Trading Momentum: Max High Breakout with ATR Based Exit

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Strategy Presentation

$$\text{Entry Condition:} \quad O_t > \underbrace{\max_{0 \le k \le t-\Delta} H_k}_{\text{Entry Line}_t}$$

- O_t and H_t are the hour's open and high. We shift max-to-date High at time t by $\Delta = \texttt{shift\_signal}$, a parameter that removes look-ahead bias. We further optimize it later.

$$\text{TR}_t = \max\Big\{ H_t - L_t,\ |H_t - C_{t-1}|,\ |L_t - C_{t-1}| \Big\}$$

$$\text{ATR}_t = \text{mean}^{(W)} \left(\text{TR}_k\right)_{t-\Delta-W \le k < t-\Delta}$$

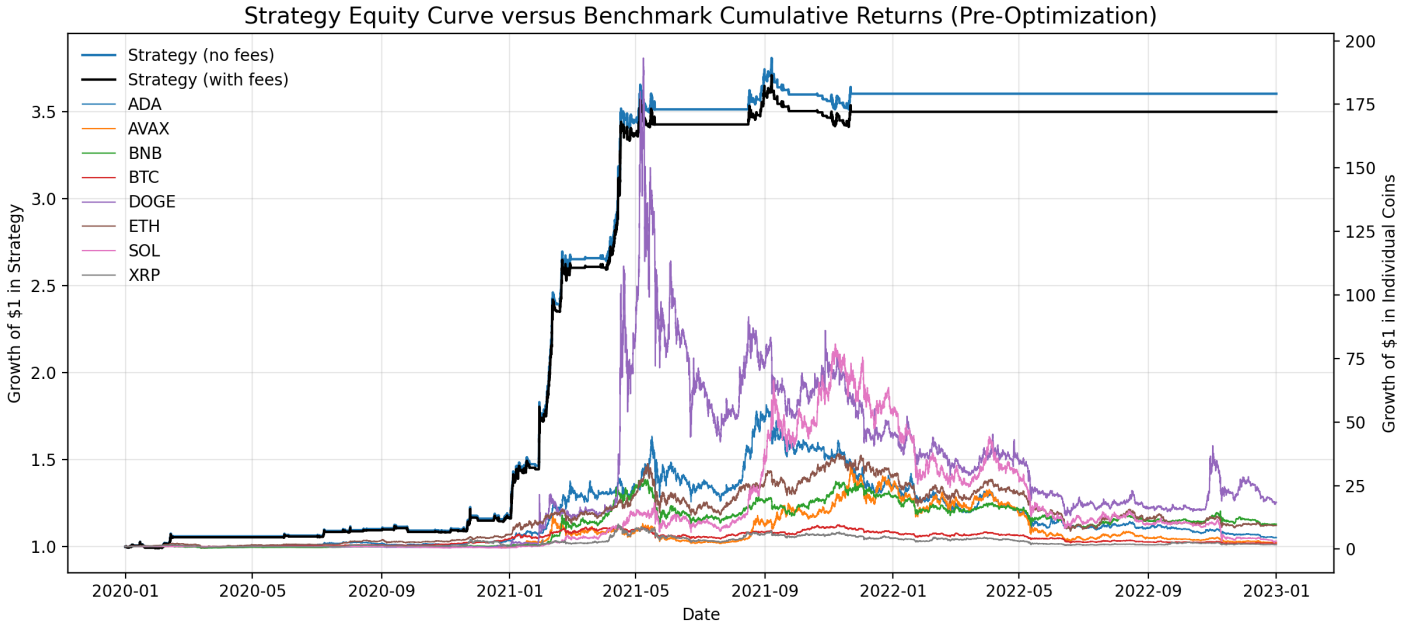
$$\text{Exit Condition:} \quad O_t < \text{Entry Line}_t - \lambda \cdot \text{ATR}_t$$

