



# Introduction to Backtesting

# Learning Objectives

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- Understand the goals of the backtesting validation technique
- Identify the steps in creating a split-data backtesting model
- Identify the steps in designing a sliding-window backtesting model
- Understand some of the weaknesses and biases that can affect a backtest
- Distinguish between development and implementation backtesting models

# Agenda

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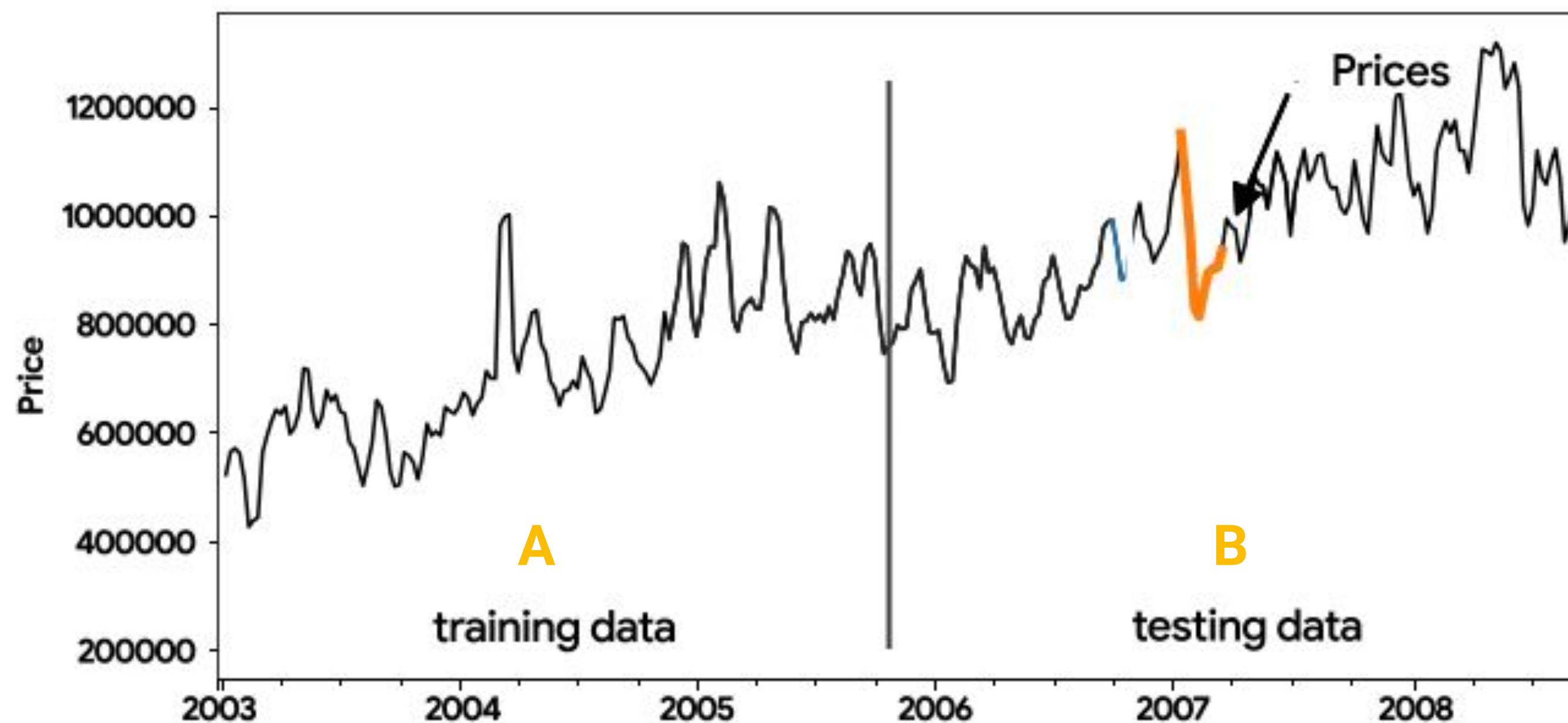
What is a Backtest?

