



# Long Short Equity Portfolio

# Macro Review



## Federal Reserve's Interest Rate Hikes

Increased borrowing costs,  
reduced consumer spending  
and business investment



## Geopolitical Risks from Constant Wars

Wars disrupts regional  
stability and trade



## China's Economic Challenges

Faltering real estate sector  
and  
92 trillion yuan government debt

# HSI Trend



## 2

## Assumptions

- Tense macro-financial situation will not improve.
- Historical trends are likely to re-emerge.

For future **3**  
months

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## Backtesting

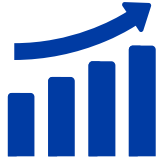
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01

# Introduction

# Portfolio Overview



**Long/Short  
stocks**



**Derivatives**



**Performance  
benchmark**

- \$10,000,000 for stock and \$100,000 for derivatives
- We long and short stocks from HSI and HSCEI
- We take positions in derivatives to protect the portfolio on rainy days
- Our final target performance benchmark is HIBOR + 4%, which is 9.3%



# 02

# Stock Basket

Selection Principles  
Allocation Scheme  
Risk Management  
Implementation

# Static Criteria



- Stocks from **HSI** and **HSCEI**
- Current Market cap larger than **50,000** million
- One year total return larger than **12%**

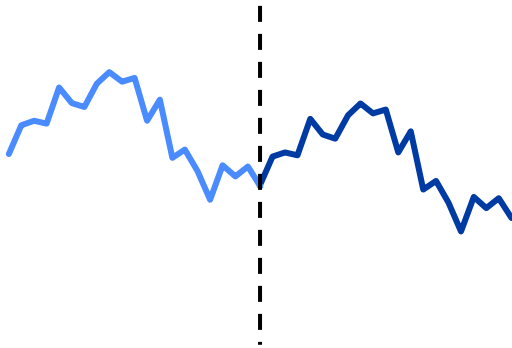


# Dynamic Criteria



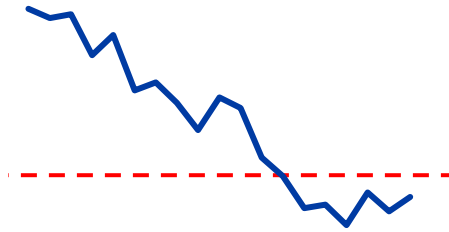
## Key Assumption

1. The historical data can reflect the future trend of the market



## Position Change

1. Mainly depending on the rebalance frequency
2. Extreme case: The stop loss order is exercised



## Portfolio Criteria

1. Use the top influential stocks that can explain at least 75% of the market variance

Methodology: Principal Component Analysis (PCA)

(will be explained in detail later)

# Risk Management

## Risk Management Principle

Diversification

No less than 10 securities

Position Size

Single short no more than 6% NAV  
(warning)  
Single short no more than 10% NAV

Gross Exposure

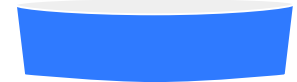
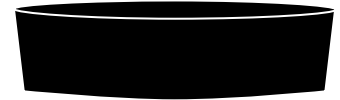
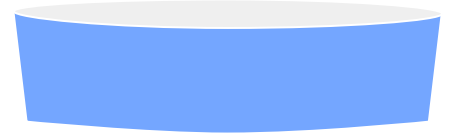
Must between 60% to 400%

Beta

Beta: -15% to 15%

Stop Loss

If the stock falls 15% or more below  
the entry, it will be sold (if no  
protective put)



**How to**  
implement?



# Understand the Procedure



## Data

Bloomberg Screening,  
Yahoo Finance Download



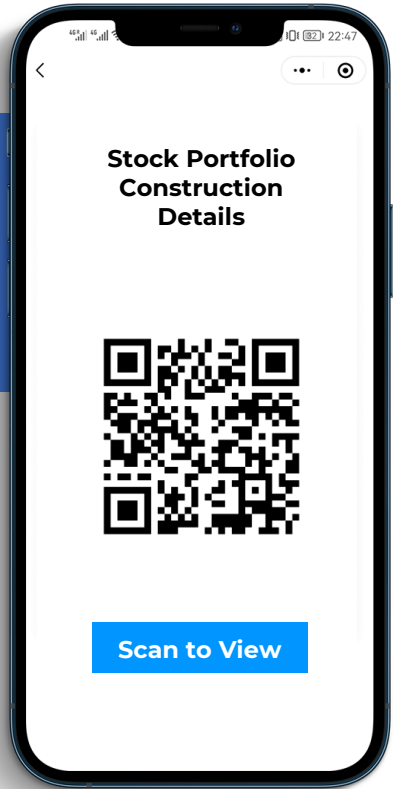
## Selection

Principal Component Analysis,  
Top 10 Influential Stocks



## Allocation

Efficient Frontier,  
Practical Consideration



## Tips

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- **NO** math worries
- **OPTIONAL** python code

# Understand the Procedure



## Data

Bloomberg Screening,  
Yahoo Finance Download



## Selection

Principal Component Analysis,  
Top 10 Influential Stocks



## Allocation

Efficient Frontier,  
Practical Consideration

# Data Overview

**48**  
**Tickers**

Static Criteria

**Bloomberg**

**200+**  
**Days**

Most recent data

**yahoo!**  
finance

# Data Retrieval

## 48 Tickers

Static Criteria

Bloomberg

- EQS<GO> **for Stock Tickers**
- OMON<GO> **for Option Data**
- BQL( ) , BDH( ) **as Bloomberg API**
- Python + **Bloomberg API**

Most recent data

yahoo!  
finance



# Data Retrieval

48

- yfinance as API
- **Retrieve Stock Price**
- **Retrieve HSI Index Price**

Static Criteria

Bloomberg

200+  
Days

Most recent data

yahoo!  
finance

# Understand the Procedure



## Data

Bloomberg Screening,  
Yahoo Finance Download



## Selection

Principal Component Analysis,  
Top 10 Influential Stocks



## Allocation

Efficient Frontier,  
Practical Consideration

# Preprocessing

- Stationary
  - Calculate 1-day log return, i.e.  $\ln \frac{P_t}{P_{t-1}}$
  - Minimize error
- Format input
  - $48 \times 48$  matrix
  -

$$\underbrace{\left\{ \begin{bmatrix} \ln \frac{P_{1,ticker\ i}}{P_{0,ticker\ i}} & \cdots & \ln \frac{P_{1,ticker\ j}}{P_{0,ticker\ j}} \\ \vdots & \ddots & \vdots \\ \ln \frac{P_{48,ticker\ i}}{P_{47,ticker\ i}} & \cdots & \ln \frac{P_{48,ticker\ j}}{P_{47,ticker\ j}} \end{bmatrix} \right\}}_{48\ Tickers}^{48+ \text{ Dates}}$$



How each stock plays a  
role in recent market  
trends.

