How to be Factor Aware

What factors are you exposed to
& how to handle exposure

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Why are we here?

Case Study

…To Dissect the Current Performance Equation

    Sophisticated Passives + Volatility Impact = Underperformance

…To Become Factor Aware

    Alpha vs. Risk Factors

…To Utilize the New Performance Equation

Focus on your Alpha + Avoid Unintentional Factor Bets = Higher Returns

Large, well-known global fund

- Stock selection ends up with country, currency, & style bets
- Risk should be "specific" but ends up allocated to factors

Attribution Analysis

- Positive "Specific" Return
- Style exposure offsets good stock selection
- Country, currency, & industry bets helped returns

Changing the Performance Equation

Cumulative Returns, 2007-2015
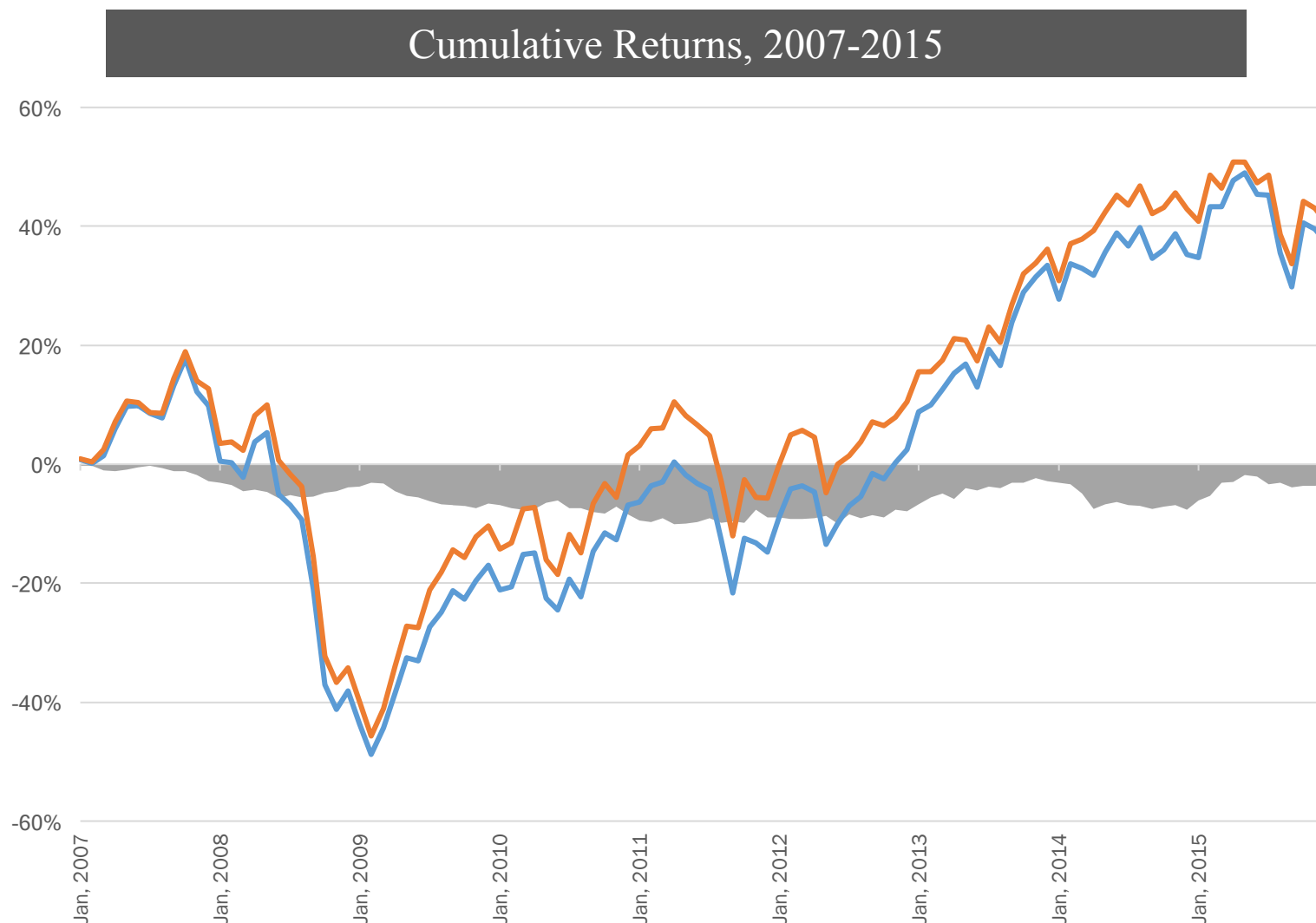
Multi-hundred billion dollar fund

