

James Yoo (jimba1tyco@gmail.com)

Todos

```

1 # @title
2 import datetime
3 #
4 # =====
5 # ## DEFINE PARMS HERE:
6 PRM_INVEST_FUND = 10000 # Total fund(s) for investment
7 PRM_YEARS = 5 # Total number of years for investment
8 PRM_TICKERS = ['QQQ', 'QLD', 'TQQQ', 'SMH', 'USD', 'SOXL', 'SCHD'] # Stock tickers
9 #PRM_TICKERS = ['QQQ'] # Stock tickers
10 CLOSE_COL_NAME = 'Adj Close' # 'Close' or 'Adj Close', It is recommended to use 'Adj Close' for historical performance analysis
11 #
12 # Strategy Params
13 PRM_DCA_INVEST_INTERVAL_WEEKS = 4
14 #
15 # L1 Strategy Params
16 PRM_RIT_HAVING_AVERAGE_DAYS = 99 # L1 finds a day with highest stock price within first X days, buy lump-sum on that day
17 PRM_RIT_BUYING_BIG_SHARE_OFFSET_PERCENT = 10 # Place Big share when price is X% below average cost
18 PRM_RIT_SELLING_SHARE_OFFSET_PERCENT = 10 # Sell all shares when price is X% above average cost
19 #
20 # DCA DCA Params
21 PRM_DCA_INVEST_INTERVAL_WEEKS = 4
22 #
23 # RIT Strategy Params
24 PRM_RIT_INITIAL_INVEST_FUND = PRM_INVEST_FUND
25 PRM_RIT_DAILY_DIVISION_RATIO = 40
26 PRM_RIT_INVEST_INTERVAL_DAYS = 1
27 #
28

```

Using Close vs Adjusted Close in Backtesting

1. Using Close (Raw Close Price)

If you backtest using Close, your analysis will NOT account for:

- Dividends
- Stock splits
- Special dividends
- Rights issues
- Spin-offs

Impact on Backtesting

- Your performance results will be **incorrect**, especially for dividend-paying stocks or ETFs.
- You will **underestimate total returns**, sometimes by a lot.
- Historical charts may show price drops on split or dividend days that are not actual losses.
- Compounding will be **wrong** because dividends aren't added back.

Example:

SCHD might show +30% price growth in 5 years using Close, but +70-80% total return when dividends are included.

2. Using Adjusted Close

Adjusted Close modifies historical prices to reflect:

- Prices (divided or multiplied historically)
- Dividends (cash value subtracted to maintain total return)
- Corporate actions that affect valuation

Impact on Backtesting

- You simulate total return, assuming dividends are reinvested.
- Results are more **realistic** and comparable across different stocks.
- Eliminates false distortions in charts (e.g., drop after dividends).
- You get the **true performance** of an investment, not just its price change.

Example:

If a stock pays a \$1 dividend, the Adjusted Close reduces previous prices to account for that dividend, ensuring total returns are calculated correctly.

Key Differences

Feature	Close	Adjusted Close
Includes dividends?	✗	✓
Includes splits?	✗	✓
Show recent return?	✗	✓
Backtesting accuracy	Low	High
Is price distorted by corporate events?	Yes	No
Good for dividend ETFs?	No	Yes

When to Use Each

Use Close when:

- You only care about daily trading signals (e.g., intraday strategy).
- You trade based purely on price, not returns.
- You don't care about long-term performance or dividends.

Use Adjusted Close when:

- You evaluate long-term performance.
- You compare stocks or ETFs.
- You do backtesting that involves total return.
- The stock pays dividends.
- You want accurate compounding.

Summary

- Close tells you the last price of the day.
- Adjusted Close tells you the true value including dividends and splits.
- For any realistic, long-term, or dividend-aware strategy, **Adjusted Close is the correct choice**.