**Principal Component Analysis (PCA)**

# Stock Selection

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Using PCA as a tool  
For each rebalance period



Top 10 influential stocks  
75% market movements

# Understand the Procedure



## Data

Bloomberg Screening,  
Yahoo Finance Download



## Selection

Principal Component Analysis,  
Top 10 Influential Stocks



## Allocation

Efficient Frontier,  
Practical Consideration



Weights to balance  
between returns  
and variance.

**Efficient Frontier**

# Weight Allocation

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## Efficient Frontier

- Objective:  $\min(\text{Portfolio Variance})$
- Constraints:
  - $\sum_{i \in S_i} w_i = 1$ : Total weight is 1
  - $\mu \geq 40\%$ : Expected return is 40% p.a.
  - $-0.2 \leq w_i \leq 1$ : No more 20% short sell

## Practical Consideration

- Lot size





03

# Derivatives

Hedging Strategy  
Derivatives Selection  
Trading Principles  
Outcomes

# Hedging Strategy

**Overall  
Portfolio**

**Bullish**

Long Position



Protective Put



**Bearish**

Short Position



Protective Call



## Bullish Stock Position

Monthly  
Rebalance

Married Put



Short-term Bullish strategy with high volatility



Protection against drastic depreciation



High transaction costs from frequent rebalance



Focus on the largest portion of the stock portfolio

# Option Selection

## Aug. 1<sup>st</sup>: 0992.HK

Spot Price: \$8.96

Shares: 370,000

Weight: 0.3329

Strike Price: \$9.00

(Nearest to the spot price)

Premium: \$0.5300

Shares: 370,000

Contract Size: 2,000

Contracts: 185

## Sept. 4<sup>th</sup>: 2899.HK

Spot Price: \$12.68

Shares: 472,000

Weight: 0.6090

Strike Price: \$12.50

(Nearest to the spot price)

Premium: \$0.2100

Shares: 472,000

Contract Size: 2,000

Contracts: 236

## Oct. 3<sup>rd</sup>: 0836.HK

Spot Price: \$14.94

Shares: 260,000

Weight: 0.3913

Strike Price: ???

(Nearest to the spot price)

Premium: ???

Shares: 260,000

Contract Size: ???

Contracts: ???

# Hedging Effects

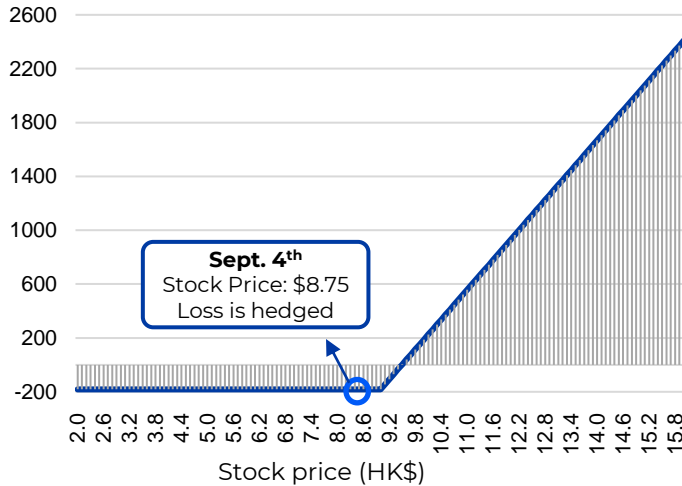
## Under “Rainy” Days



- Stock price goes against our expectation
- Losses are limited to acceptable range

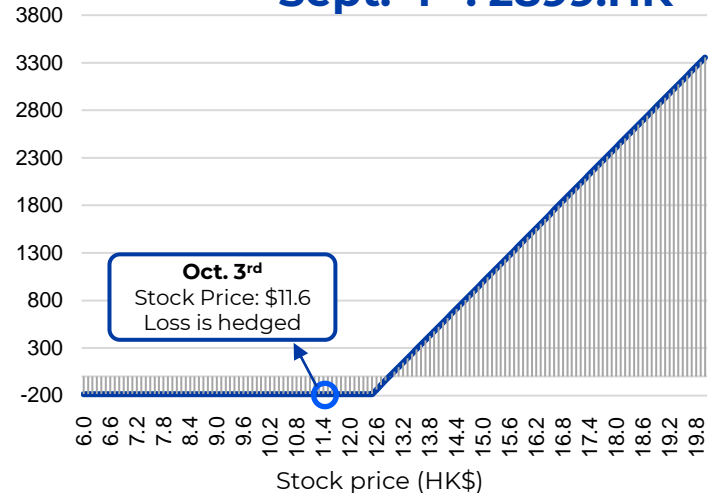
Stock + Option  
P/L (HK\$ 1,000)

**Aug. 1<sup>st</sup>: 0992.HK**



Stock + Option  
P/L (HK\$ 1,000)

