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# Modeling Risk in Quantitative Portfolios

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See important disclosures at the end of this presentation.

# | Outline

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1. Quantifiable risk measures
2. Case Study - Strategy depicting importance of chosen risk metric
3. Predictive risk models
4. Asymmetric Investor Bias - Loss Aversion
5. Optimize Investor utility

## | Popular Risk Measures

- Volatility
- Drawdown
- Expected Shortfall

## | Other Specific Risk Measures

- Beta to benchmark
- Sector concentration
- Meet future cash flows

## | Behavioural Risk

- Loss Aversion

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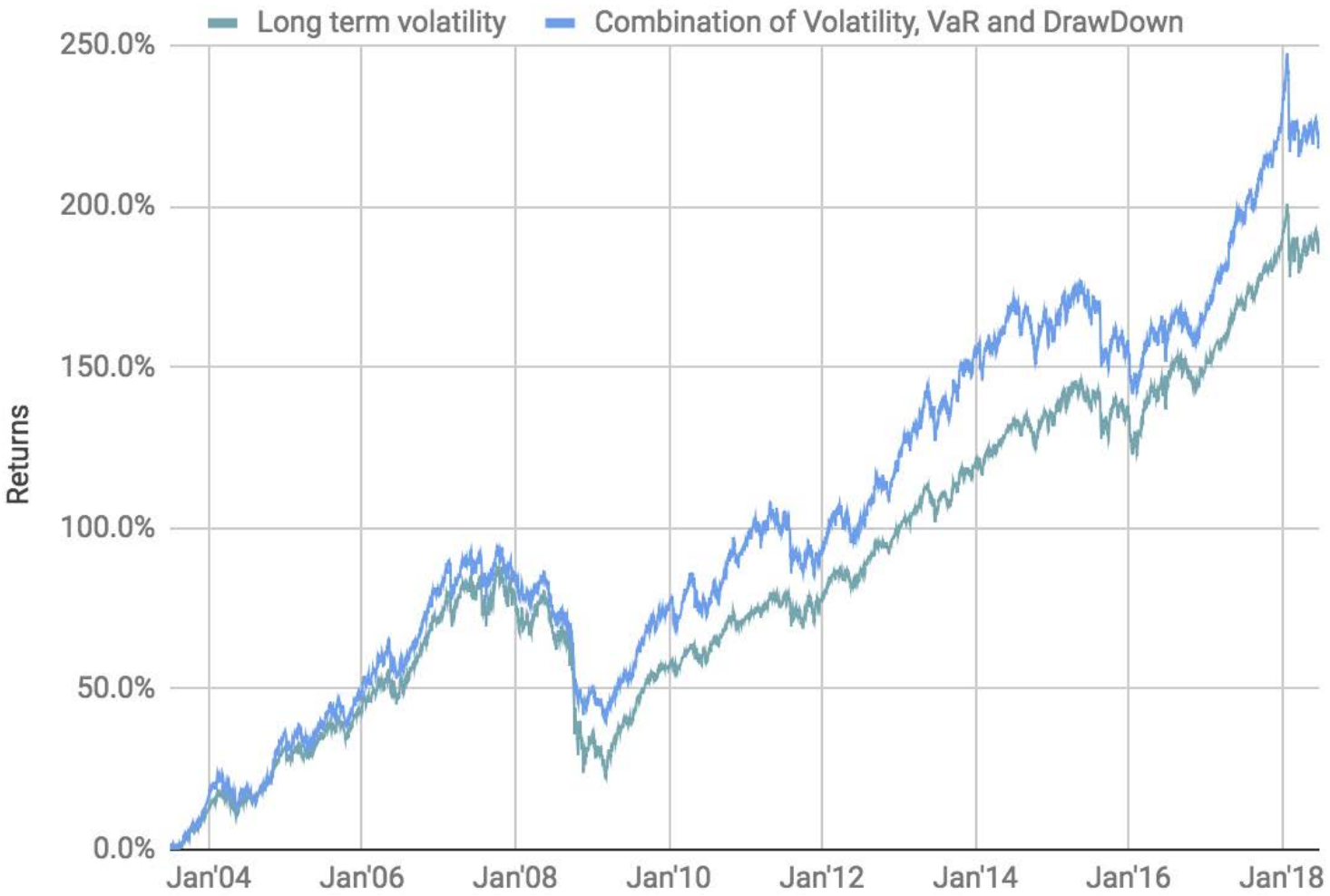
# Hypothetical Case Study

