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June 18, 2024

Enlightened Stock Trading

The Power of Backtesting: From Theory to Practice (How to Validate You Actually Have an Edge)

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Enlightened Stock Trading

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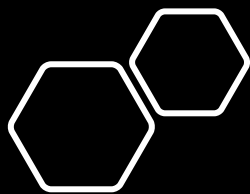
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As with all investments, your capital is at risk



The Power of Backtesting: From Theory to Practice

How to Validate You Actually Have an Edge
Adrian Reid
Founder – Enlightened Stock Trading



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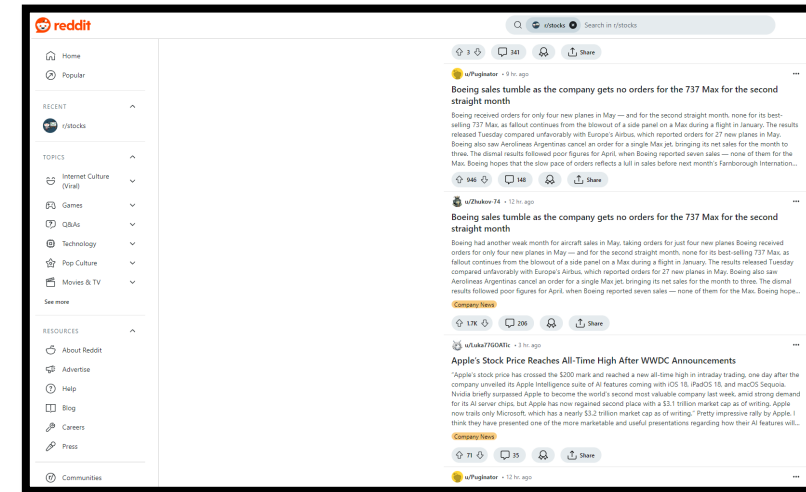
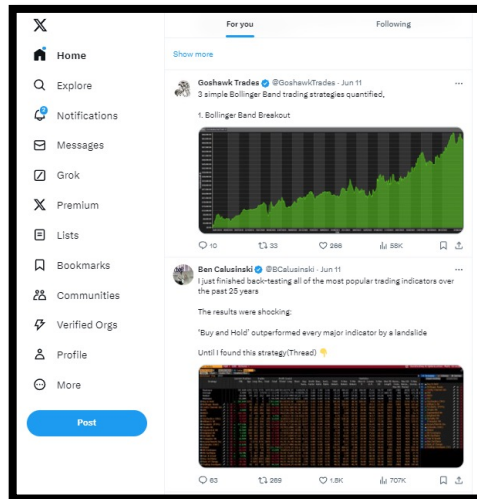
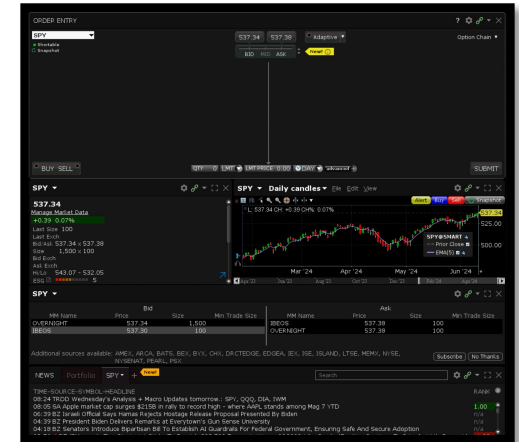
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Agenda

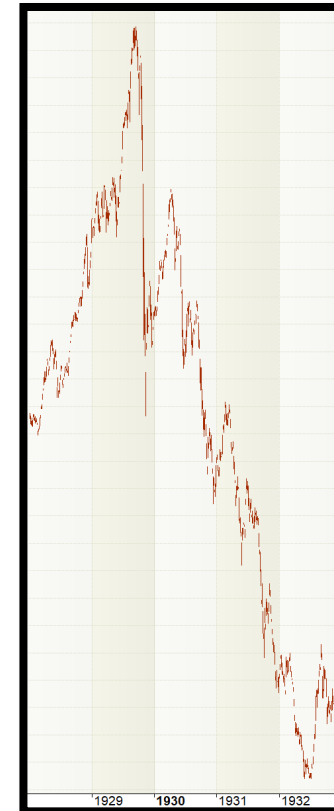
- Typical Trader Problems
- What is Backtesting & The Main Resistance
- Evolution of Backtesting Approach
- Optimization: Why / Paradox / How
- Confidence Building Through Backtesting
- Common Backtesting Mistakes / Issues

Typical Trader Problems

Do I have an edge?



Typical Trader Problems



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What is Backtesting

Backtesting is the process of applying your trading strategies to historical data to determine how well those strategies would have performed in the past

