P>|t|**	**[0.025**	**0.975]**
const	-0.0648	0.048	-1.348	0.180	-0.160	0.030
close	3.1907	6.814	0.468	0.641	-10.307	16.689

Omnibus:	127.025	**Durbin-Watson:**	1.367
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	2802.672
Skew:	-3.657	**Prob(JB):**	0.00
Kurtosis:	25.834	**Cond. No.**	144.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Regression Validation Results

R-squared	**p-value (const)**	**p-value (close)**	**R-squared above threshold**	**P-values significant**	**Model is valid**
0.001903	0.180443	0.640505	False	False	False

** R-squared should be above the threshold and p-values should be below the threshold for model validity.

Alpha Analysis Results

Alpha (Intercept)	p-value	Confidence Interval Lower Bound(2.5%)	Confidence Interval Upper Bound(97.5%)	Alpha is significant
-0.064817	0.180443	-0.160091	0.030457	False

** Note: For model validity, alpha should be significant (p-value < 0.05), and confidence intervals should not include zero.

Beta Analysis Results

Beta (Slope)	p-value	Confidence Interval Lower Bound(2.5%)	Confidence Interval Upper Bound(97.5%)	Beta is significant
3.190739	0.640505	-10.307356	16.688834	False

** Note: For model validity, beta should be significant (p-value < 0.05), and confidence intervals should not include zero.

zscore volatility Results

Annualized Volatility	Annualized Mean Return	Z-score for 1 SD (annualized)	Z-score for 2 SD (annualized)	Z-score for 3 SD (annualized)
3.264422	-1.700878	-1.521035	-2.521035	-3.521035

** Note: Z-scores provide a statistical measure of the volatility's deviation from its mean, with larger absolute values indicating more significant deviations.

Summary Stats

	Metric	Value
0	Market Contribution	0.003904
1	Idiosyncratic Contribution	-0.064817
2	Total Contribution	-0.060913
3	Market Volatility	0.022276
4	Idiosyncratic Volatility	0.510179
5	Total Volatility	0.510665
6	Sharpe Ratio	-0.532900
7	Portfolio Dollar Beta	27982.781348
8	Market Hedge NMV	-27982.781348
9	Beta	3.190739