*The model or backtested portfolio and performance data provided in this presentation is theoretical and is not based on the performance of actual portfolios. It does not reflect trading in actual accounts; actual results may significantly differ from the theoretical returns being presented It is provided for informational purposes to illustrate use of deep learning only. Any interpretation of the results should take into consideration the limitations inherent in the results of the model. Backtested performance is developed with the benefit of hindsight, including the ability to adjust the method for selecting securities until returns for the past period are maximized, and has inherent limitations. Actual performance may differ significantly from backtested performance.*

# | Case Study- Dynamic Tactical Allocation

- Dynamicallyallocate assets between global equity and fixed income ETFs
- Target a fixed volatility of 10%
- Enforce a turnover constraint

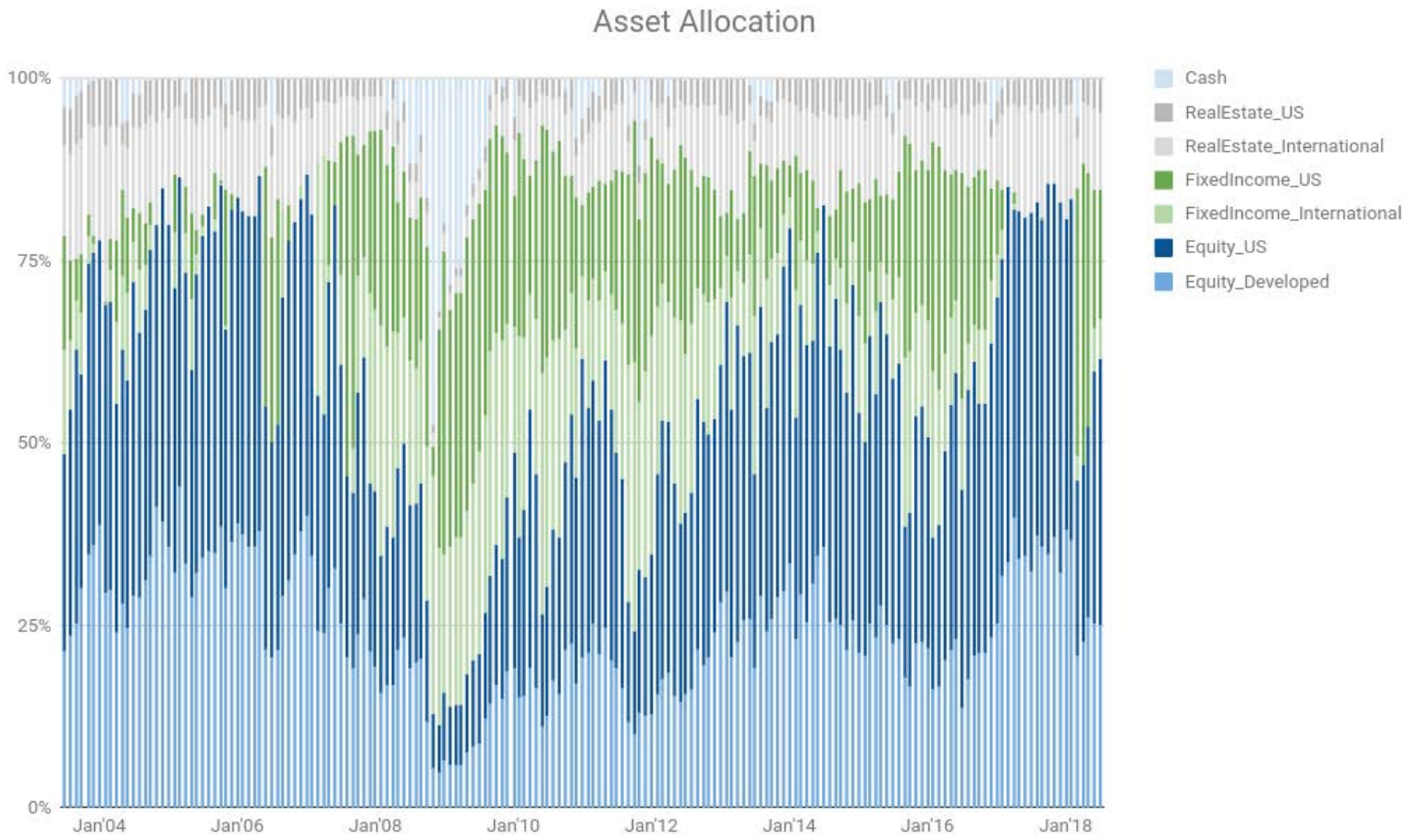
# | Case Study- Results




Backtested cumulative returns of the two strategies. For Illustrative Purposes Only.