Key Objectives

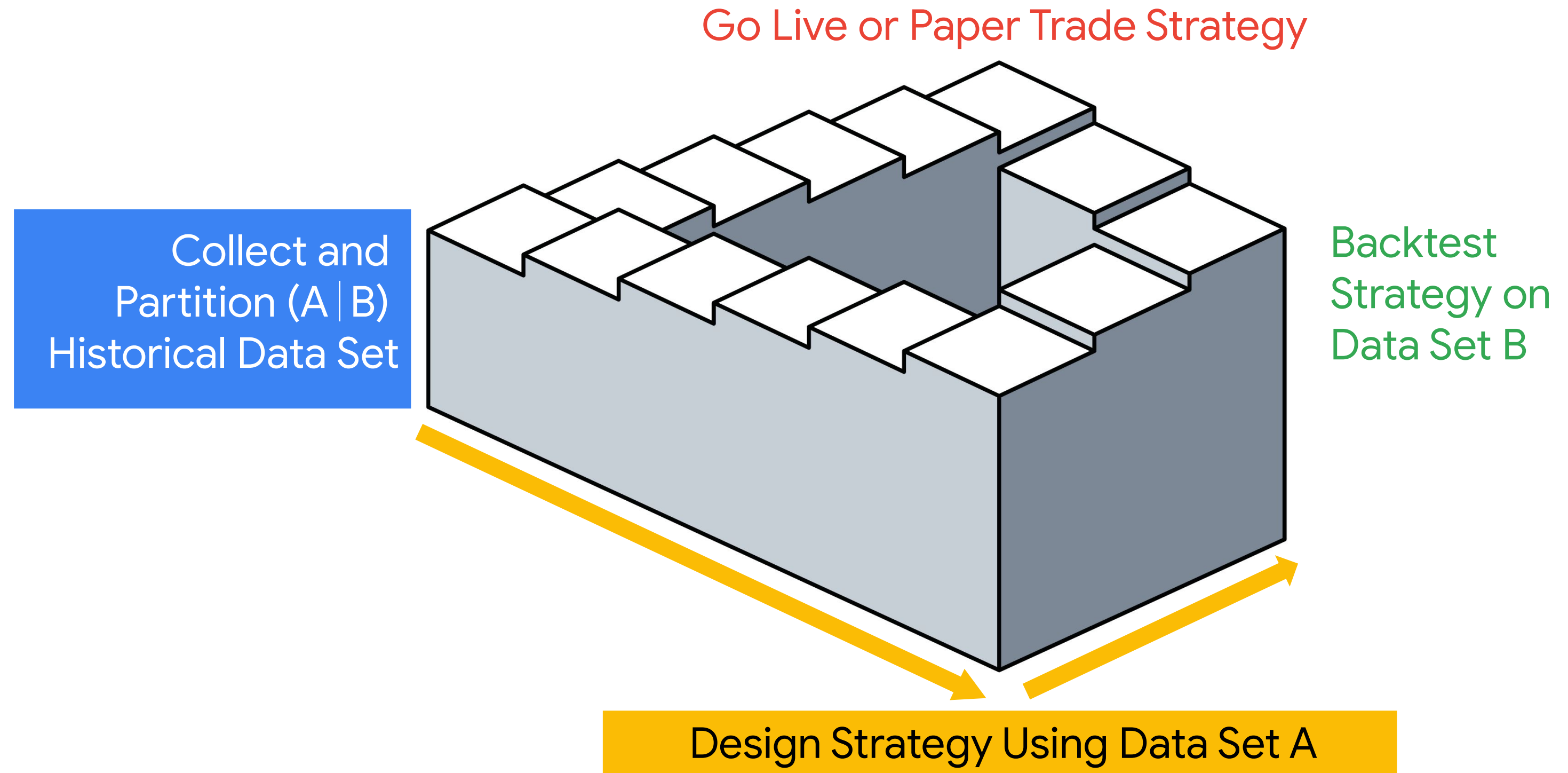
Common Weaknesses and Biases

Design: Development vs  
Implementation

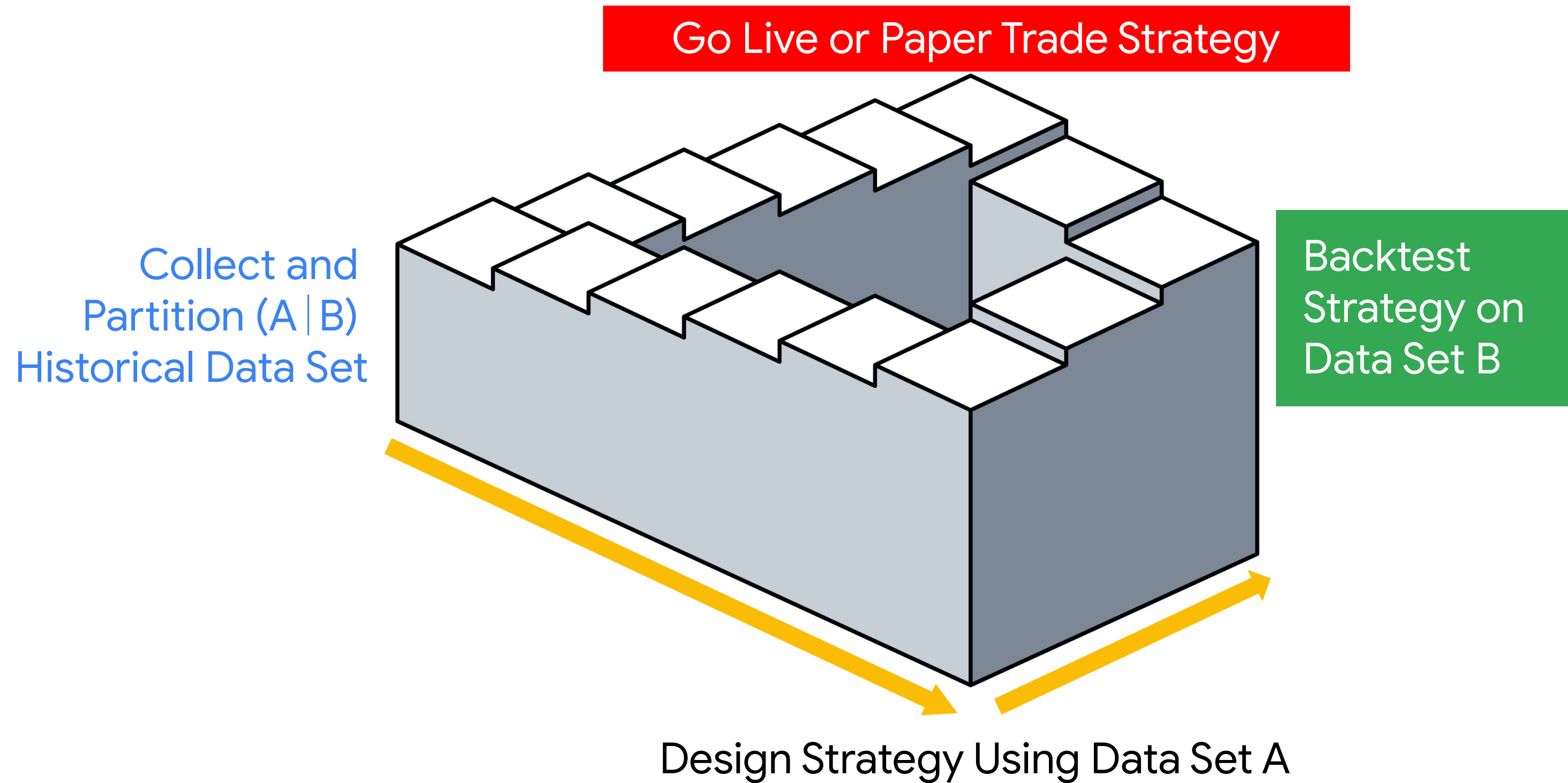
# Split Window Backtesting Data