**Sept. 4<sup>th</sup>: 2899.HK**



# Hedging Effects

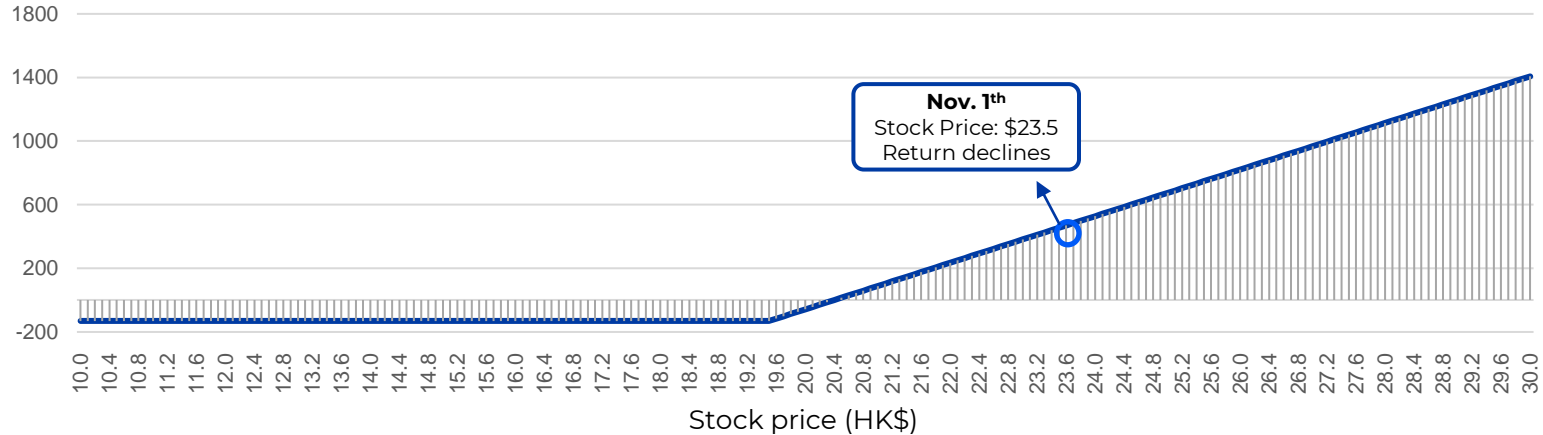
## Under “Sunny” Days



- Stock price goes with our expectation
- While return declines, gains on stock movements are still earned

Stock + Option  
P/L (HK\$ 1,000)

**Oct. 3<sup>rd</sup>: 0981.HK**





04

# Backtesting

Backtesting Set-Up  
Historical Performance  
Risk Management  
Limitation

# Backtesting Set-up

## Fictitious Portfolio

- \$10.1 million HKD long/short equities
- long direction view
- 10 stocks (either long or short) each month by PCA
- Hedge the largest holding with covered calls and protective puts

## Investment Horizon

- Period: 1 Aug – 9 Nov 2023
- Duration: ~3 months (69 trading days)
- Rebalancing frequency: monthly basis

# Portfolio Timeline

Equities Allocation

Options

1/8/2023 - 31/8/2023

As of 1/8/2023

Ticker	Holding	Return
0992.HK	33%	▼ 3%
1810.HK	32%	▲ 1%
9961.HK	23%	▼ 2%
0981.HK	17%	▼ 1%
9988.HK	10%	▼ 8%
9888.HK	0%	▼ 8%
1024.HK	-1%	▼ 7%
2269.HK	-1%	▲ 5%
9868.HK	-4%	▼ 9%
0241.HK	-10%	▼ 16%

**Protective Put** (0992.HK):  
156,000@11.5, 1-month

4/9/2023 - 30/9/2023

As of 4/9/2023

Ticker	Holding	Return
2899.HK	60%	▼ 7%
1099.HK	36%	▼ 1%
9868.HK	32%	▼ 8%
0836.HK	21%	▼ 1%
2020.HK	0%	▼ 5%
0388.HK	-9%	▼ 7%
1209.HK	-10%	▼ 11%
2269.HK	-10%	▲ 1%
6862.HK	-10%	▼ 7%
3968.HK	-10%	▲ 3%