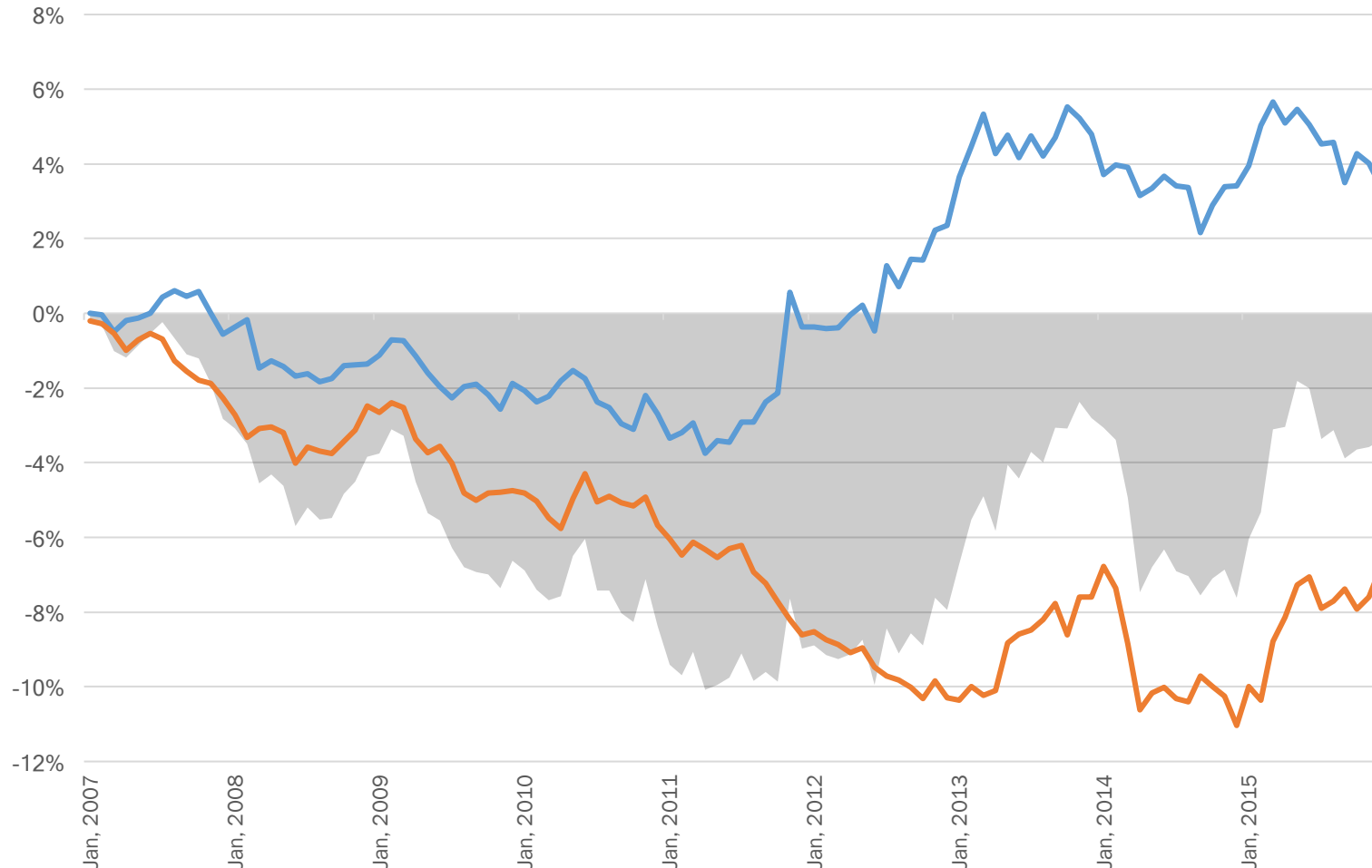Largely underperformed its index over the past 10 years

Benchmark

Fund

Active Return

Active Return Breakdown

Return Contribution, 2007-2015

We see an interesting story emerge:

- This PM has a winning alpha strategy, but…

- Factor contribution has a large negative effect
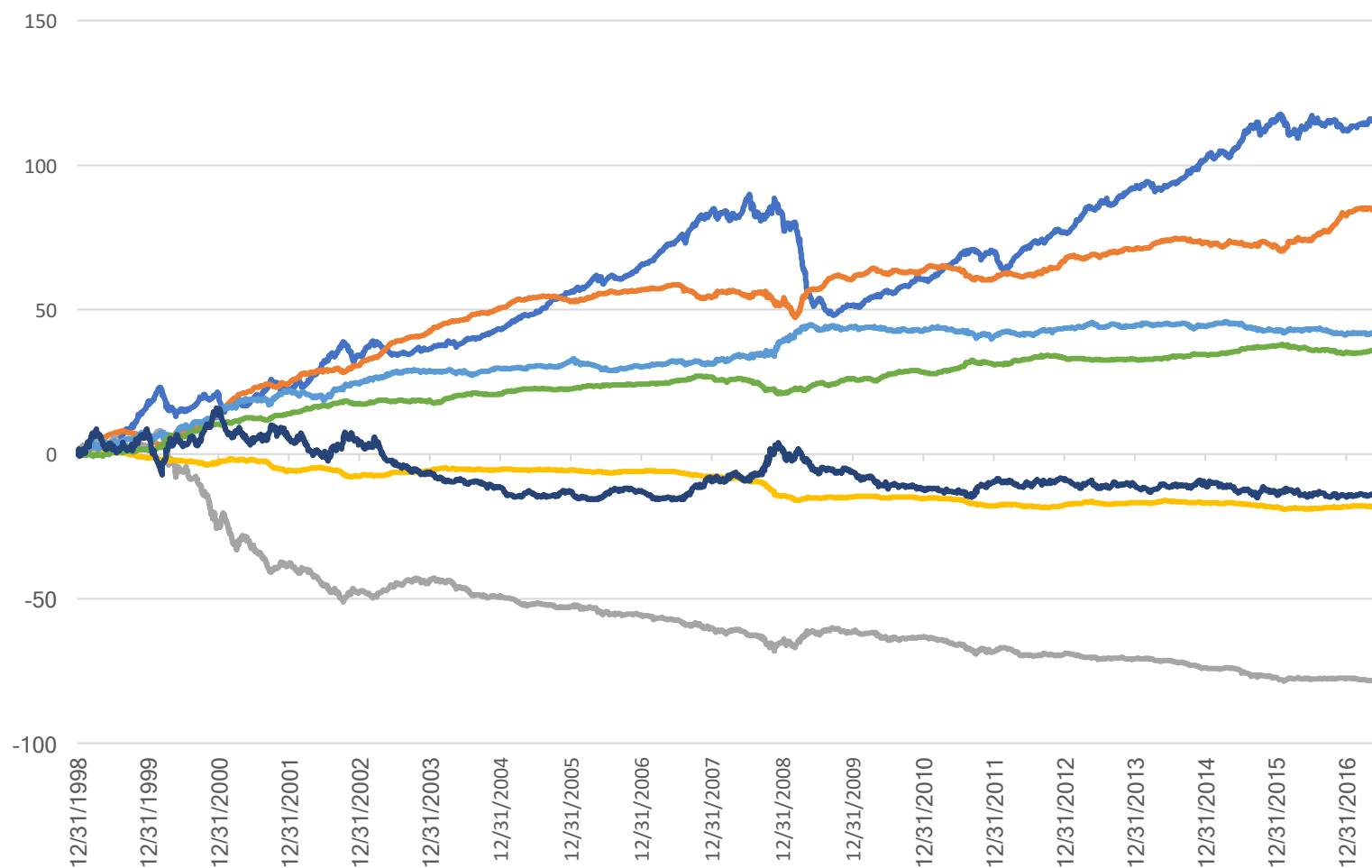
Factor Contribution