**Daily ETF Data sourced from NANEX and IEX*

# | Case Study- Asset Allocation




Backtested asset allocation of the strategy that combines different risk measures.For Illustrative Purposes Only.

**Daily ETF Data sourced from NANEX and IEX*

# | Risk Prediction

## | Macroeconomic Indicators

- Unemployment Rate
- Non-Farm Payrolls
- GDP
- CPI etc.

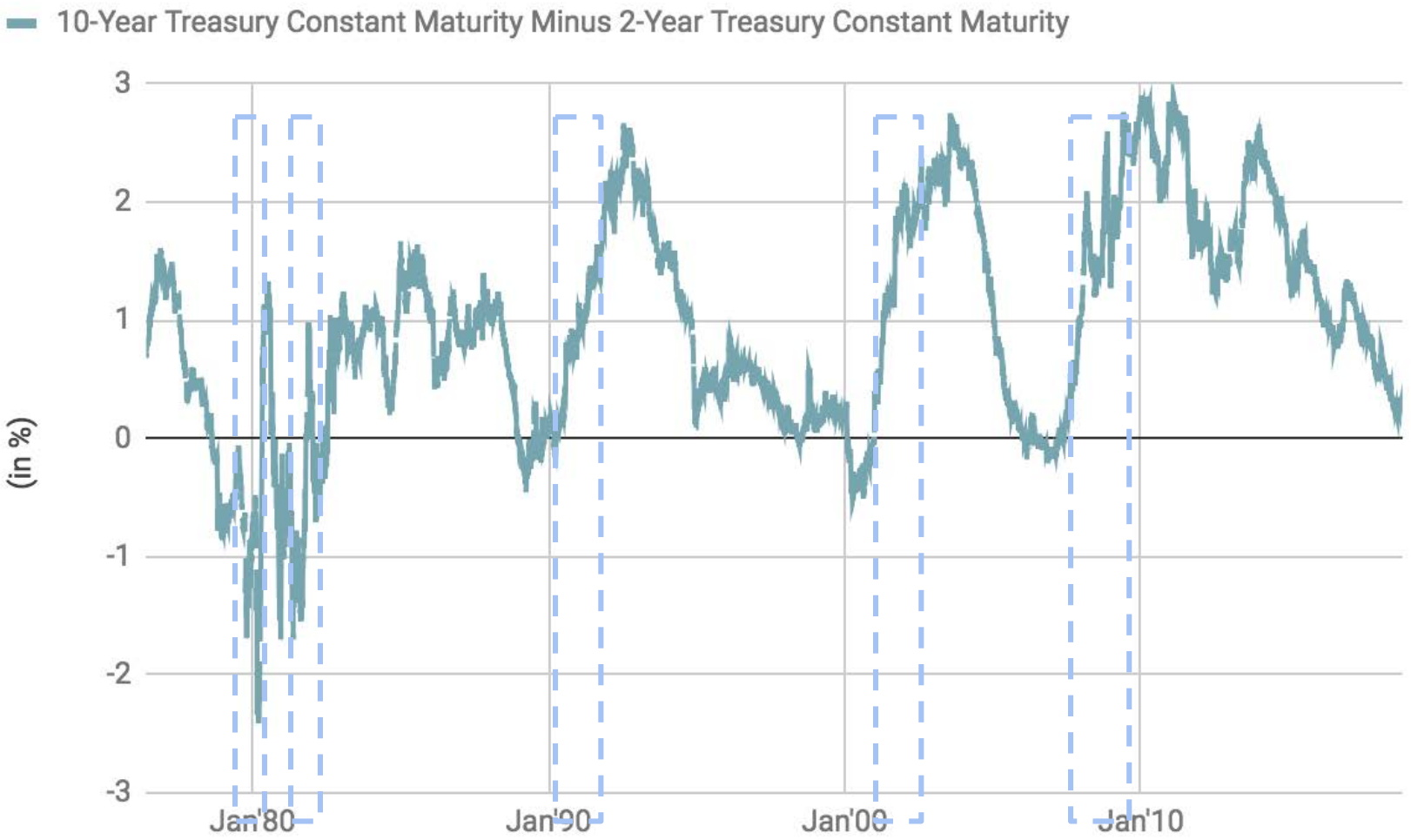
## | Other Economic and Technical Indicators