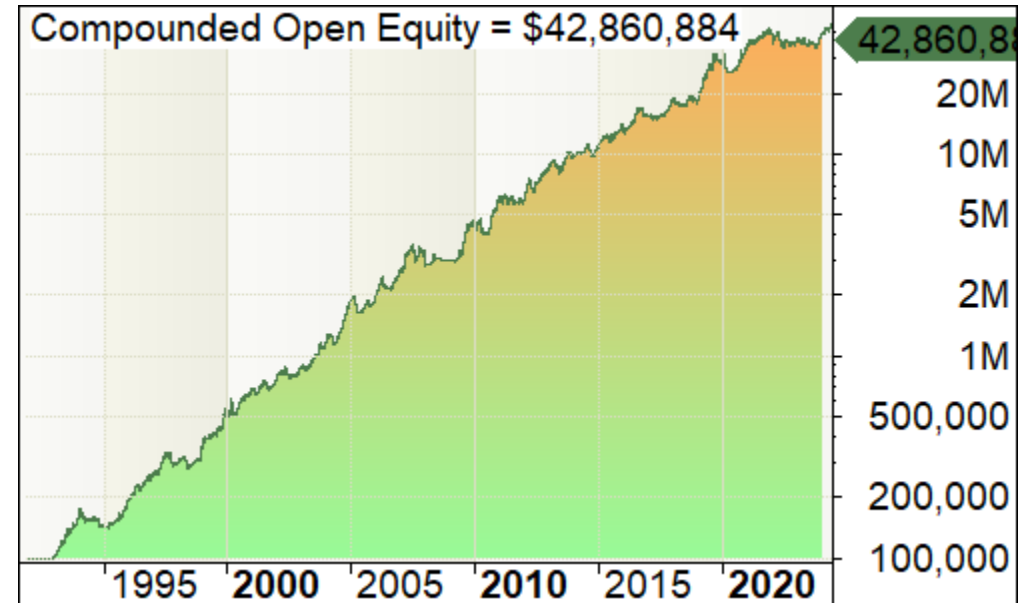
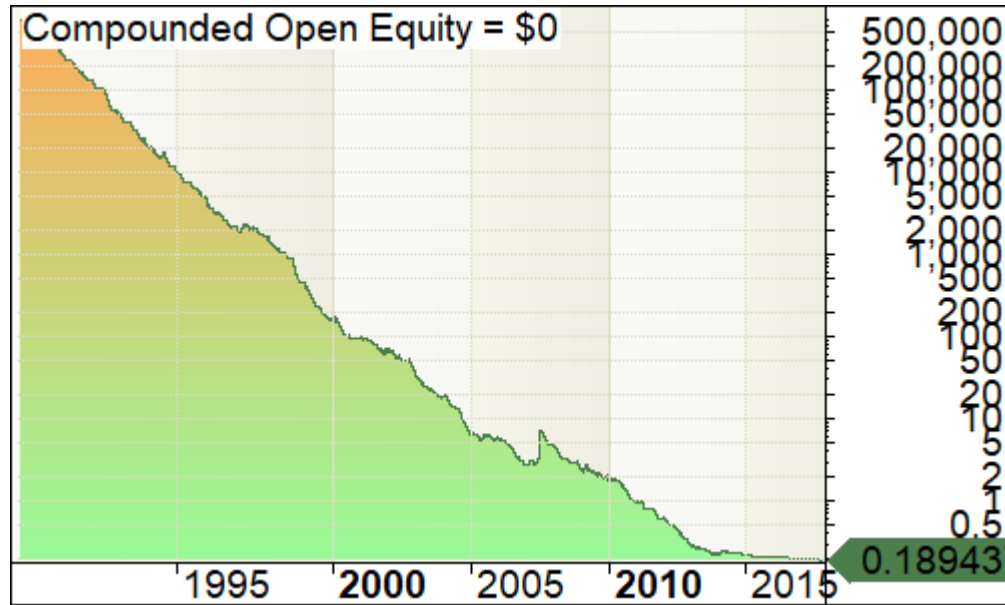
It's like a rehearsal for your trading, allowing you to see potential outcomes without risking actual capital

The Resistance



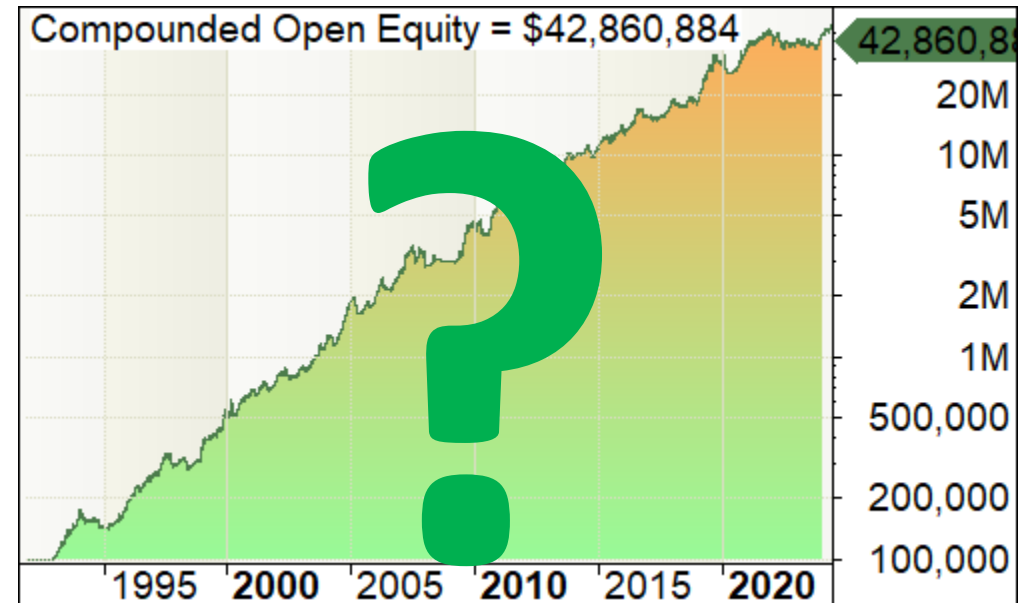
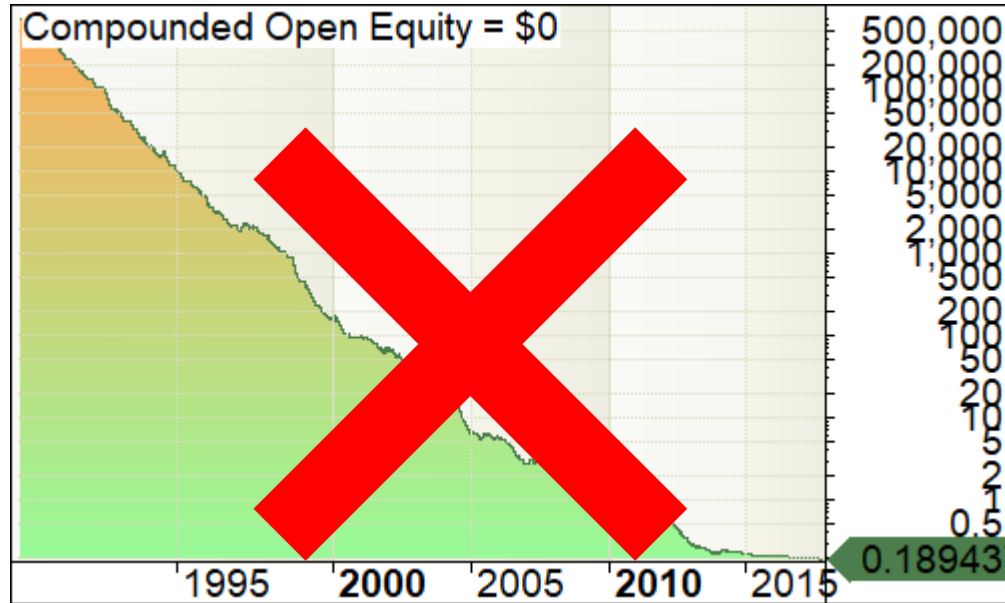
“But why would I backtest? Past performance is not representative of future performance so why waste my time?”