# Split Window Backtest



# Split Window Backtest

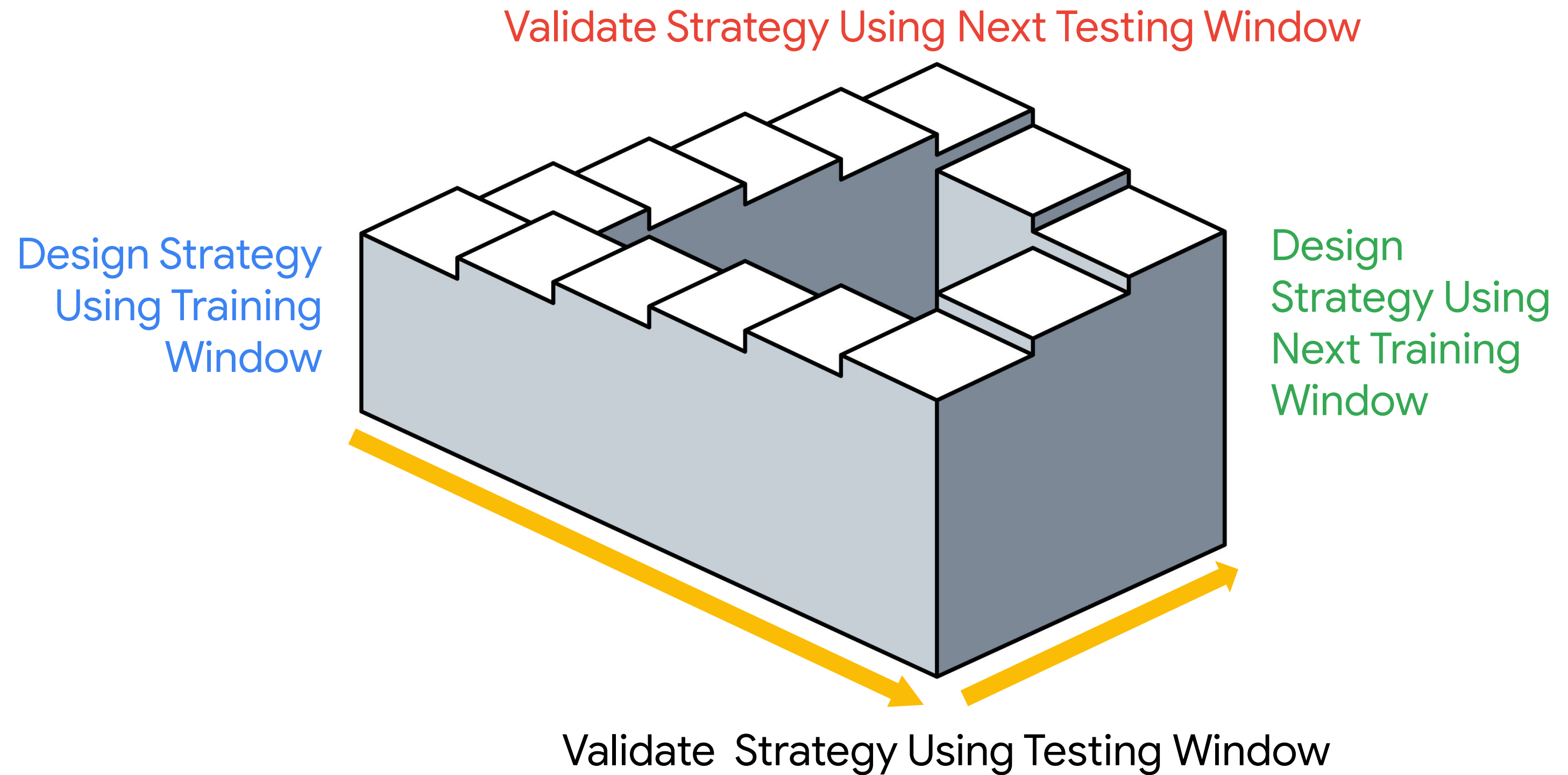


# What is a Backtest?

- A simulation designed to measure the performance of your trading and risk management rules applied to historical data
- Quantifies the performance of your strategy for comparison with other strategies
- Predicts likely capital requirements, trade frequency and risk for your portfolio

