

A Brief History of Quantitative Investing

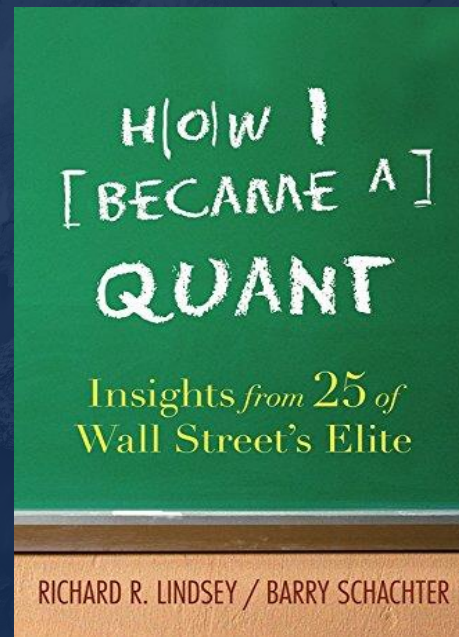
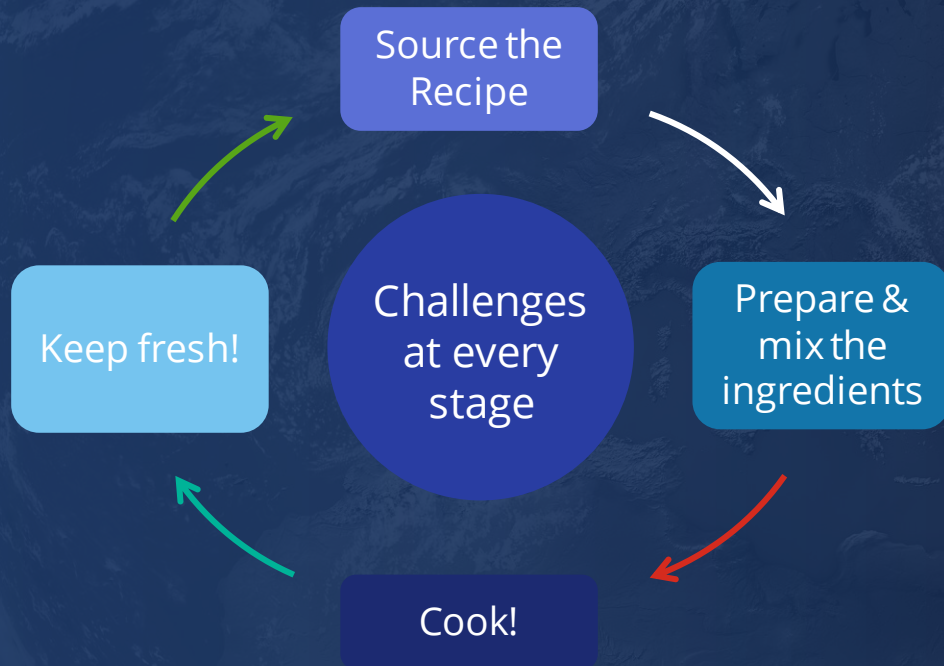
It's a cooking class

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Master Chef Challenge

There are a number of stages to building a quantitatively derived portfolio



Challenge 1 : Finding a recipe

Delving into the past for inspiration

$$(X' \cdot X)^{-1} \cdot X'$$

Maxing the factors

"Factor investing" gains popularity

ESG investing and smart beta combination
grows in popularity

The evolution
of "modern
portfolio theory"