Which strategy would you rather trade?



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Which strategy would you rather trade?



The future will be different than the past...
but backtesting is still important!

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The right question is not
SHOULD we backtest?

The right question is:
HOW should we backtest?

How should we backtest?

Manual Chart Review

Place indicators on charts and manually review historical signals

- × Error Prone
- × Very Slow
- × Narrow Conditions
- × No Optimization
- × Very Few Trades
- × Single Instrument
- × Success Unlikely

How should we backtest?

Manual Chart Review

Place indicators on charts and manually review historical signals

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Chart Replay

Place indicators on charts and simulate live trading with replay feature

- × Error Prone
- × Very Slow
- × Narrow Conditions
- × No Optimization
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How should we backtest?

Manual Chart Review

Place indicators on charts and manually review historical signals

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Single Instrument Backtest

Automatically test rules on long history of one instrument

- ✓ Accurate
- ✓ Fast
- ✓ All Market Conditions
- ✓ Possible Optimization
- ✗ Few Trades
- ✗ Single Instrument
- ✗ Some Level of Success

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Portfolio Backtest

Automatically test rules on long history of a universe of instruments

- ✓ Accurate
- ✓ Fast
- ✓ All Market Conditions
- ✓ Good Optimization
- ✓ Many Trades
- ✓ Many Instrument
- ✗ Some Level of Success

How should we backtest?