**Protective Put** (2899.HK):  
470,000@12.5, 1-month

3/10/2023 - 9/11/2023

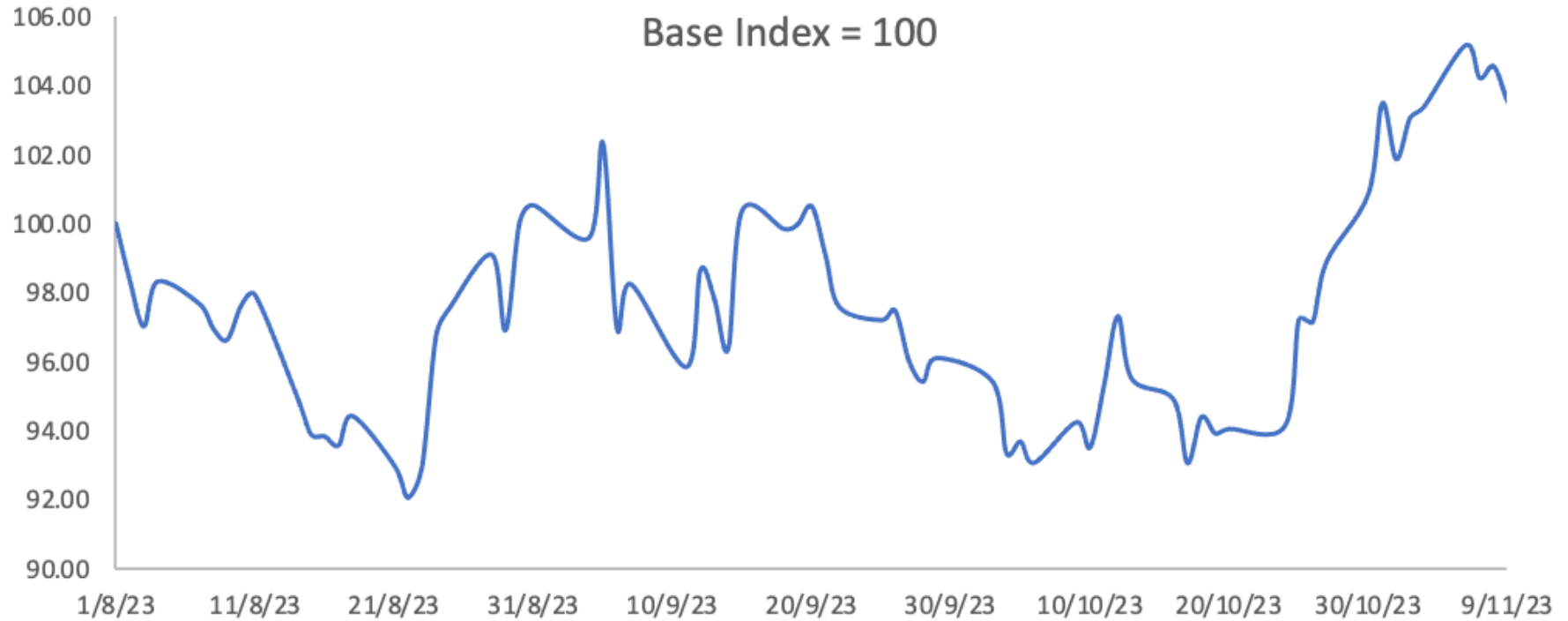
As of 3/10/2023

Ticker	Holding	Return
0836.HK	37%	▼ 2%
0981.HK	27%	▲ 23%
2015.HK	25%	▲ 11%
2899.HK	22%	▲ 1%
1209.HK	7%	▼ 3%
1109.HK	0%	— 0%
9868.HK	-2%	▼ 10%
2628.HK	-7%	▼ 12%
2269.HK	-7%	▲ 15%
0241.HK	-10%	▲ 2%

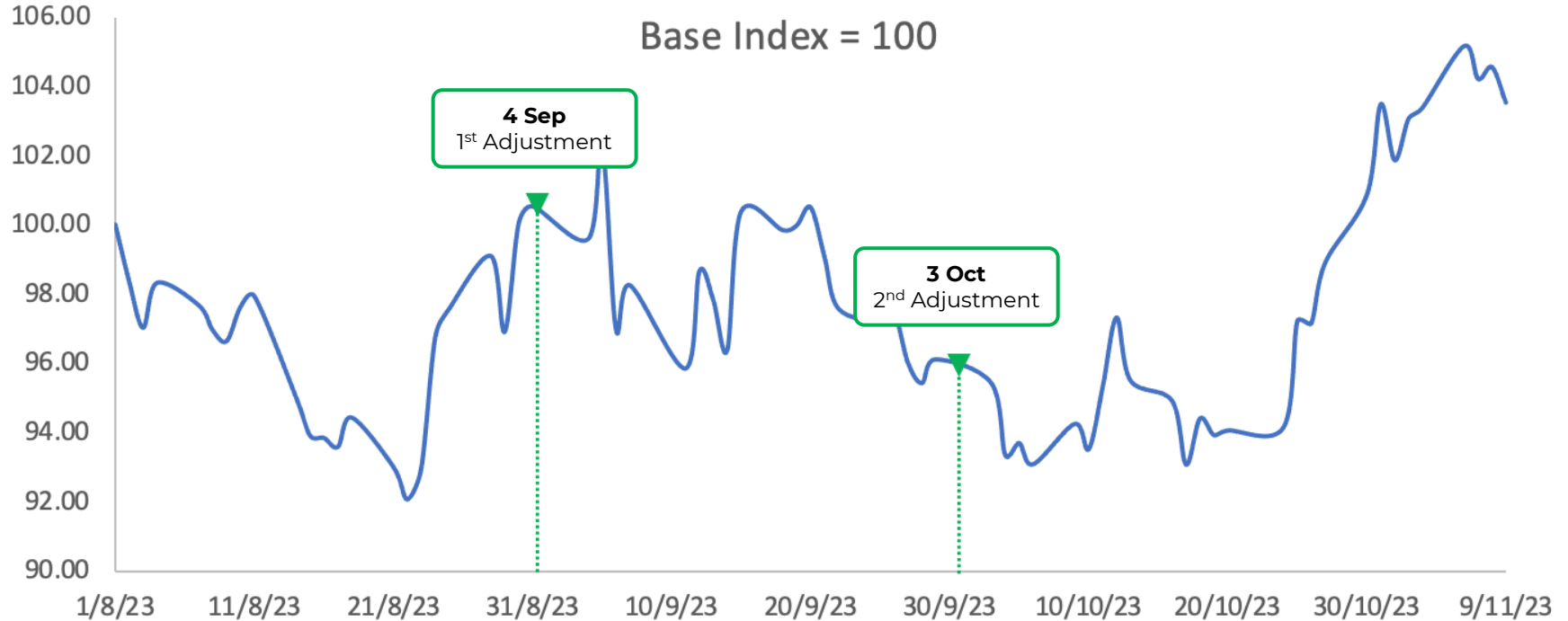
**Protective Put** (0989.HK):  
90,000@19.5, 1-month