- Yield Curve ( 10Y-2Y spread, 10Y-3M spread)
- Movement of funds between sectors
- Copper/Gold Ratio
- Mean Reversionof returns

# | Unemployment Rate as Predictor

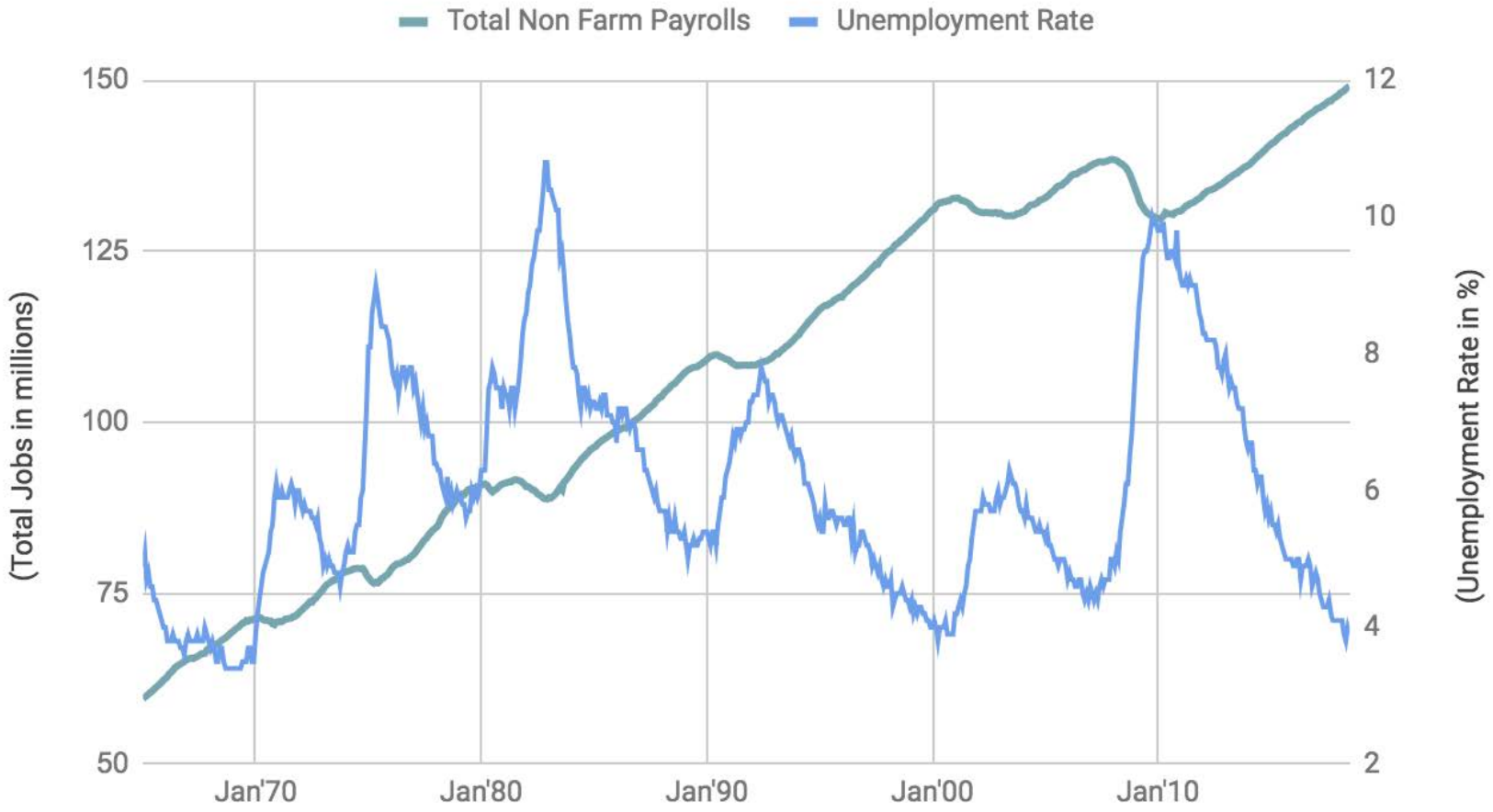

*Data sourced from Federal Reserve Economic Data

# | Yield Curve Inversion as Predictor



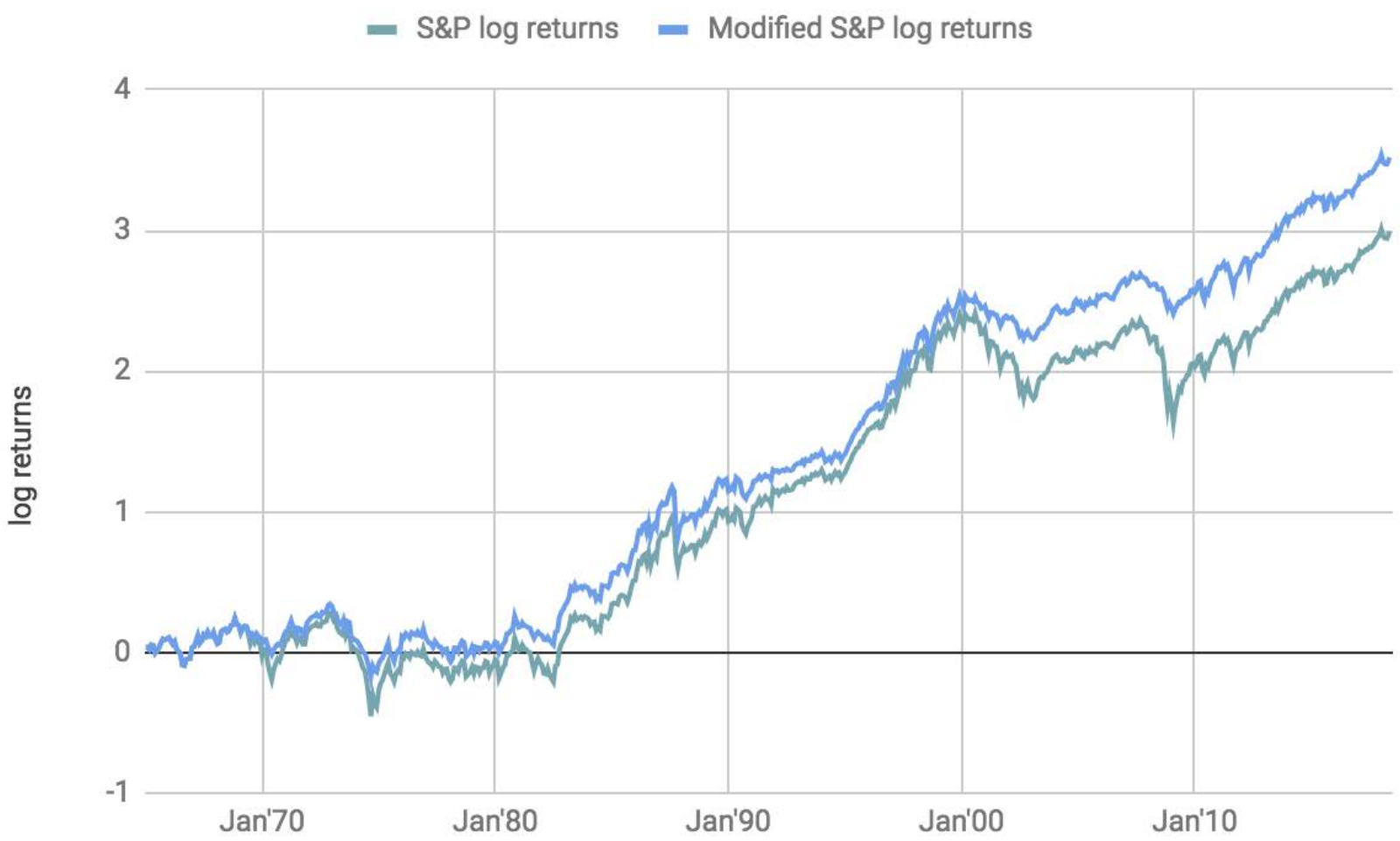

*Data sourced from Federal Reserve Economic Data

# | Combination of Unemployment Rate and Jobs added is a stronger predictor



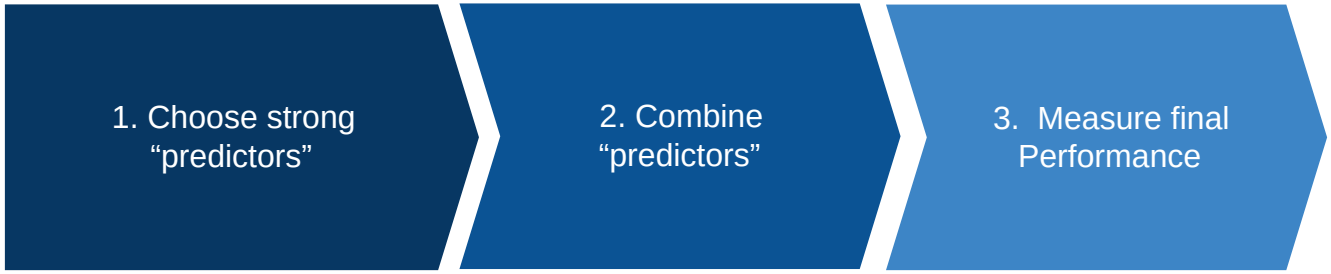