Manual Chart Review

Place indicators on charts and manually review historical signals

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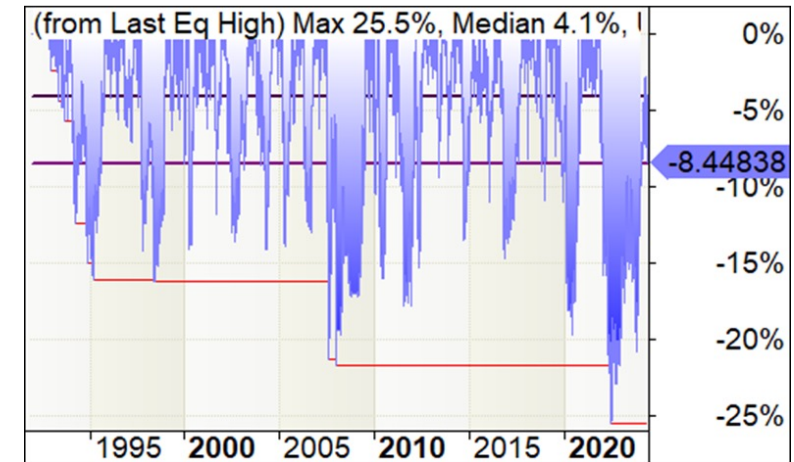
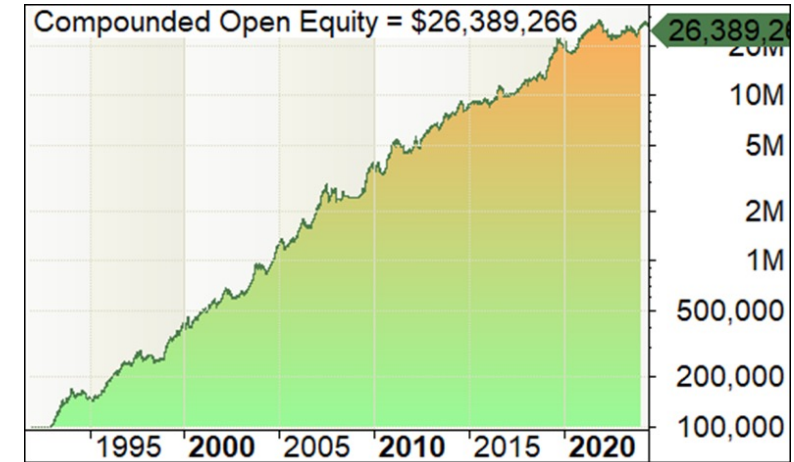
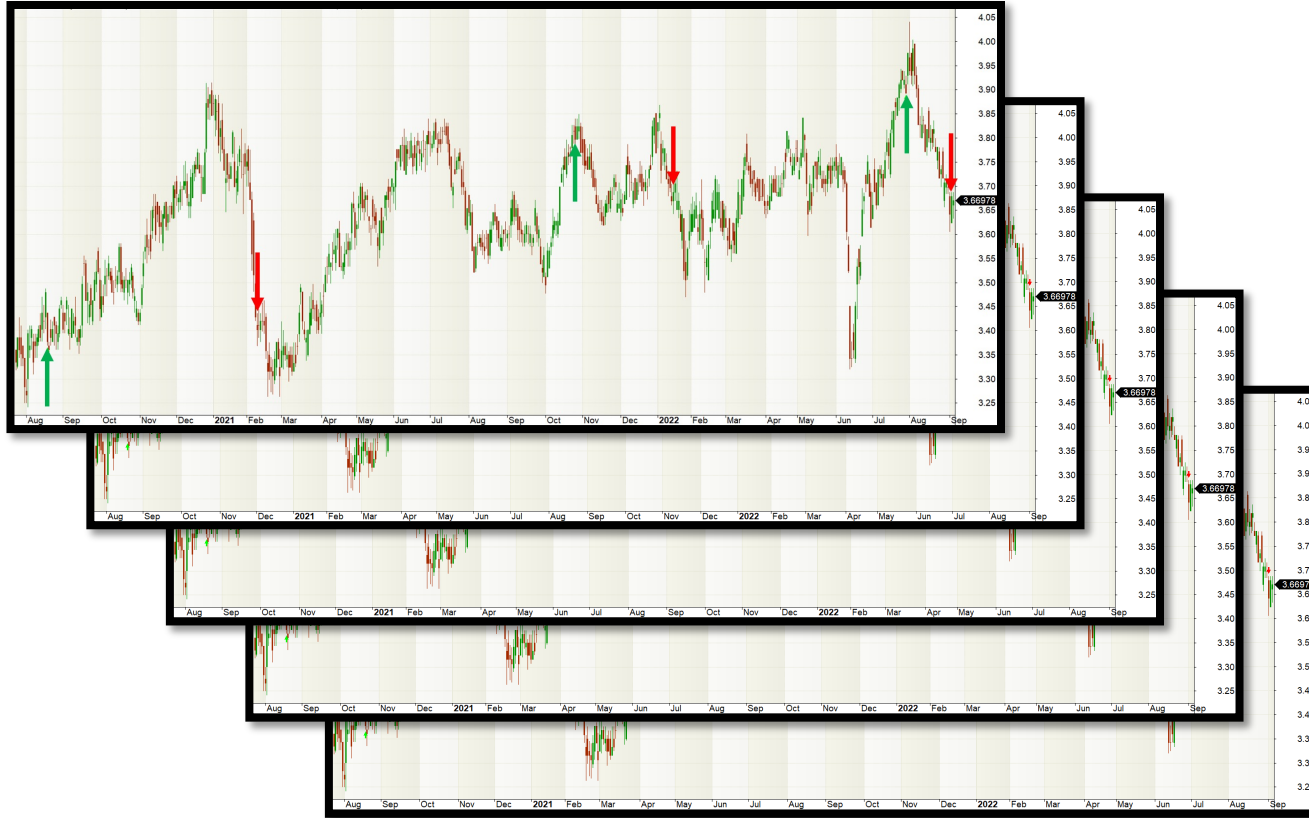
- ✓ Accurate
- ✓ Fast
- ✓ All Market Conditions
- ✓ Good Optimization
- ✓ Many Trades
- ✓ Many Instrument
- ✗ Some Level of Success

Advanced Portfolio Backtesting

Robust optimization, monte carlo, stability & robustness test, walk forward

- ✓ Accurate
- ✓ Fast
- ✓ All Market Conditions
- ✓ Good Optimization
- ✓ Many Trades
- ✓ Many Instrument
- ✓ Good Level of Success

What is Portfolio Backtesting?



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Portfolio Backtesting

Code the rules

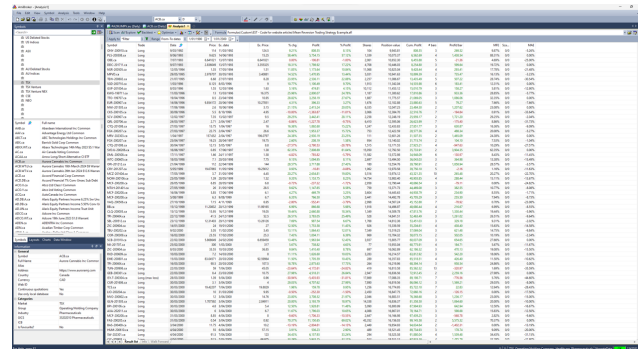
```

//=====
//Entry Conditions (Liquidity Filters, Volatility Filters, Setup, Entry Triggers)
//=====
TrendFilter      - C > EMA(C,200);
VolatilityFilter - ATR(14)/C<=0.08;
LiquidityFilter  - HLC(CW,20)>1000000;
EntryTrigger     - Cross(S,RSI(3));
SellRule1       - C>DMA(C,7);
SellRule2       - C<DMA(C,200);

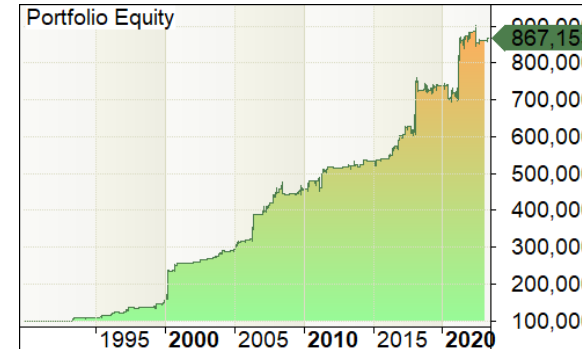
// Specify which rules to use in the Buy and Sell conditions...
//=====
Buy              - TrendFilter
                  AND VolatilityFilter
                  AND LiquidityFilter
                  AND EntryTrigger;
Sell            - SellRule1
                  OR SellRule2;

// Position Sizing & Risk Management
PositionScore = 100-RSI(3);
ApplyStop(stopTypeLoss,stopModePercent,40,1,False,5);
SetPositionSize(10,spsPercentOfEquity);
    
```