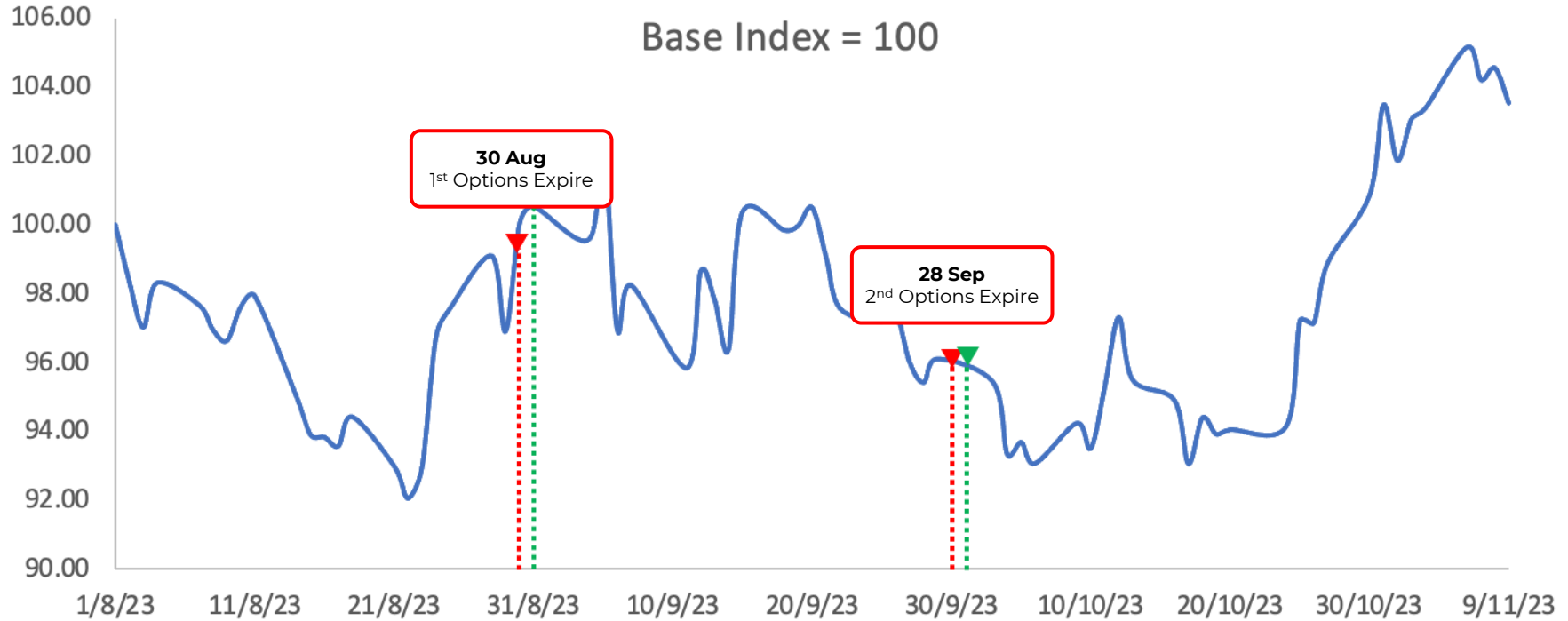
# Overall Performance



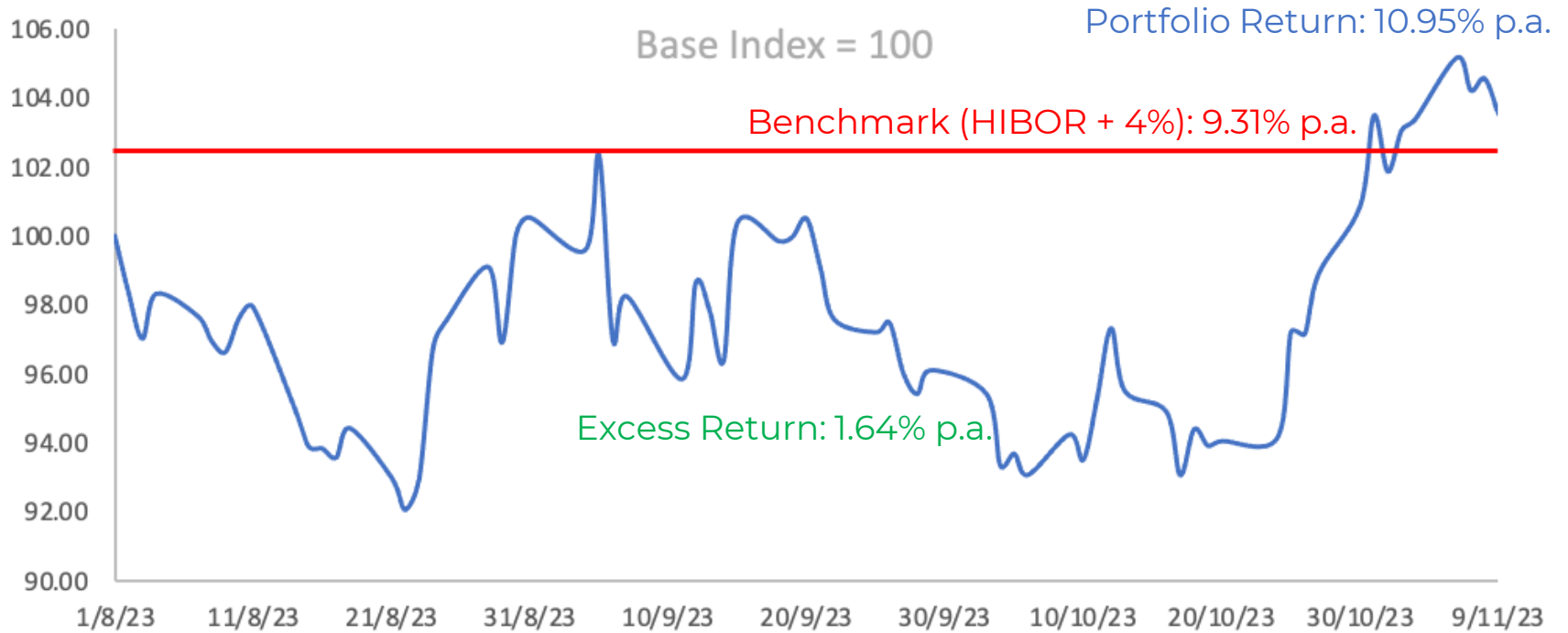
# Portfolio Adjustments



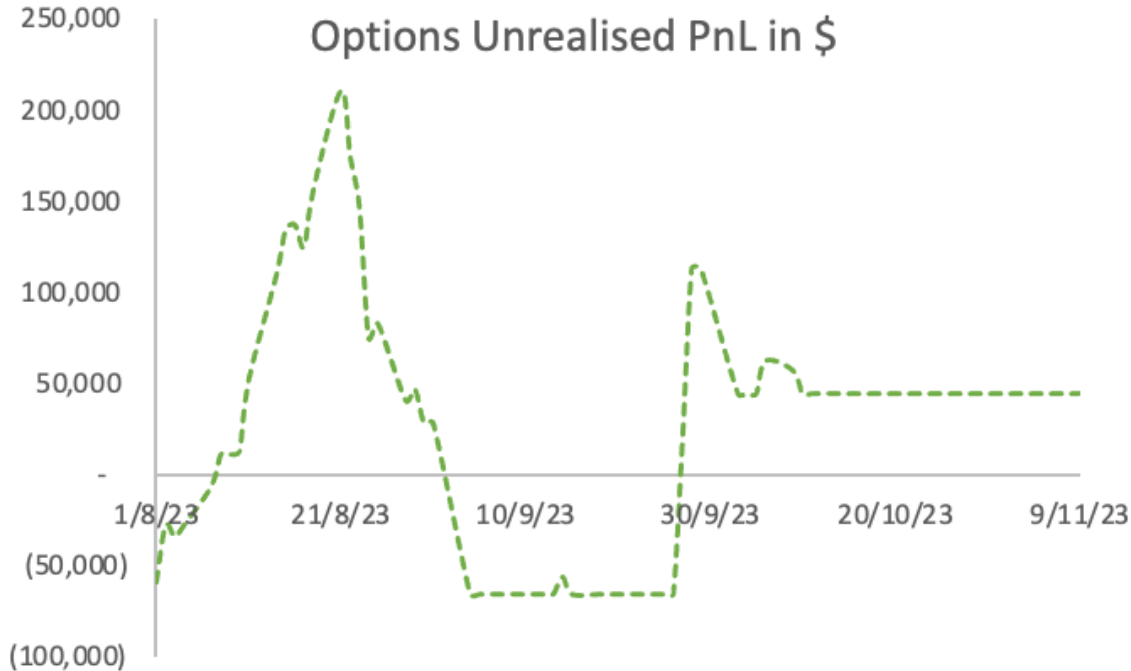
# Derivatives Profit Realisation



# Overall Performance