Retrieve Stock Data

```

Show code
Start Date : 2020-12-06
End Date : 2025-12-06
Duration : 5 years
Fund : $10,000

```

... [REDACTED]

```

Data Validation Passed.

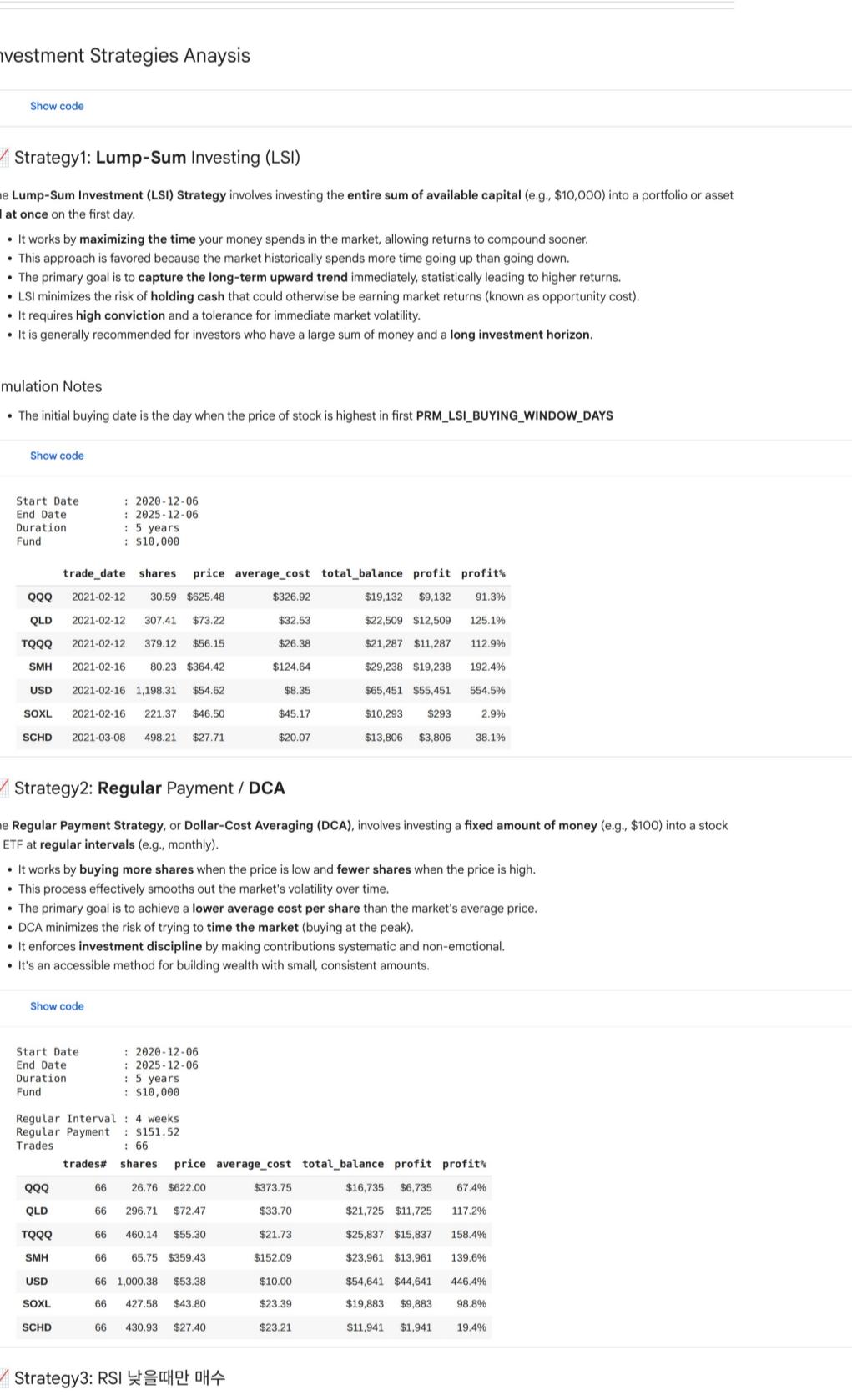
```

Overview

```

1 #@title
2 #dump_stock_data_dict(stock_data_dict)
3 plot_stock_data_dict(stock_data_dict, f'Stock Prices Over ({PRM_YEARS} Years)')

```



'Total Return' vs 'CAGR', Why important?