Use trading software (e.g. Amibroker) to generate all historical trades over past 30 years & Assemble portfolio



Evaluate & Improve Performance



Initial capital	100000.00	All trades	11
Ending capital	867152.58	Avg. Profit/Loss	0.35
Net Profit	767152.58	Avg. Profit/Loss %	0.76
Net Profit %	767.15%	Avg. Bars Held	0.76
Exposure %	0.76%	Winners	34 (30.4%)
Net Risk Adjusted Return %	51.07%	Total Profit	140.54
Annual Return %	0.76%	Avg. Profit	0.35
Risk Adjusted Return %	0.76%	Avg. Profit %	0.35
Transaction costs	0.02	Avg. Bars Held	0.33
		Max. Consecutive	1.15
		Largest win	0.31
		# bars in largest win	0.3
		Losers	27 (23.6%)
		Total Loss	-43.06
		Avg. Loss	-0.26
		Avg. Loss %	-0.26%
		Avg. Bars Held	0.73
		Max. Consecutive	6.1
		Largest loss	0.12
		# bars in largest loss	0.12
		Max. trade drawdown	0.04
		Max. trade % drawdown	0.52
		Max. system drawdown	0.50
		Max. system % drawdown	0.76%
		Recovery Factor	0.37
		CAR/MaxDD	0.78
		RAR/MaxDD	0.19
		Profit Factor	0.20
		Payoff Ratio	0.38
		Standard Error	0.47
		Risk-Reward Ratio	0.48
		Ulcer Index	0.23
		Ulcer Performance Index	0.56
		Sharpe Ratio of trades	2.90
		K-Ratio	0.05

Historical Performance From Strategy Backtest



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“You’re Only One System Away!”

Pop Quiz

Why do we optimize our trading systems?

A. To improve performance of the system

B. To eliminate bad trades that could hurt us

C. To make the system as stable as possible

D. To make the equity curve as smooth as possible

Pop Quiz

Why do we optimize our trading systems?

A. To improve performance of the system

B. To eliminate bad trades that could hurt us

C. To make the system as stable as possible

D. To make the equity curve as smooth as possible

The system with the most stable parameter set is most likely to perform well in the future

The Optimization Paradox

The more heavily we optimize a trading system to achieve the best backtest results the poorer performance will typically be in real trading.



This happens because the optimization process overfits the historical data, capturing noise rather than the underlying signal

How To Optimize Your System

```
//=====
//Entry Conditions (Liquidity Filters, Volatility Filters, Setup, Entry Triggers)
//=====

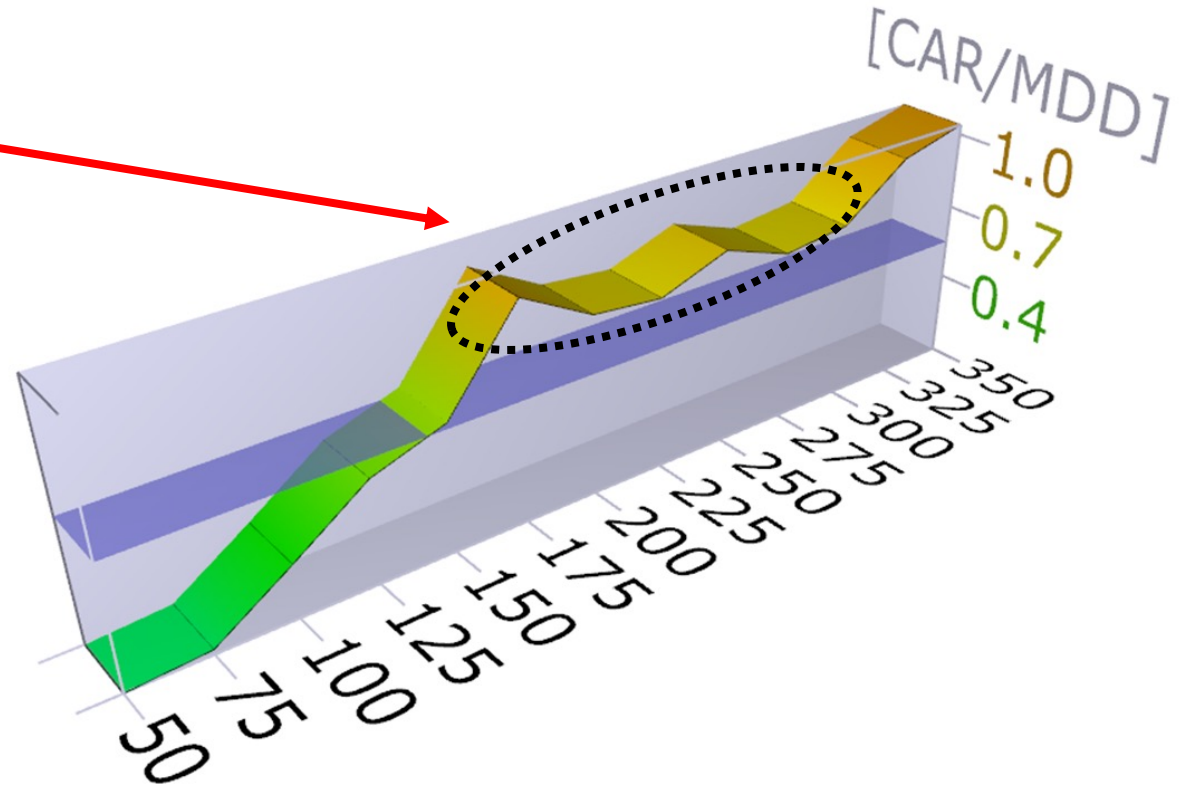
TrendFilter           = C > EMA(C,200);
VolatilityFilter      = ATR(14)/C>0.08;
LiquidityFilter       = MA(C*V,20)>1000000;
EntryTrigger         = Cross(5,RSI(3));
SellRule1             = C>EMA(C,3);
SellRule2            = C<EMA(C,200);

//=====
// Specify which rules to use in the Buy and Sell conditions...
//=====

Buy                  = TrendFilter
                    AND VolatilityFilter
                    AND LiquidityFilter
                    AND EntryTrigger;

Sell                 = SellRule1
                    OR SellRule2;

//=====
// Position Sizing & Risk Management
//=====
```