Alpha Contribution

Active Return

Understanding Factors

Cumulative Factor Returns

Factors are **underlying characteristics**

- Explain & Influence an investment's returns

- Long-term effect

Momentum

Value

Volatility

Leverage

Liquidity

Growth

Size

Types of Factors

Risk factors explain **cross-sectional differences in performance**

- E.g. small stocks expected to outperform large stocks

- Pure risk factors have no expected associated long-term return

- Alpha factors have an expected direction

- "Stock selection" or idiosyncratic risk is specific to an individual company apart from its risk exposures

All alpha factors are risk factors, but not all risk factors are alpha factors
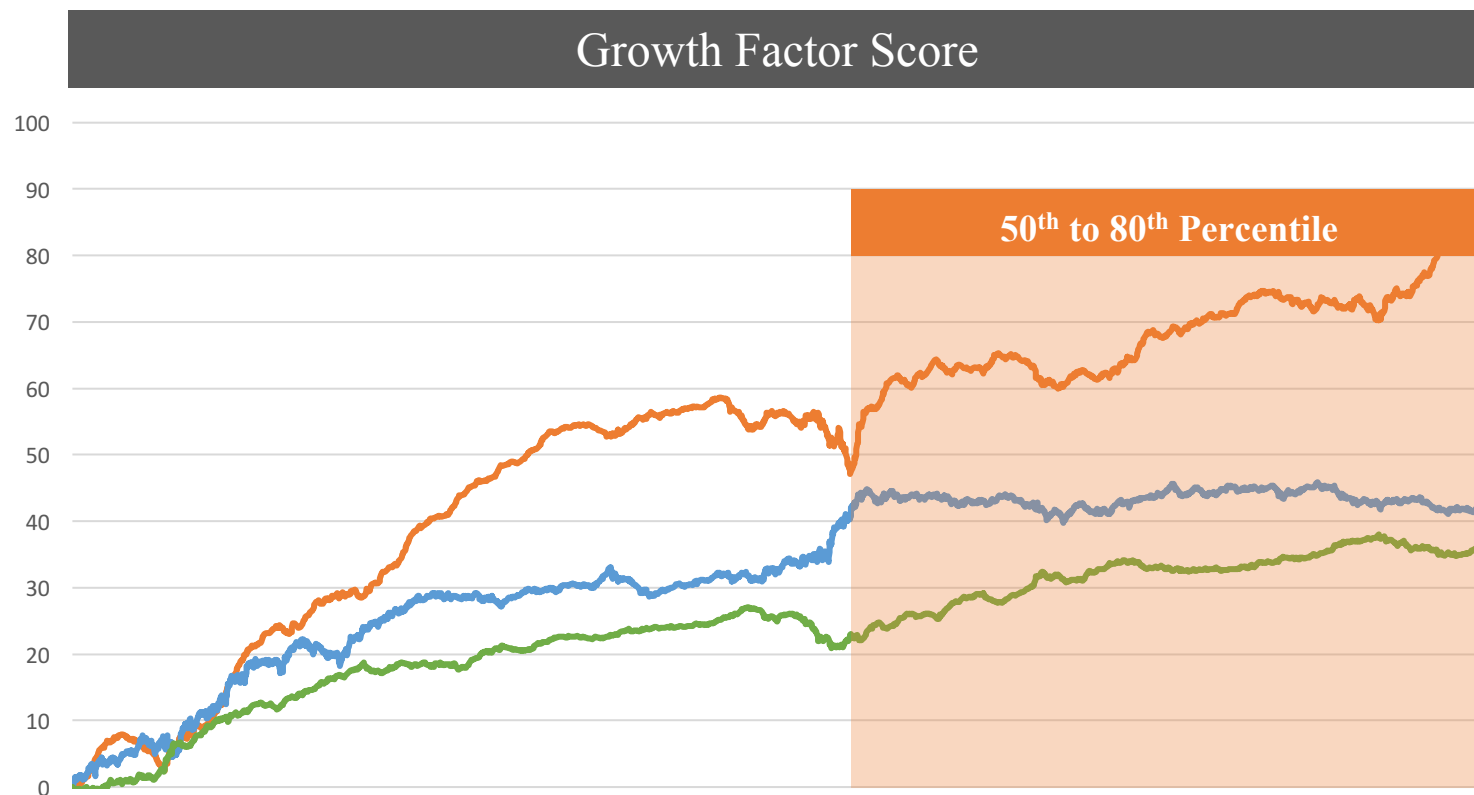
Risk