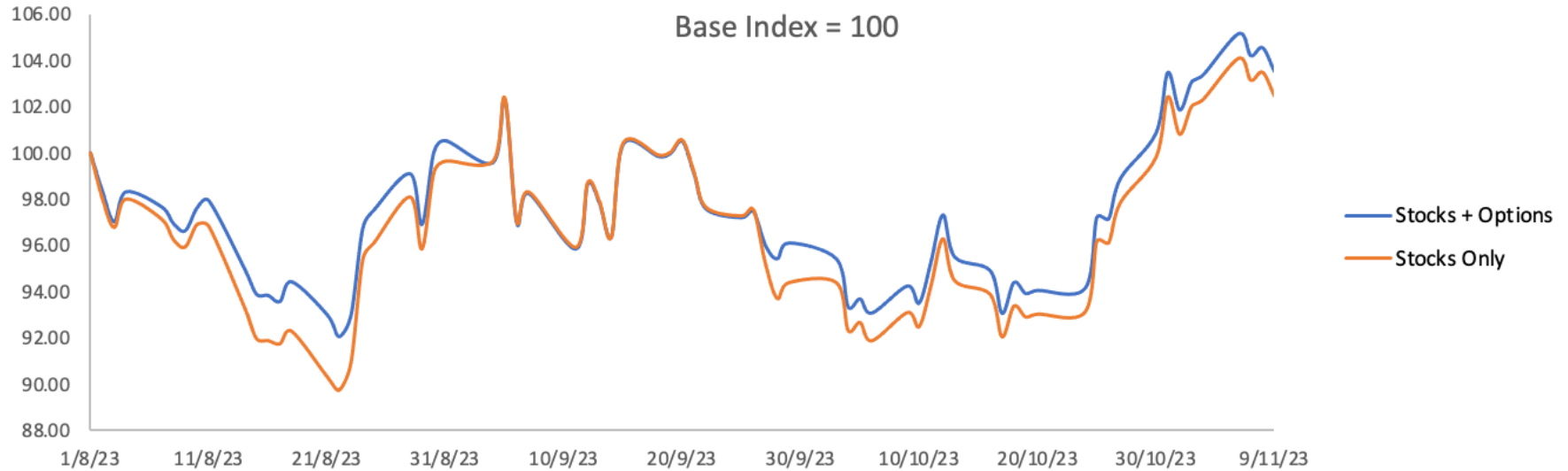


# Derivatives Strategy PnL



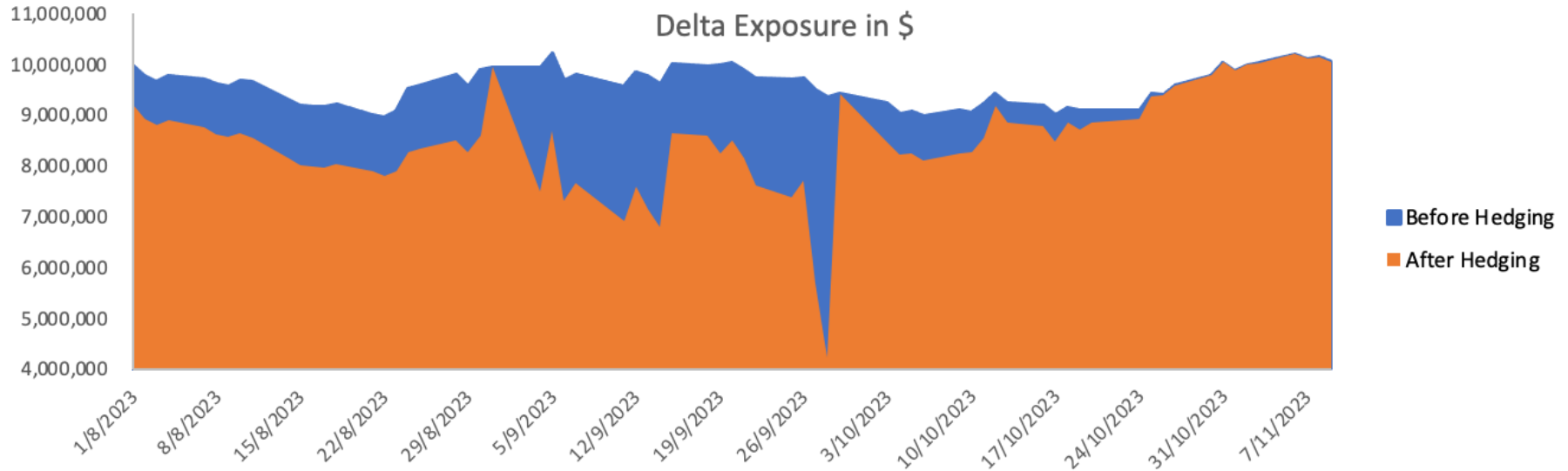
- Unrealised return
- Options valuation:  $(S - K) - \text{Premium}$
- Positive return at the end of the investment horizon

