BACKTESTING REPORT

Statistical Arbitrage

03/04/2024

1 Objective and Constraint

Capital Size	10B
Return Objective	Medium
Liquidity needs	Low
Time Horizon	Medium
Other Specific Constraint	N/A

2 Trading Algorithm

Algorithm Name	Statistical Arbitrage
Target Market	Future and Stock
Decision-making schedule	Daily

3 Backtesting Assumption

Liquidity	Full
Price slippage	N/A
Market impact	N/A
Simulated fill price	N/A
Transaction fee and taxes	.23 point/ .23%
Sales proceeds advance	Yes

4 Backtesting Performance Evaluation

Time Period	In-Sample 08-2021-12/2023		Out-of-Sample 01/2024-12/2024
	Initial Parameters	Optimal Parameters	Optimal Parameters

In-Sample — Initial Parameters

```json
{
    "estimation_window": 60,
    "min_trading_days": 30,
    "max_clusters": 10,
    "top_stocks": 6,
    "tier": 1,
    "first_allocation": 0.4,
    "adding_allocation": 0.4,
    "correlation_threshold": 0.6
}
```

YEAR	2021	2022	2023
YEARLY	4.2%	-25.11%	-0.12%
JAN	n.a%	-1.27%	0.23%
FEB	n.a%	-1.02%	-2.53%
MAR	n.a%	-3.31%	2.90%
APR	n.a%	-6.48%	-0.11%
MAY	n.a%	-6.66%	2.89%
JUN	n.a%	-0.57%	-0.0%
JUL	n.a%	0.77%	-0.07%
AUG	0.00%	-0.00%	0.00%
SEP	0.36%	-4.47%	-4.55%
OCT	1.28%	-5.13%	-5.32%
NOV	1.55%	0.00%	5.42%
DEC	-0.96%	0.00%	1.54%

In-Sample — Optimal Parameters

```json
{
    "estimation_window": 50,
    "min_trading_days": 25,
    "max_clusters": 10,
    "top_stocks": 3,
    "tier": 1,
    "first_allocation": 0.4,
    "adding_allocation": 0.2,
    "correlation_threshold": 0.6
}
```

YEAR	2021	2022	2023
YEARLY	-2.2%	-4.4%	5.05%
JAN	n.a%	-0.63%	3.36%
FEB	n.a%	1.33%	-0.27%
MAR	n.a%	1.64%	3.02%
APR	n.a%	-4.04%	-1.53%
MAY	n.a%	-0.2%	-0.2%
JUN	n.a%	3.29%	2.27%
JUL	n.a%	0.35%	0.38%
AUG	-3.03%	-0.00%	1.14%
SEP	-0.28%	-3.58%	-3.19%
OCT	1.14%	-2.41%	0.00%
NOV	0.00%	0.00%	-0.31%
DEC	0.00%	0.00%	0.47%

Out-of-Sample — Optimal Parameters

```json
{
    "estimation_window": 50,
    "min_trading_days": 25,
    "max_clusters": 10,
    "top_stocks": 3,
    "tier": 1,
    "first_allocation": 0.4,
    "adding_allocation": 0.2,
    "correlation_threshold": 0.6
}
```

YEAR	2023	2024
YEARLY	0.00%	15.31%
JAN	0.00%	3.81%
FEB	0.00%	9.68%
MAR	0.00%	2.11%
APR	0.00%	-1.14%
MAY	0.00%	0.00%
JUN	0.00%	-0.29%
JUL	0.00%	0.38%
AUG	0.00%	0.16%
SEP	0.00%	2.17%
OCT	0.00%	-1.52%
NOV	0.00%	-1.16%
DEC	0.00%	0.63%

Time Period	In-Sample < 08/2022-12/2023>			Out-of-Sample <01/2024-12/2024>	
	Initial Parameters		Optimal Parameters	Optimal Parameters	
	Portfolio	VN30	Portfolio	Portfolio	VN30
Beta	0.24	n.a	0.12	0.22	n.a%
HPR	-22.05%	-20.80%	-1.78%	-1.77%	15.31%
Excess HPR	-1.25%	n/a	22.51%	-3.52%	n/a
Annual Return	-10.15%	-4.24%	-0.75%	-15.37%	18.9%
Annual Excess Return	-0.62%	n/a	10.26%	-3.54%	n/a
Maximum Drawdown	30.27%	42.46%	8.1%	4.32%	8.38%
Longest Drawdown	468	472	422	116	71
Turnover Ratio	6.35%	n/a	7.53%	10.87%	n/a
Sharpe Ratio	-1.53	-0.65	-0.86	1.47	0.97
Sortino Ratio	-0.9	-0.54	-0.11	3.28	1.67
Information Ratio	-0.03	n/a	0.51	-0.27	n/a
No. stocks in periods					
No. held stocks in periods					
Excess returns in periods					