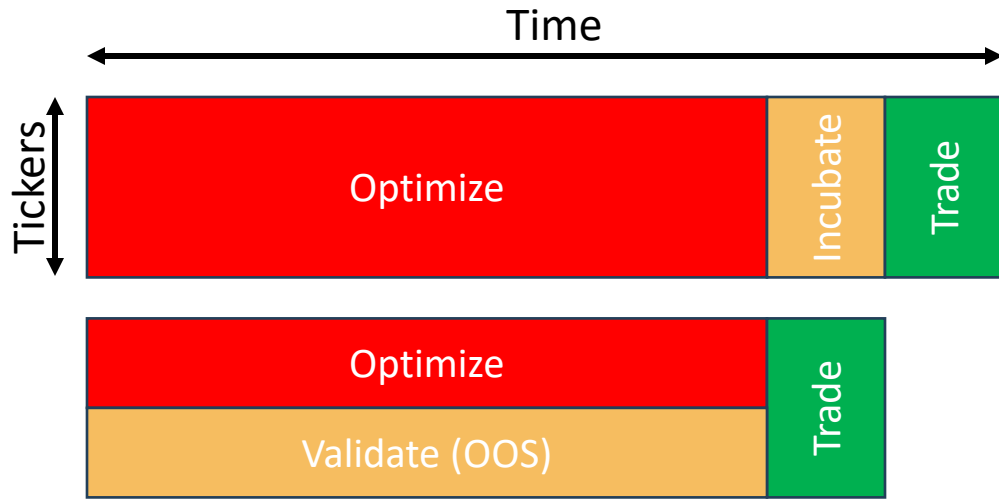
Example of a trading system only
Not a recommendation to trade

```
));
opModePercent,40,2,False,5);
centOfEquity);
```