# Stocks + Options vs Stocks Only



- Stocks + Options Return : **3.91%**
- Stocks Only Return : **2.67%**
- Yield Enhancement : **1.24%**

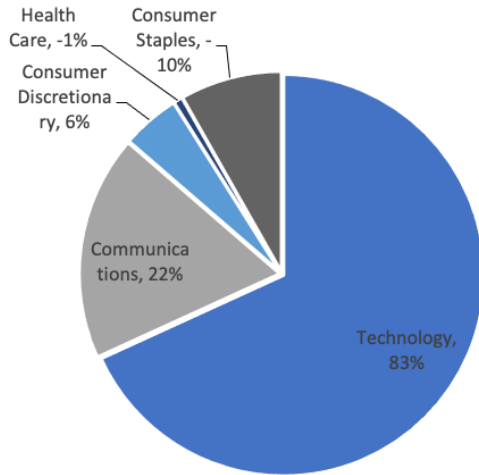
# Delta Hedging



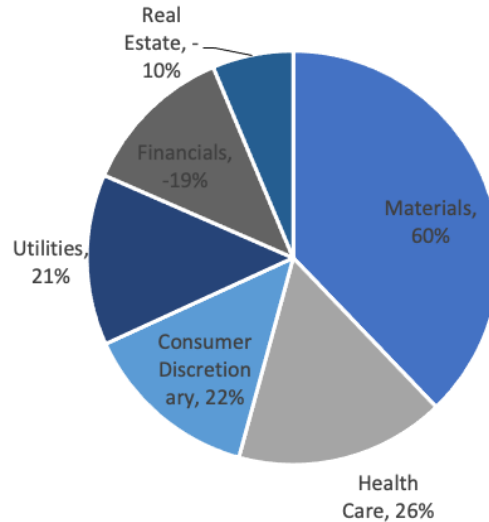
- Main objective is not to make the portfolio delta-neutral
- But delta hedging helps limit downside risk and reduce volatility

# Diversification

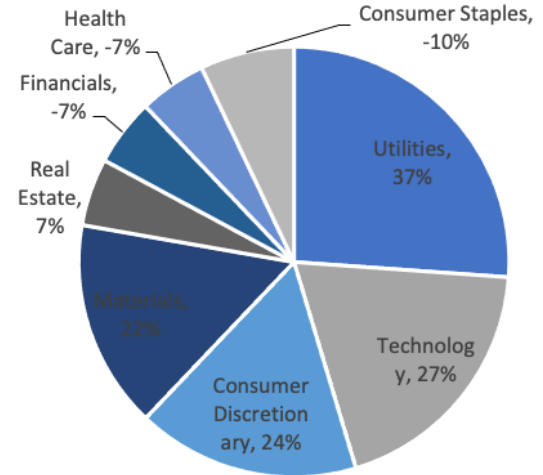
As of 1/8/2023



As of 4/9/2023



As of 3/10/2023



- Slightly biased towards technology sector in the August allocation
- Overall, the portfolio is well-diversified



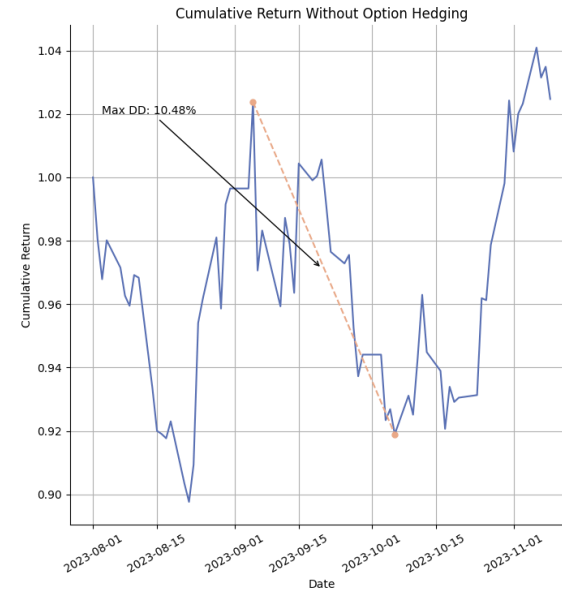
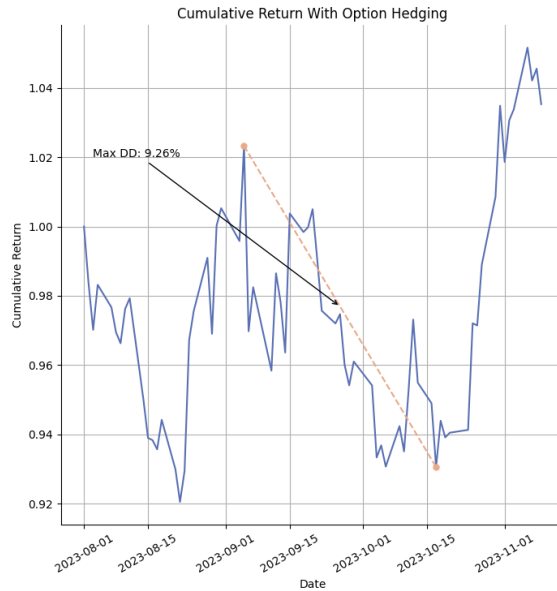
# Monthly Return and Volatility by Month

- Monthly return is improved in Aug. and Step., slightly decreased in Oct.
- Daily volatility by month is reduced in Aug. and Step., slightly increased in Oct.