1. Total Return

This tells you how much the investment increased (or decreased) in total over a year period.

Formula

$$\text{Overall Growth} = (\text{Ending Value} - \text{Beginning Value}) / \text{Beginning Value} \times 100\%$$

Example

- Start value: \$100
- End value: \$180

$$\text{Overall Growth} = (180 - 100) / 100 = 80\%$$

Total return = +80% over X years

What it tells you

- Simple
- Not annualized
- Doesn't show volatility

2. CAGR (Compound Annualized Growth Rate)

CAGR tells you the annual growth rate as if the investment grew smoothly each year, even if the real returns were volatile.

Formula

$$\text{CAGR} = (\text{Ending Value} / \text{Beginning Value})^{(1/\text{years})} - 1$$

Using the same example

- Start: \$100
- End: \$180 (total +80%)
- Years: 5

$$\text{CAGR} = (1.80)^{(1/5)} - 1 = 12.5\%$$

CAGR = 12.5% per year

What it tells you

- Annualized return
- Great for comparisons
- Smooths out volatility

★ Why Both Matter

Metric What it Shows Best For

Metric	What it Shows	Best For
Overall Growth	Total return	'How much did I return?'
CAGR	Annualized rate	Comparing investments

CAGR is usually better for comparisons, while overall growth tells your final wealth increase.

Summary

- The strategy works by aggressively buying when the price is low and fewer shares when the price is high.
- This approach is favored because the market historically spends more time going up than going down.
- The primary goal is to capture the long-term upward trend immediately, statistically leading to higher returns.
- It minimizes the risk of holding cash that could otherwise be earning market returns (known as opportunity cost).
- It requires high conviction and a tolerance for immediate market volatility.
- It is generally recommended for investors who have a large sum of money and a long investment horizon.

Simulation Notes

- The initial buying date is the day when the price of stock is highest in first PRM_LSI_BUYING_WINDOW_DAYS

```

Show code
Start Date : 2020-12-06
End Date : 2025-12-06
Duration : 5 years
Fund : $10,000

```

1. Strategy1: Lump-Sum Investing (LSI)

The Lump-Sum Investment (LSI) Strategy involves investing the entire sum of available capital (e.g., \$10,000) into a portfolio or asset all at once on the first day.

- It works by **maximizing the time** your money spends in the market, allowing returns to compound sooner.

This is the most popular strategy because the market historically spends more time going up than going down.

- The primary goal is to **capture the long-term upward trend** immediately, statistically leading to higher returns.

LSI minimizes the risk of holding cash that could otherwise be earning market returns (known as opportunity cost).

- It requires **high conviction** and a tolerance for immediate market volatility.

It is generally recommended for investors who have a large sum of money and a long investment horizon.

Simulation Notes

- The initial buying date is the day when the price of stock is highest in first PRM_LSI_BUYING_WINDOW_DAYS

```

Show code
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Duration : 5 years
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```

2. Strategy2: Regular Payment / DCA

The Regular Payment Strategy, or Dollar-Cost Averaging (DCA), involves investing a **fixed amount of money** (e.g., \$100) into a stock or ETF at regular intervals (e.g., monthly).

- It works by **buying more shares** when the price is low and **fewer shares** when the price is high.

This is a quick and easy way to diversify your portfolio over time.

- The primary goal is to achieve a **lower average cost per share** than the market's average price.

DCA minimizes the risk of trying to time the market (buying at the peak).

- It requires **high conviction** and a tolerance for immediate market volatility.

It is an accessible method for building wealth with small, consistent amounts.