Markowitz

Arbitrage
Pricing Theory

Fama & French

Computer Science, Data Science and
significant Quant product launches

1960s

1970s

1980s

1990s

2000s

2010s

Smart beta funds pass \$1tn in assets

Milestone underscores the increasing popularity of hybrid investment strategy

"Beware geeks bearing formulas."
Quote: Warren Buffet

The quant factories are producing the
fund managers of tomorrow

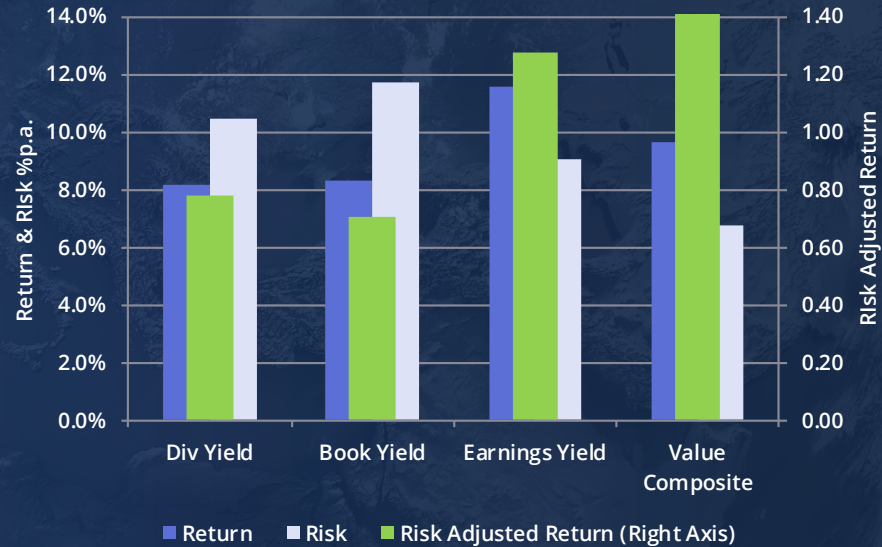


Challenge 2 : Preparing and combining the ingredients?

The impact of good combinations



Risk, Return & Risk Adjusted Return



Challenge 3 : How much style factor intensity?

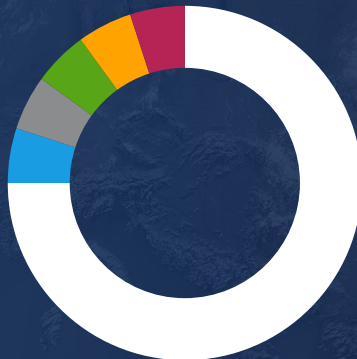
Market Cap Index Factor Investing



■ Index

- Market-Cap weighted tracker
- Index matching

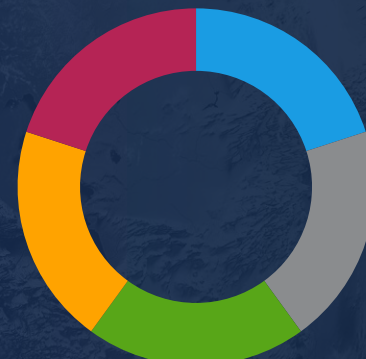
Index Relative Factor Investing



■ Index ■ Value ■ Quality
■ Momentum ■ Size ■ Low Volatility

- Factor tilts on Market-Cap weights
- Enhancing index return

Total Return Factor Investing



■ Value ■ Quality ■ Momentum
■ Low Volatility ■ Size

- Factors make the weights
- Improving total return and risk



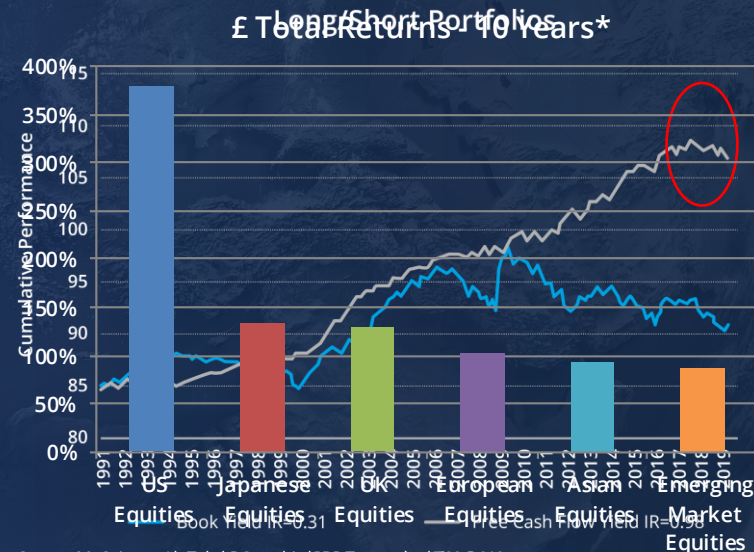
Challenge 4 : 'keeping it fresh'