With Hedging	Monthly Return		Monthly Return		Without Hedging
	Aug	0.53%	Aug	-0.35%	
	Step	-3.49%	Step	-5.26%	
	Oct	8.45%	Oct	8.49%	
	Daily Volatility		Daily Volatility		
	Aug	1.64%	Aug	1.88%	
	Step	2.10%	Step	2.16%	
	Oct	1.49%	Oct	1.48%	

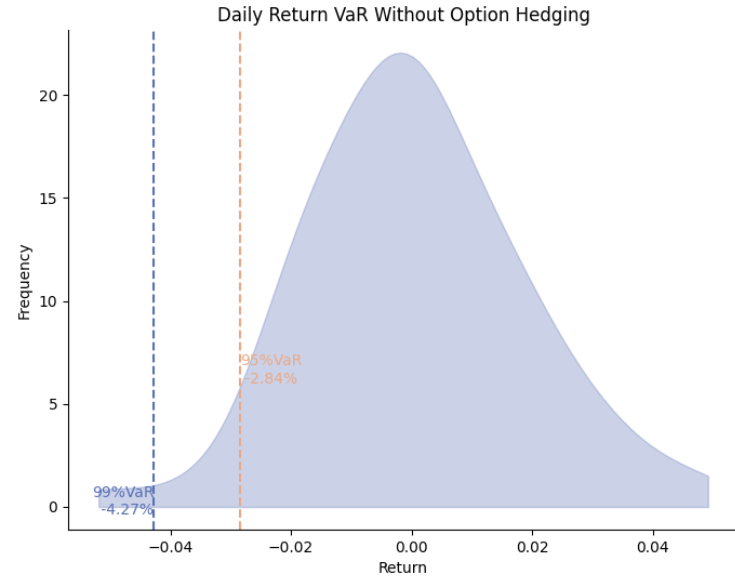
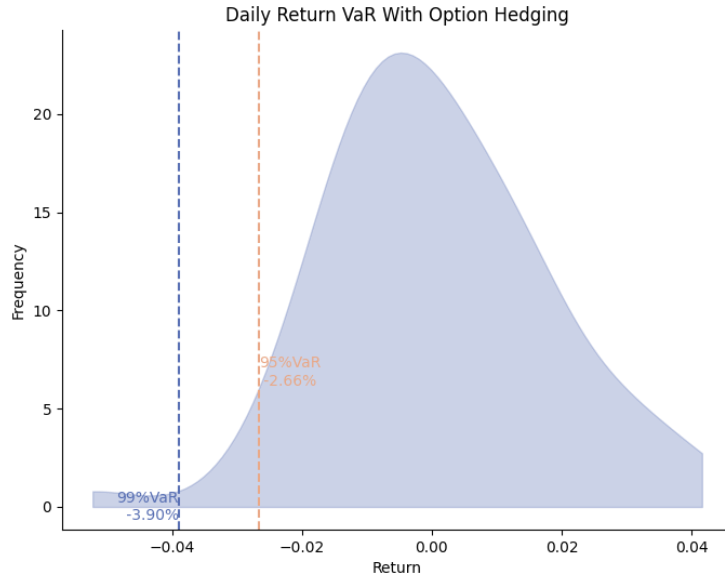
# Maximum Drawdown

- Max Draw Down is improved by **1.22%**



# Daily Return Histogram and VaR

- 99% VaR is improved by **0.37%**, 95% VaR is improved by **0.18%**.



# Limitations

## Costs

- Zero transaction cost (both explicit and implicit)
- 0.5% borrow cost as given

## Options

- Hold options until expiration
- Approximate daily options price using payoff

## Earnings

- Zero dividend
- Zero cash investment gain

## Stocks

- Return based on closing price
- Adequate liquidity

# Risk Management

## Diversification

No less than 10 securities

Satisfied ✓

## Position Size

Single short no more than 6% NAV  
(warning)  
Single short no more than 10% NAV

Satisfied ✓

## Gross Exposure

Must between 60% to 400%

Satisfied ✓

## Beta and Delta

Beta: -15% to 15%

Satisfied ✓

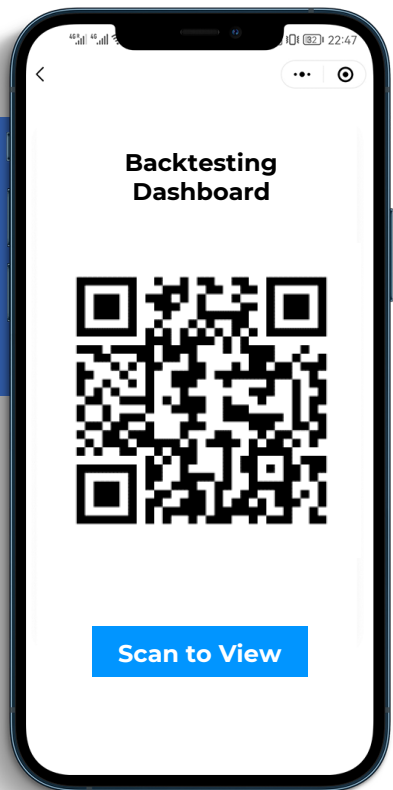
## Stop Loss

If the stock falls 15% or more below  
the entry, it will be sold (if no  
protective put)

Satisfied ✓

# Q & A

Thank you!



# Dashboard

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- Scan to take a look