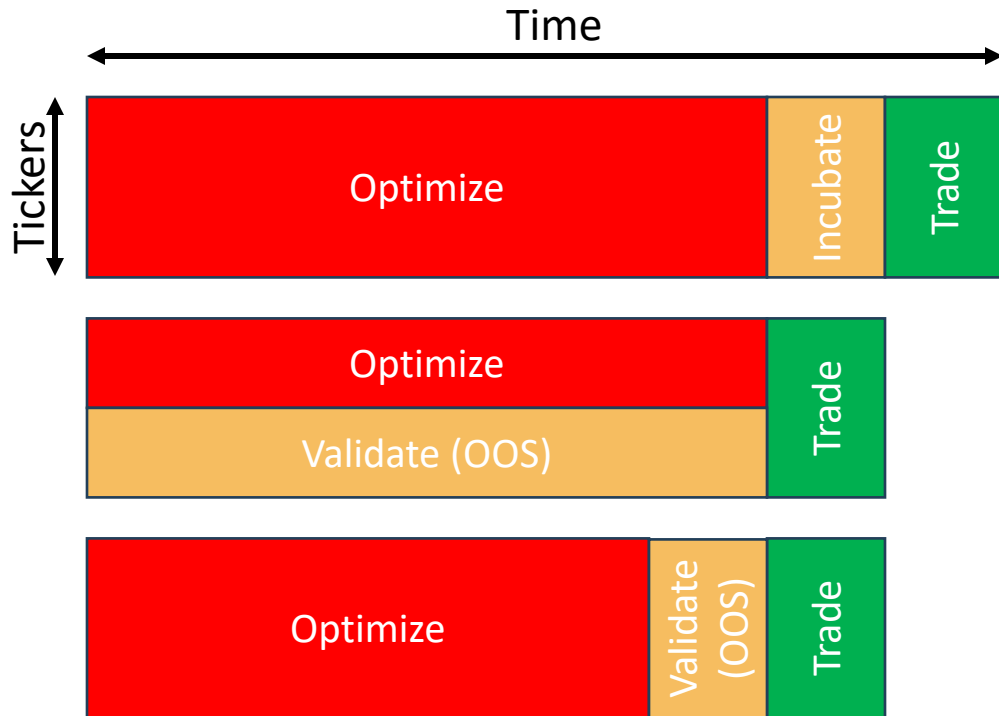
Validation Techniques



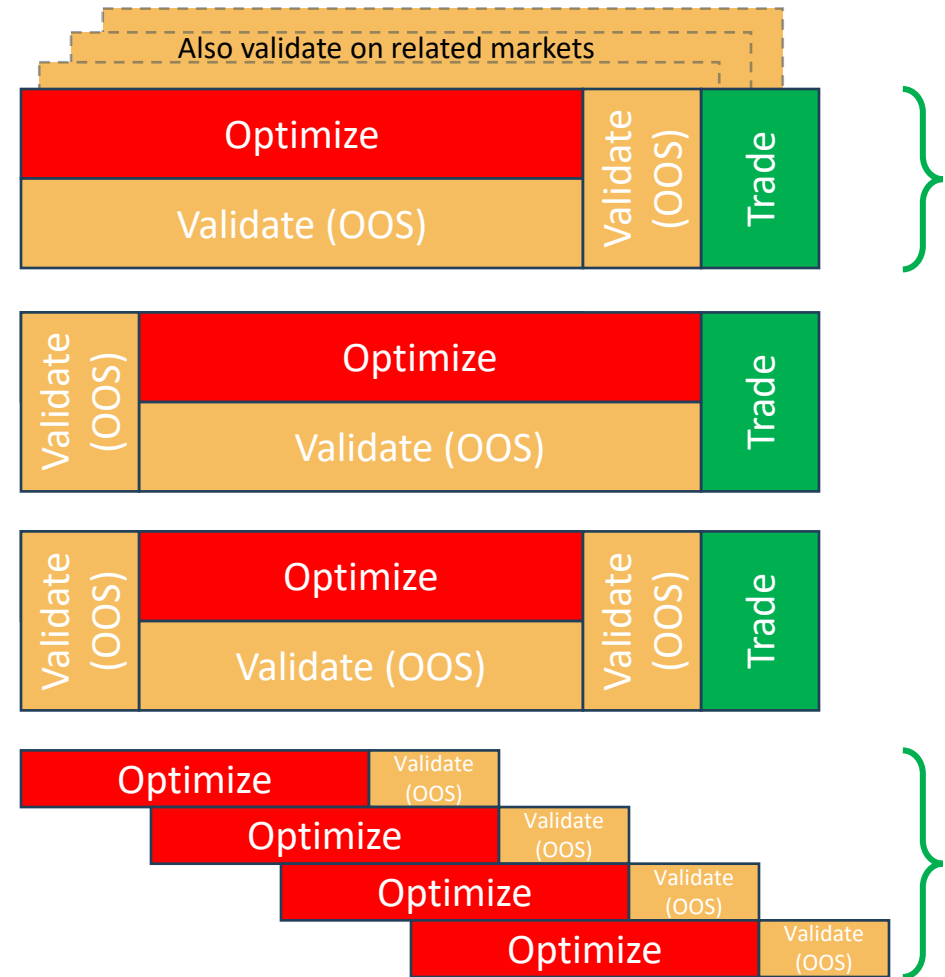
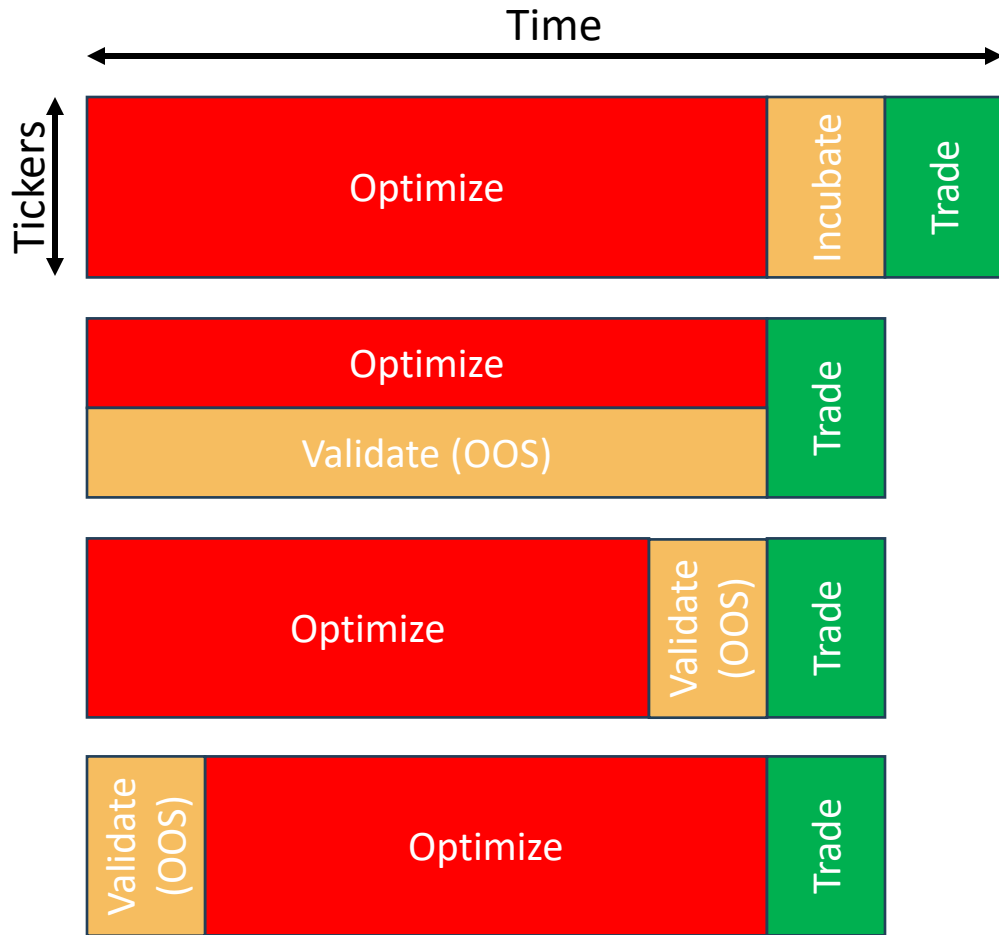
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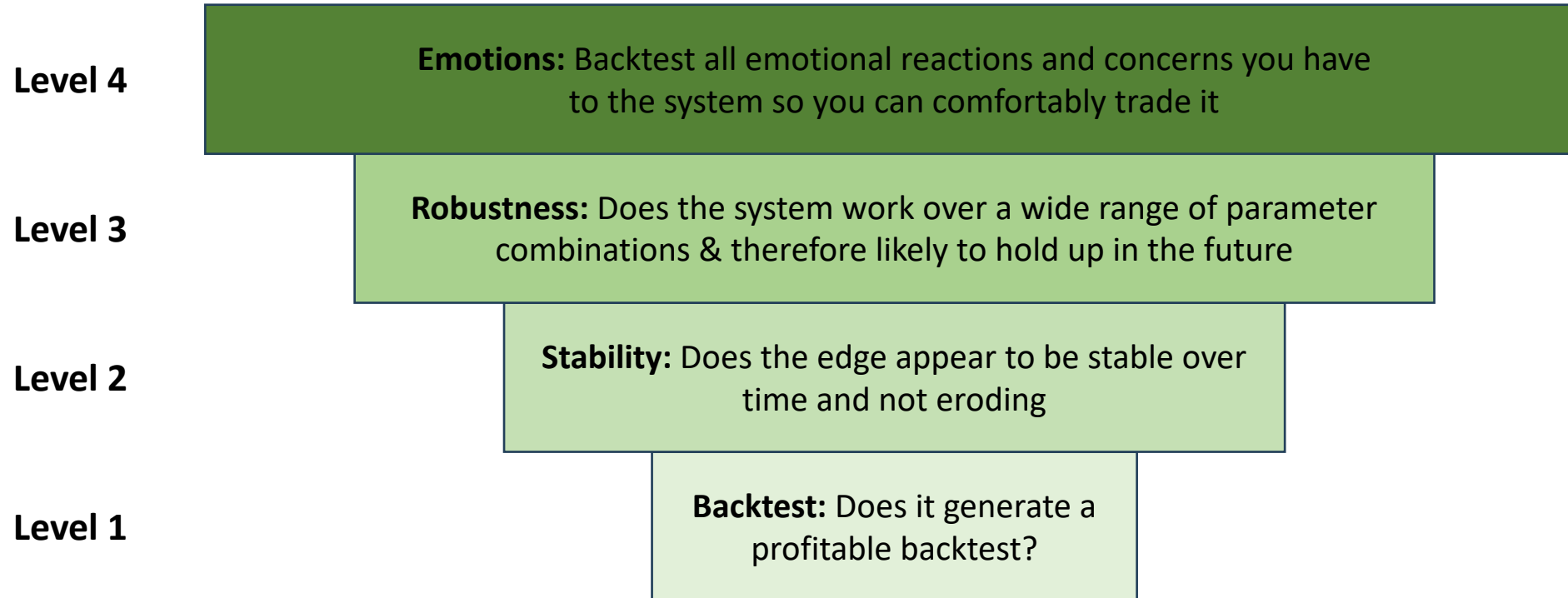
Validation Techniques