```

Show code
Start Date : 2020-12-06
End Date : 2025-12-06
Duration : 5 years
Fund : $10,000

```

3. Strategy3: RSI 높을 때 매수

This is a systematic trading strategy often applied to highly volatile instruments like 3x Leveraged ETFs (e.g., TQQQ). It relies on continuous dollar-cost averaging (DCA) and using specific limit orders (LOC) to manage risk and secure profits.

- The investor commits to investing this 1/40 amount every single day.

LOC Buy Rule: An LOC buy order executes at the day's **Closing Price** if the Closing Price is less than or equal to the limit price set.

- The LOC purchase rule: By setting the limit price 10% above the current market price, the investor ensures that, on almost any normal day (when the stock doesn't jump 10% in a single day), the closing price will be less than the limit price.

This rule successfully executes at the **Closing Price** every day, achieving the desired DCA effect.

- The **Cap Rule**: If the stock spikes more than 10% in a day, the order will **not execute**, preventing the investor from buying at an inflated, peak price.

What it tells you

- Annualized return
- Great for comparisons
- Smooths out volatility

4. Strategy4: Rado's Infinite Trading Strategy (무한매수법)

This is a systematic trading strategy often applied to highly volatile instruments like 3x Leveraged ETFs (e.g., TQQQ). It relies on continuous dollar-cost averaging (DCA) and using specific limit orders (LOC) to manage risk and secure profits.

- The investor commits to investing this 1/40 amount every single day.

LOC Buy Rule: An LOC buy order executes at the day's **Closing Price** if the Closing Price is less than or equal to the limit price set.

- The LOC purchase rule: By setting the limit price 10% above the current market price, the investor ensures that, on almost any normal day (when the stock doesn't jump 10% in a single day), the closing price will be less than the limit price.

This rule successfully executes at the **Closing Price** every day, achieving the desired DCA effect.

- The **Cap Rule**: If the stock spikes more than 10% in a day, the order will **not execute**, preventing the investor from buying at an inflated, peak price.

What it tells you

- Annualized return
- Great for comparisons
- Smooths out volatility

5. Summary

- The strategy works by aggressively buying when the price is low and fewer shares when the price is high.

This is the most popular strategy because the market historically spends more time going up than going down.

- The primary goal is to capture the long-term upward trend immediately, statistically leading to higher returns.

LSI minimizes the risk of holding cash that could otherwise be earning market returns (known as opportunity cost).

- It requires high conviction and a tolerance for immediate market volatility.

It is generally recommended for investors who have a large sum of money and a long investment horizon.

Advantages and Challenges

Advantages

- Systematic Buying Low and Selling High: VA mechanically forces the investor to buy more when prices are low and less (or sell) when prices are high, which is the classic goal of successful investing.

May Lead to Higher Returns: Studies have suggested that VA can potentially produce slightly higher returns than DCA in certain market conditions, as it is a more aggressive form of buying the dips.

- Goal-Focused: It keeps the investor focused on achieving a specific, measurable end value for their portfolio.

Challenges

- Unpredictable Cash Needs: The biggest drawback is that in a sharply declining market, VA can require a significantly large cash contribution to meet the target value, which an investor may not have readily available. This necessitates keeping a **large cash reserve** or sides.

Complexity and Management: It requires active monthly or quarterly calculations and adjustment, making it more involved than the hands-off approach of DCA.

- Trade Costs/Taxes: The strategy may require occasional selling, which can incur brokerage fees and create taxable events, even during the drawdown.

VA video from Fidelity Investments explains the more common dollar-cost averaging strategy, which is the direct contrast to Value Averaging: [What is dollar-cost averaging? | Fidelity Investments](#).http://gooleusercontent.com/youtube_content0

VA vs. DCA: Key Difference

Feature Value Averaging (VA) Dollar-Cost Averaging (DCA)

Metric	What it Shows	What it Assumes
Total Return	Total return	Total return
Annualized rate	Comparing investments	Invest the same amount every month
Market Up	Invest the same amount every month	Invest the same fixed amount (Buy more shares)
Market Down	Invest the same amount every month	Invest the same fixed amount (Buy fewer shares)