The market never sleeps

- When new information becomes available and portfolios need to be refreshed
 - Prices change
 - Valuations change
 - Factor exposures change!
 - New ingredients and techniques become available
 - Correlations change
- But Causality rarely changes

Relationships change

Investors have paid a price for diversifying across equity markets

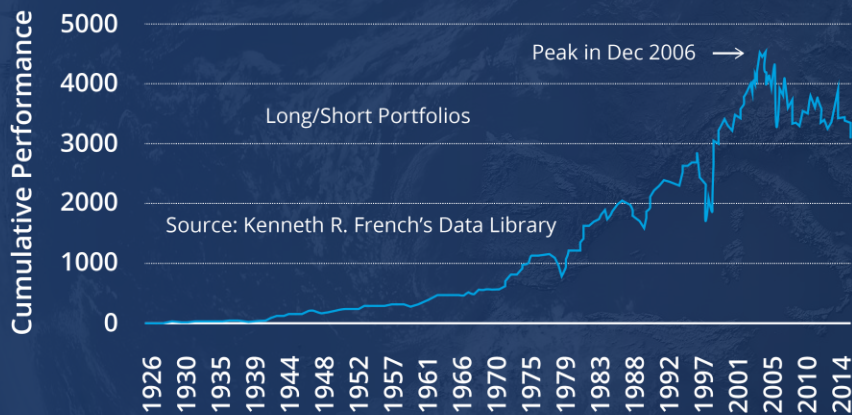


Source MSCI, Standard & Poor's, Bloomberg, and FTSE

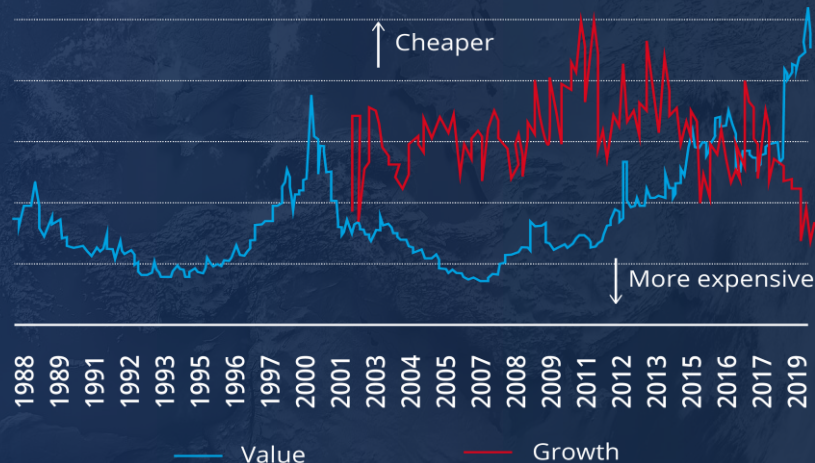
Reasons to be optimistic

The Value factor might look like this

Value's Lost Decade



but it also looks like this



Source: Aberdeen Standard Investments

Conclusion



- Pick a good clear Recipe
- Choose fine ingredients and mix well
 - Correlation and causation
- Adhere to the steps in the recipe
- Season to taste
- Exercise patience
- Don't over-indulge
- Enjoy



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