— Vs —

Alpha

Examples of Risk Factors

Factors	Definition	Theory	Expected Factor Return
Risk-based Investment Behaviors			
Volatility	3 month average of absolute return over cross-sectional standard deviation	Low risk stocks tend to outperform high risk lottery tickets	Negative
Price-Reaction Based Factors			
Momentum	Total Return over the past 12 months, excluding the most recent month	Investors underreact to good news on medium term horizon	Positive
Growth & Value			
Growth	Sustainable growth rate, historical earnings growth, historical sales growth	Stocks with sustainable earnings growth tend to outperform	Positive
Value	Book-to-price ratio, earnings-to-price ratio	Cheap stocks outperform in the long run	Positive
Other Characteristics			
Size	Natural logarithm of total issuer market capitalization	Smaller stocks outperform large	Negative

Using Alpha Signals

Changes in an individual security's risk factor score

- Company's earnings projections increase thus elevating it's Growth factor score to the 80th percentile of the market

Growth Factor Score

Interplay between Risk Factors

- **Observation: "When volatility exceeds a certain level in the market, momentum typically underperforms"**

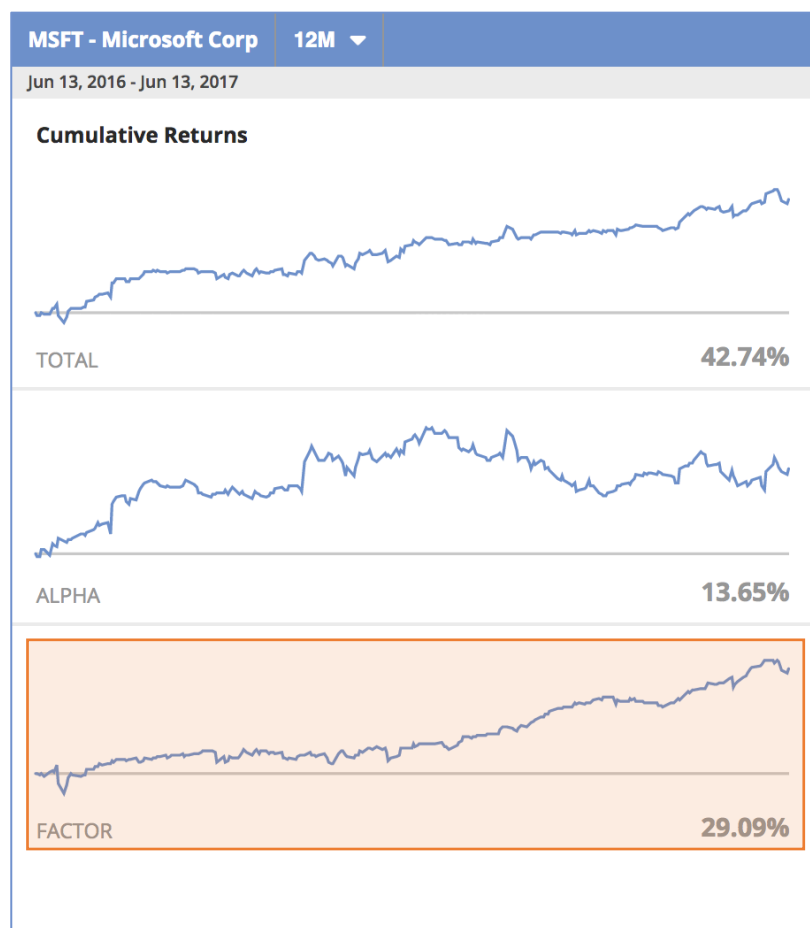- **Machine-learning algorithms learn these types of if/then-rules and offer insights**