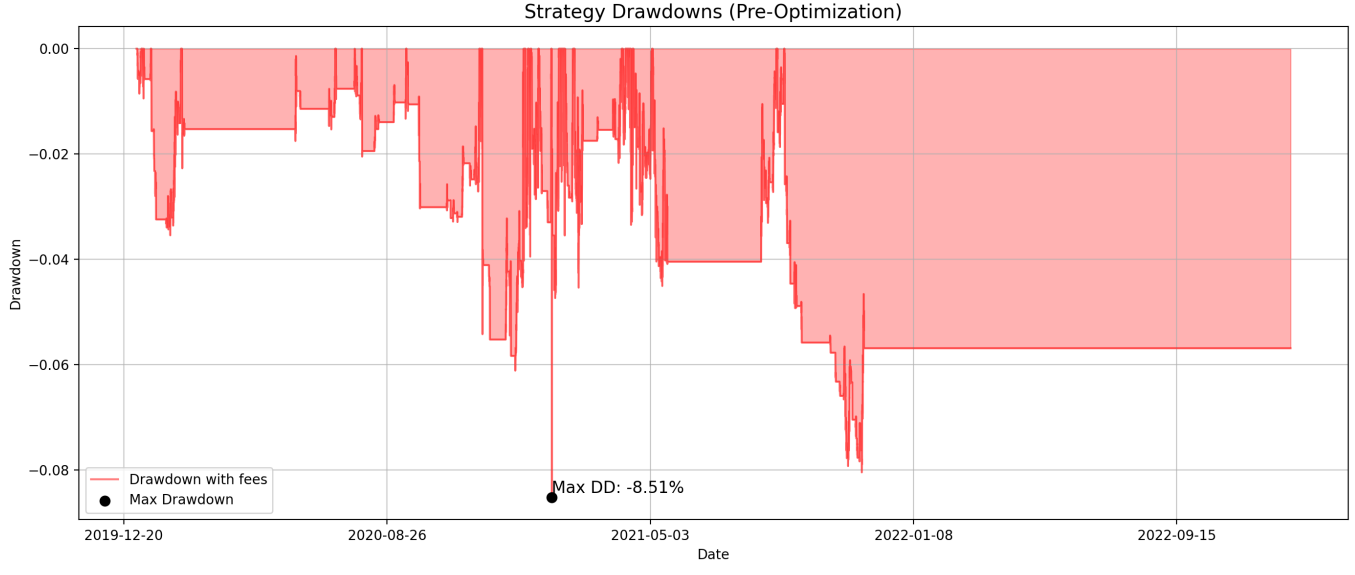
Strategy Parameters

Parameter	Symbol	Value
Window	W	10 periods
ATR Multiplier	λ	1.5
Shift Signal	Δ	10

- Portfolio weight for each active coin: $w_{i,t} = \frac{\text{Signal}_{i,t}}{\#\{\text{active coins}\}}$.

Training Set Performance (1 Jan 2020 - 31 Dec 2022)





Training Set Performance Metrics

Metric	Value
Annualized Return	51%
Annualized Volatility	14%
Sharpe Ratio	2.88
Sortino Ratio	1.5
Maximum Drawdown	-0.08
Average Holding Period	11 periods
Number of Trades	476

Parameter Optimization

Random Search (1000 Simulations)

- Search Range: $W \in [5, 30]$, $\lambda \in [1, 10]$, $\Delta \in [1, 20]$
- Aim: maximise training-set Sharpe Ratio

Trial	W	λ	Δ	Sharpe
1	27	1.8	19	2.85
2	29	1.9	20	2.82
3	26	1.6	20	2.79
4	31	1.5	19	2.78
5	30	1.5	18	2.75

Table 1: Top 5 Configurations

Parameter Optimization

Heat Map

- Search Range: $\lambda \in [1, 10]$, $\Delta \in [2, 20]$
- Aim: maximise training-set Sharpe Ratio