*Data sourced from Federal Reserve Economic Data

# | Improvement in Performance




**Monthly data sourced from Global Financial Data*

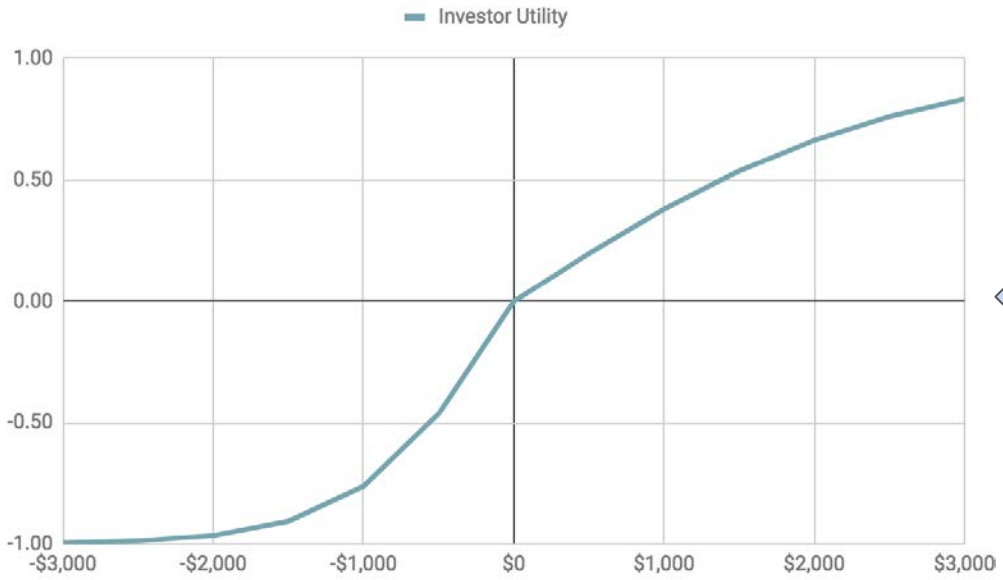
# | Combine Multiple Risk Predictors

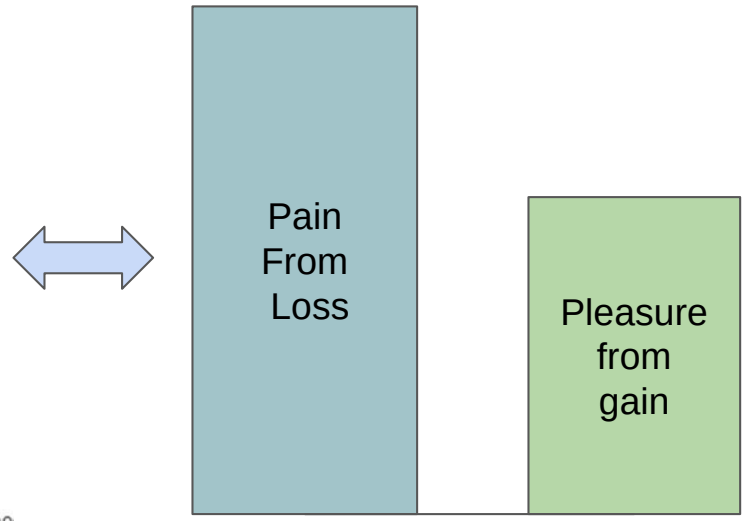



- Combine the "predictors" to achieve lower false positives

# | Asymmetric Investor Bias - Loss Aversion

*"Losses loom larger than gains"*