New Sources of Information & Alternative Data

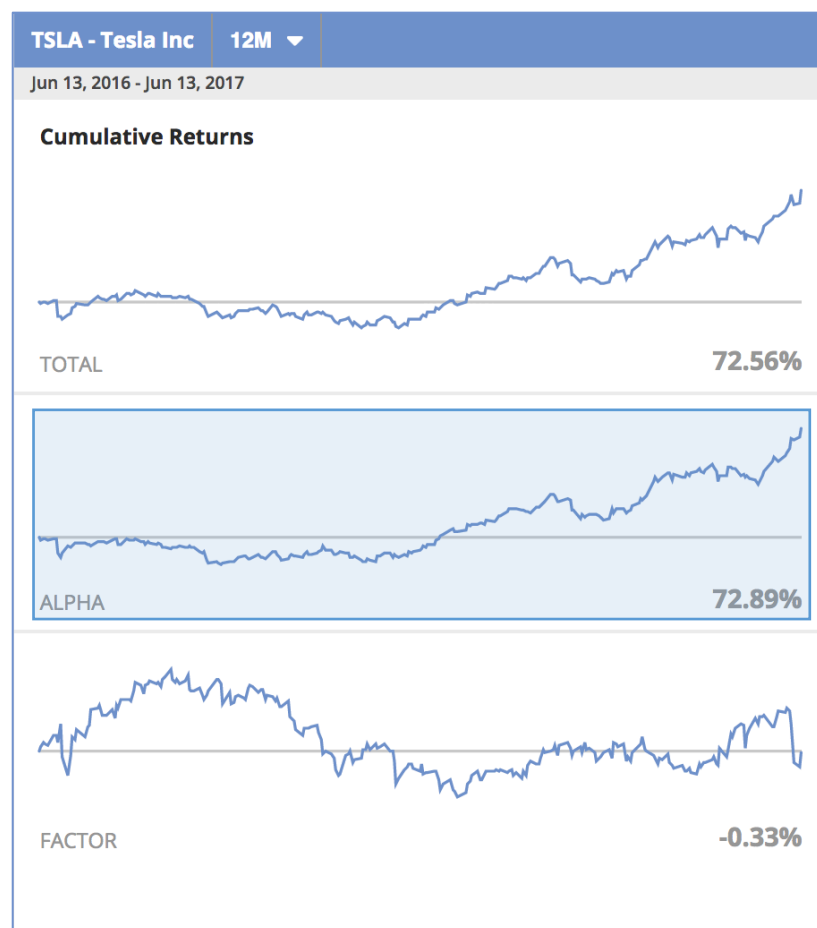- **When information is released, it is only fully understood by a narrow portion of the market**

Easily Become Factor Aware

Factor Heavy

Alpha Rich

Drive your research process into higher alpha-rich names using quant tools.

MSFT - Microsoft Corp 12M
Jun 13, 2016 - Jun 13, 2017

Cumulative Returns

TOTAL — 42.74%

ALPHA — 13.65%

FACTOR — 29.09%

TSLA - Tesla Inc 12M
Jun 13, 2016 - Jun 13, 2017

Cumulative Returns

TOTAL — 72.56%

ALPHA — 72.89%

FACTOR — -0.33%

Benefits of Factor Awareness

Growth	3M ▾
Feb 9, 2017 - May 9, 2017	

Overbought

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CURRENT

CUMULATIVE RETURN   **0.73%**

NORMALIZED RETURN   **1.26**

Earnings Surprise	3M ▾
Mar 13, 2017 - Jun 13, 2017	

Oversold

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CURRENT

CUMULATIVE RETURN   **-0.03%**

NORMALIZED RETURN   **-1.87**
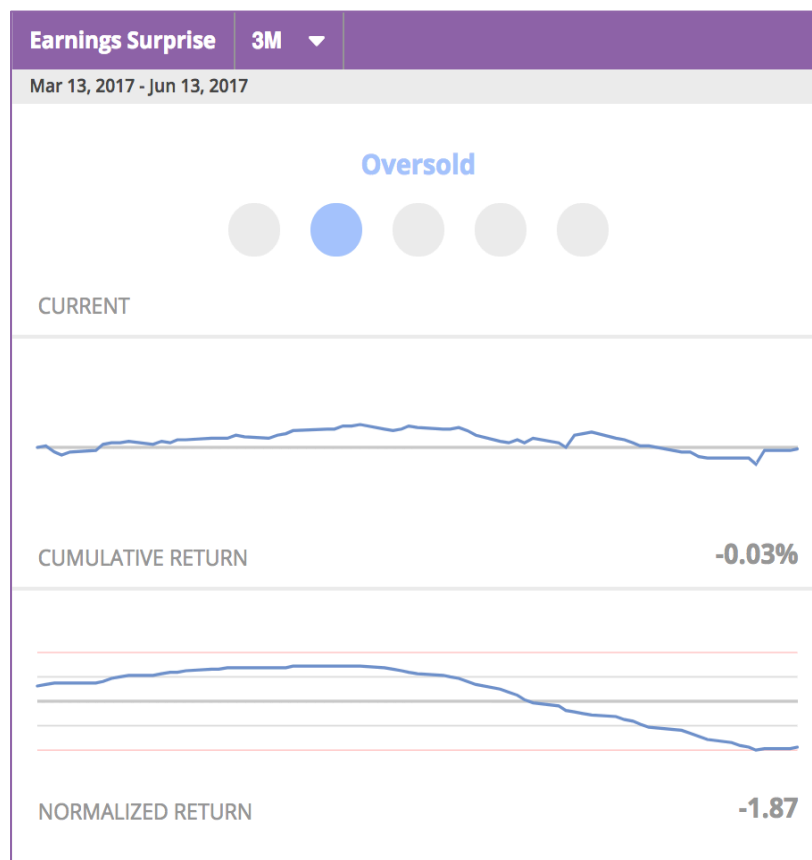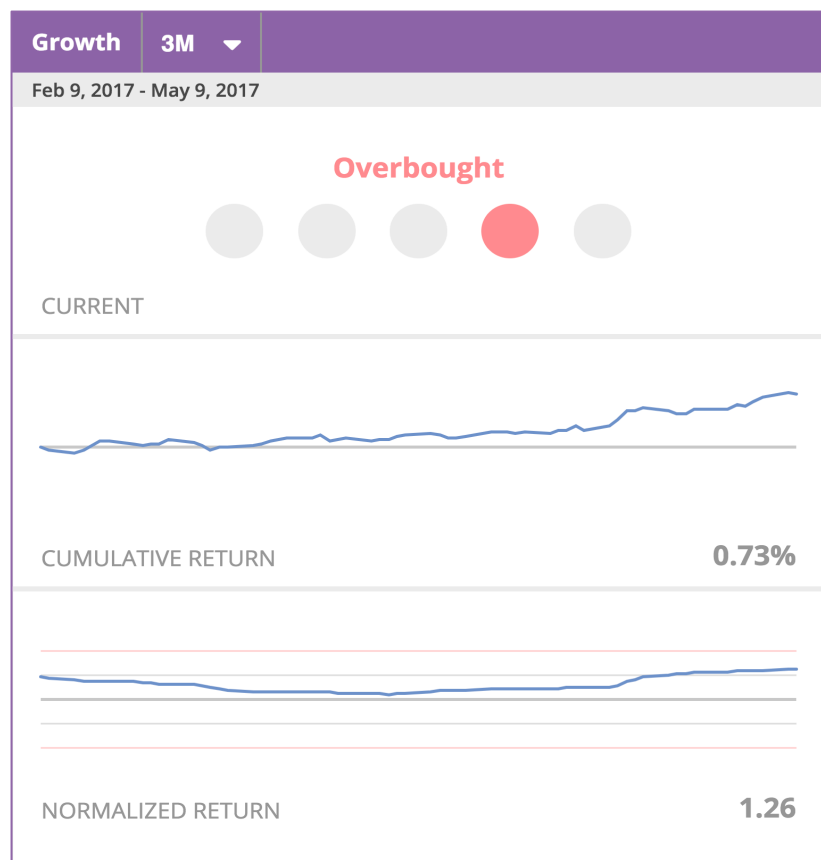
Position sizing & timing of capital allocations