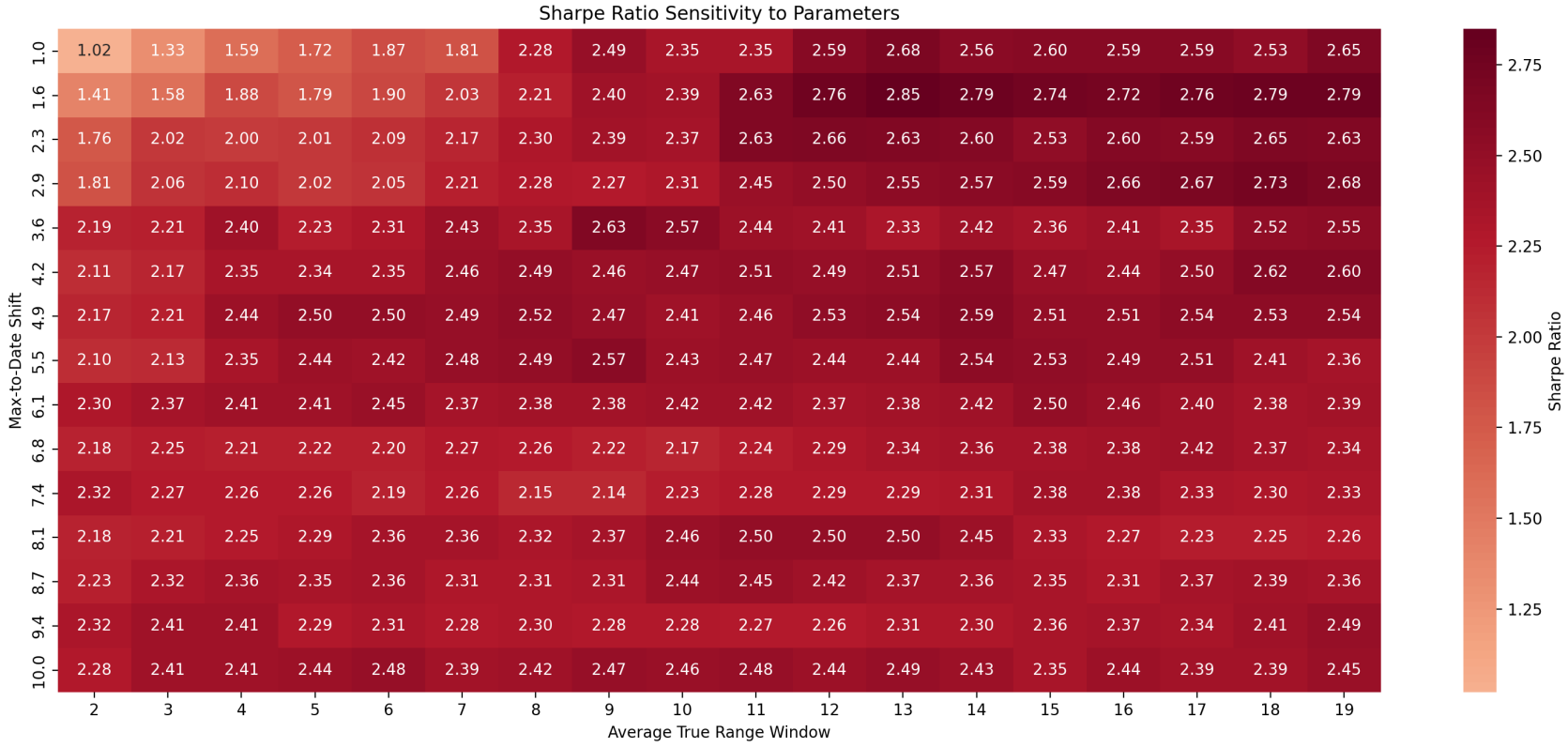


Figure 1: Heat Map: Sharpe Ratio Sensitivity to λ and Δ

Validation Set Performance (1 Jan 2023 - 31 Dec 2023)