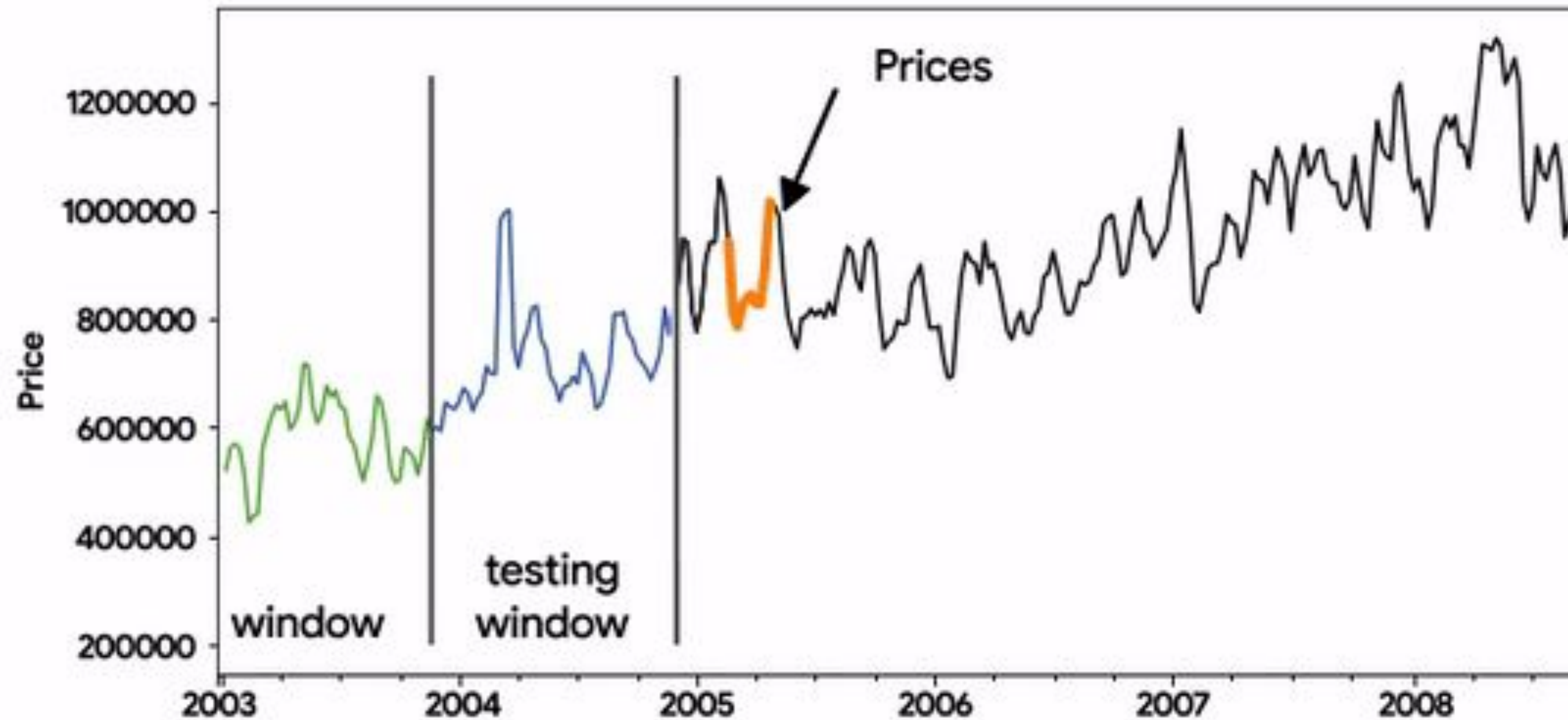


# Sliding Window Backtest





# How a Sliding Window helps in Back Testing



# Agenda

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What is a Backtest?

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Common Weaknesses and Biases

Design: Development vs  
Implementation

# Backtesting Objectives

- Filter out any strategies that don't meet your performance criteria:
- Sharpe Ratio = Return / Risk
- Calmar Ratio = Return / Maximum Drawdown

# Backtesting Objectives

- Test and fine tune the performance of new models taking into account microstructure issues:
- Transaction costs (spread and market impact)
- Order routing
- Latency (data and orders)
- Liquidity

# Agenda

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Design: Development vs  
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# Backtesting Objectives

- Optimize your strategy
- Increase its performance by modifying its associated quantity or parameter values

# Backtesting Weaknesses

- Dependence on transient correlations
- Low-quality data
- Unrealistic handling of:
  - Slippage
  - Market impact costs



# Backtesting Biases

- **Optimization Bias** - Overfitting your model too closely to limited data
- **Look-ahead Bias** - Unintended introduction of future information into past data
- **Survivorship Bias** - Only including financial instruments which still exist (positively skewed sample)

# Backtesting Biases

## Drawdown Tolerance Bias

- Backtest data for longer-term momentum strategies often show upwardly trending equity prices
- These strategies can show very attractive returns and good Sharpe Ratios but can often have drawdowns of as much as 25% with a duration of 3 or more months (think Fall 2018)
- When you are actually faced with this big a drawdown, it can be difficult to sustain the strategy

# Agenda

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# Development Backtesters

- Create preliminary models quickly so many strategy/parameter variations can be tested quickly
- Identify statistical relationships
- Often give inflated performance