Size down lower-conviction, heavy momentum names

Size up higher conviction, positive earnings surprise names

Incorporate a Factor Strategy

Factor analysis is similar to traditional fundamental investing

> The majority of factor information is already used by fundamental investors, such as financial ratios

Quick adoption for fundamental asset managers who are familiar with factors

> Systematic integration helps fine-tune decision-making on portfolio construction & rebalancing

Factor-based portfolio analytics can be viewed as another tool

> Omega Point & Axioma provide a turnkey package that integrates with your portfolio, automatically performing customized and scalable factor analysis
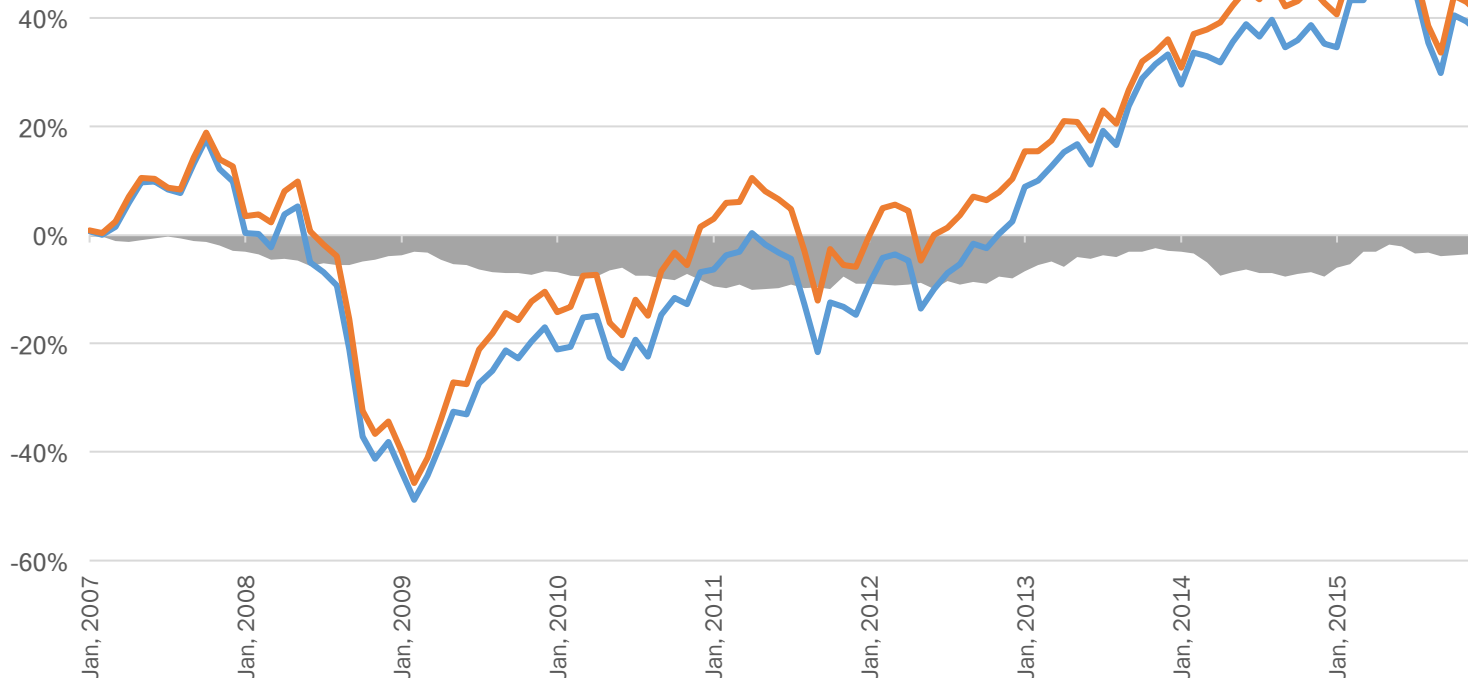
Discover