Validation Techniques



Levels of Confidence Building



Common backtesting mistakes / Issues

1. **Ignoring Slippage and Commissions:** Not accounting for these costs can significantly inflate backtest performance results.
2. **Overfitting the Model:** Creating a system that performs exceptionally well on historical data but fails to predict future movements accurately.
3. **Lack of Out-of-Sample Testing:** Relying solely on in-sample backtesting without validating the strategy on out-of-sample data can lead to overfitting and poor real-world performance.
4. **Inadequate Sample Size:** Sometimes traders use too short a historical period for backtesting, which may not capture a full market cycle or various economic conditions, leading to misleading results.
5. **Look-Ahead Bias:** Using information in the backtest that would not have been available at the time the trade was made.
6. **Modeling Errors:** Errors in the model itself, such as incorrect assumptions about market dynamics or the use of inappropriate mathematical models, can invalidate a backtest.
7. **Survivorship Bias:** Only including stocks that have survived the period tested, which can skew results positively as it ignores those that have failed.
8. **Ignoring Liquidity:** Failing to account for lack of liquidity in instruments the system trades.
9. **Data Snooping:** Extensively searching through data to find patterns without a prior hypothesis, leading to models that capture noise rather than a true signal.
10. **Ignoring Market Regime Changes:** Failing to test how a strategy performs under different market conditions, such as bull or bear markets, can lead to an incomplete understanding of performance.
11. **Data Quality Issues:** Using data that has errors or omissions can skew backtesting results. It's crucial to ensure the data is clean and representative of actual market conditions.
12. **Failure to Adjust for Dividends and Splits:** Not adjusting for dividends and stock splits can significantly alter the performance metrics of a strategy, especially for long-term backtests.
13. **Neglecting Trading Costs Beyond Commissions:** Many traders account for commissions but forget to include realistic costs like the bid-ask spread and borrowing fees for short positions.
14. **Underestimating Psychological Factors:** Backtesting doesn't account for the psychological challenges a trader faces, such as the temptation to deviate from the strategy during drawdowns.
15. **Parameter Sensitivity:** A strategy might be too sensitive to its parameters. Small changes in input values can lead to significant differences in backtest outcomes, suggesting a lack of robustness.
16. **Ignoring Order Execution Realities:** Not considering the practical aspects of order execution can lead to unrealistic backtesting results. E.g. Needing to know the closing price before exiting at the close.
17. **Model Stability Over Time:** Some strategies may appear robust in a specific time frame but fail to adapt to changing market conditions and suffer large losses when the market regime changes.
18. **Risk of Model Decay:** Strategies can decay over time as market conditions evolve or as more traders begin to exploit the same anomalies.

Let me ask you...

- Would you like to take your trading to the next level?
- Do you want specific, actionable guidance to improve your trading?
- Would you like to discover simple changes you can make to improve your results, reduce your risk and make you a better trader?

Would you like all of this for FREE?

Next Steps

Do you want to improve YOUR trading systematically?

- Get The Trader Acceleration Bundle... FREE!
 - **The Millionaire Trader Code:**
Course that shows you the path to consistent trading results
 - **Trading Systems Confidence eBook:**
Discover how to build the confidence to launch and follow your trading system
 - **Portfolio CPR Cheat Sheet:**
Step by step approach to resurrect your portfolio and position yourself for growth
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SCAN ME