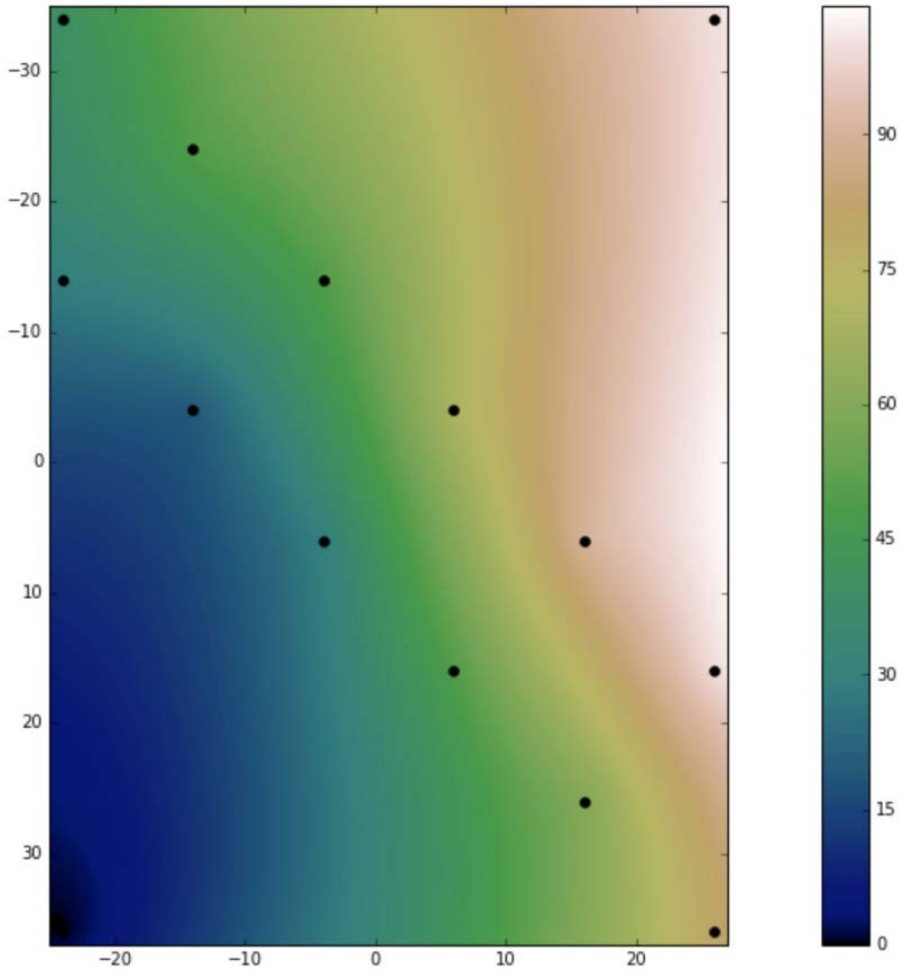

For Illustrative Purposes Only.

# | Investor sentiment score for various scenarios

Sample Inputs

| Hypothetical Scenario | Strategy's Returns | Benchmark's Returns | Sentiment |
|---|---|---|---|
| 1 | -24% | -14% | 30 |
| 2 | -24% | -34% | 40 |
| 3 | -14% | -4% | 20 |
| 4 | -14% | -24% | 50 |
| 5 | -4% | 6% | 30 |
| 6 | -4% | -14% | 50 |
| 7 | 6% | 16% | 50 |
| 8 | 6% | -4% | 70 |
| 9 | 16% | 26% | 60 |
| 10 | 16% | 6% | 90 |
| 11 | 26% | 36% | 80 |
| 12 | 26% | 16% | 100 |
| 13 | 26% | -34% | 100 |
| 14 | -24% | 36% | 0 |

# | Optimize investor utility score




Source: Qplum Research  For Illustrative Purposes Only

# | Conclusion

1. Choice of risk measure is vital to the strategy's performance
2. Risk measures exhibit predictability
3. Behavioural risk is a critical yet underutilized input in asset management

# Questions?

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