↓

Analyze

↓

Manage

↓

Customize
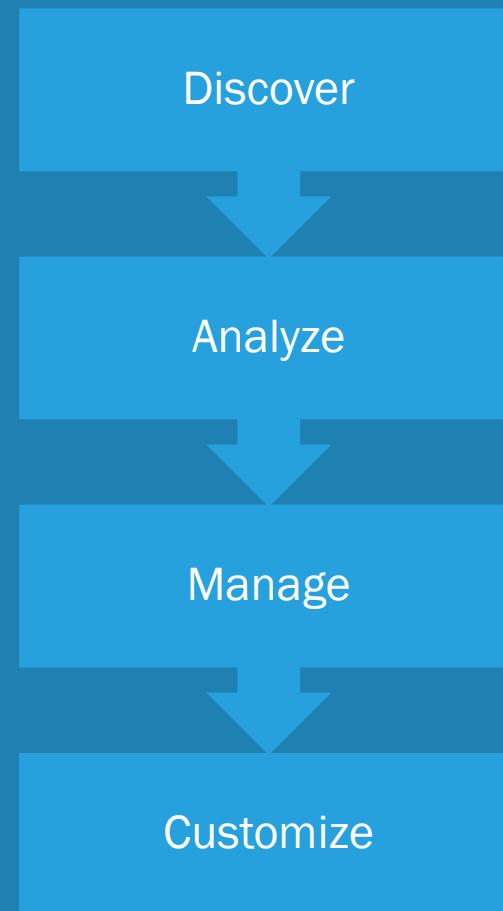
Case Study: Realized Returns

Discover

Realized Portfolio Results, 2007-2015

	Return	Risk	IR
Portfolio	3.58%	18.15%	
Benchmark	3.86%	17.60%	
Active	-0.28%	2.63%	-0.11

Large, well-known global fund

- Stock selection ends up with country, currency, & style bets

- Portfolio has underperformed the benchmark *and* was more volatile
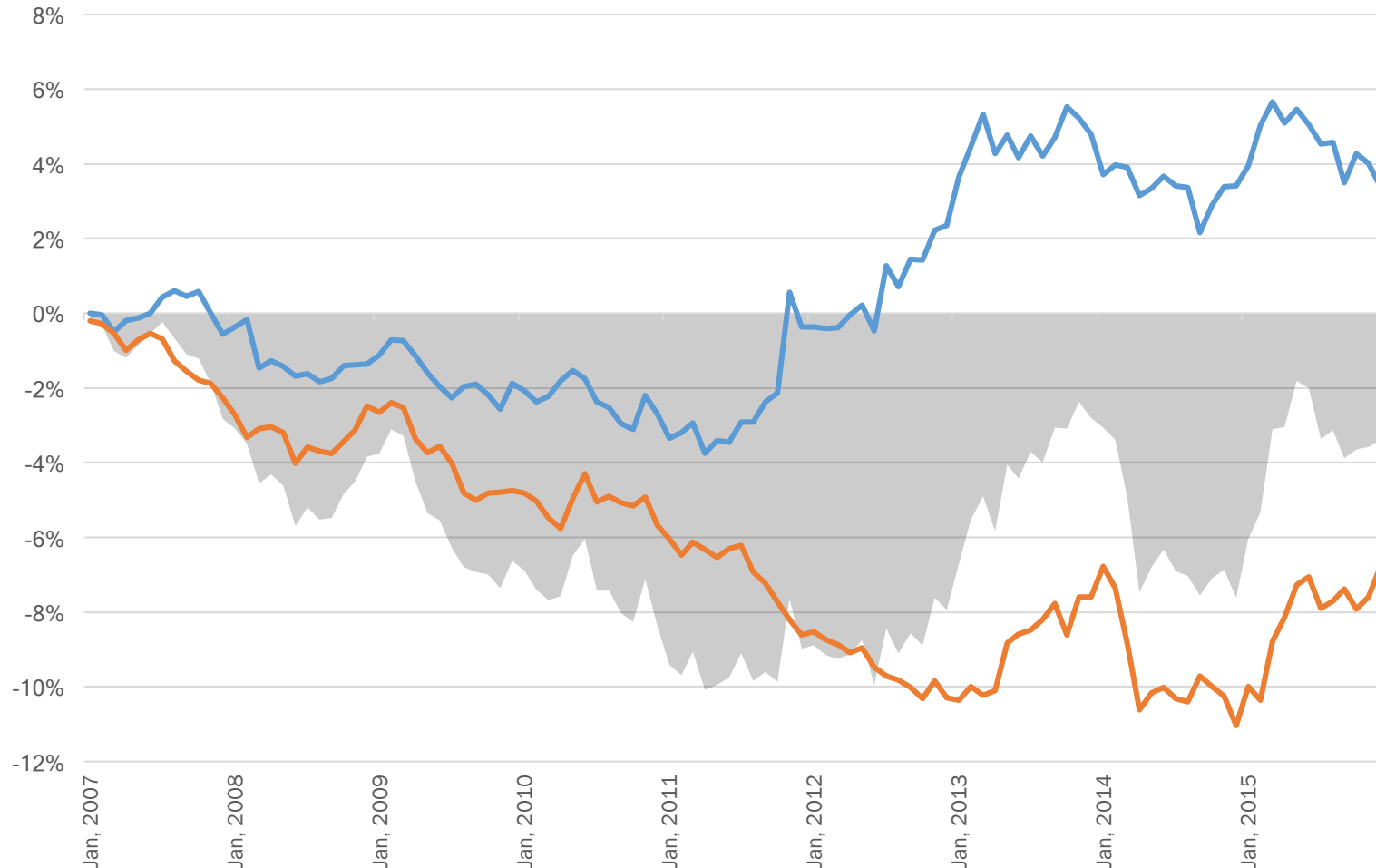
Is it poor stock selection or something else?

Hint:

The answer is "something else".

Case Study: Factor Breakdown

Time Series of Alpha vs Factor

Attribution Analysis

- Return from "specific" is positive i.e. stock selection was good

- Return from style exposure more than offsets the good stock selection

Can we mitigate the negative effects?

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Case Study: Factor Attribution

Analyze

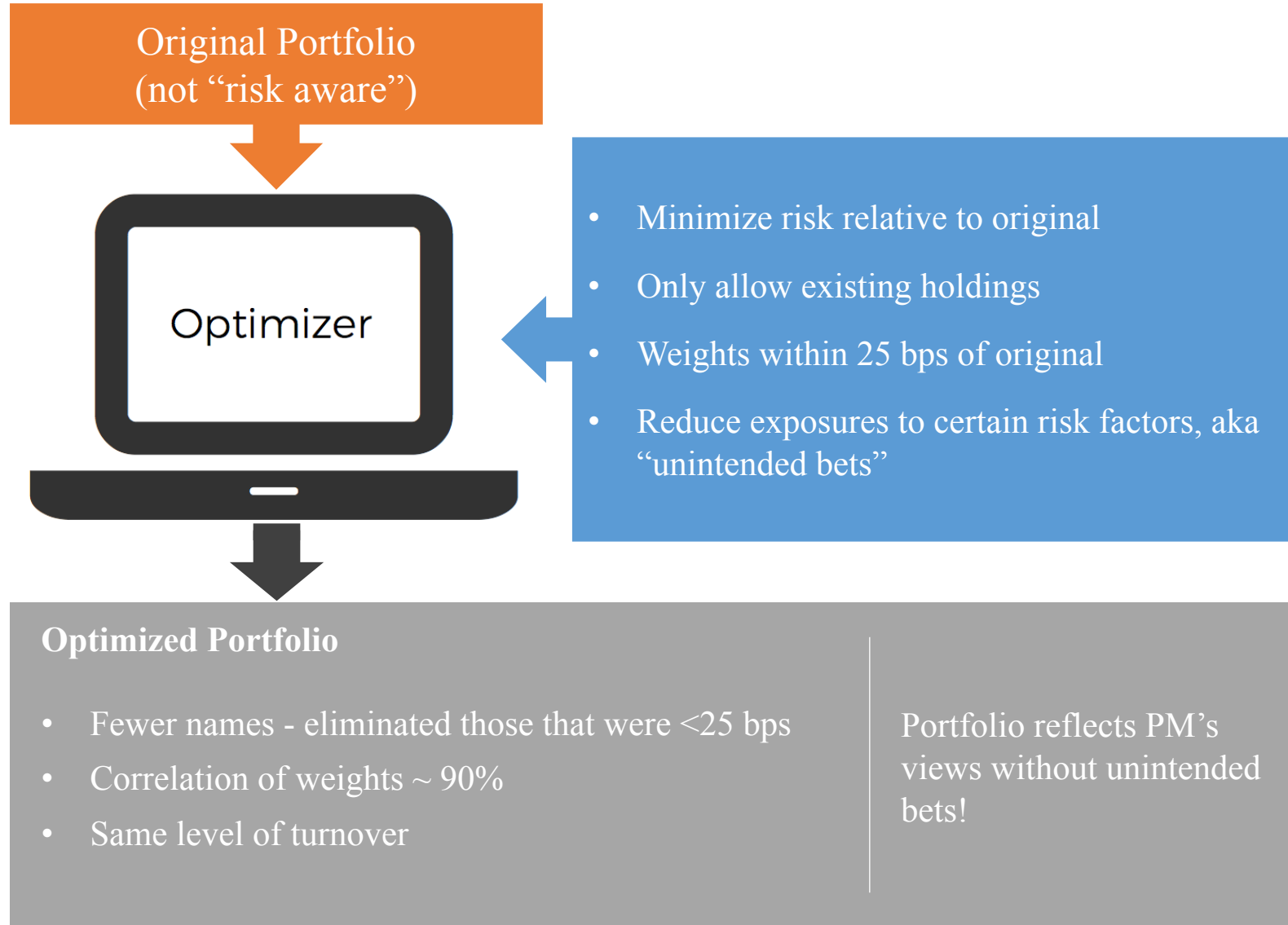| Source of Return	Contribution	Avg	T-Stat
Portfolio	3.58%		
Benchmark	3.86%		
Active	-0.28%		-0.32
Specific Return	0.28%		0.44
Factor Contribution	-0.56%		-1.00
Axioma Style	**-1.37%**	**-0.20**	**-3.38**
Dividend Yield	-0.25%	-0.29	-2.37
Earnings Yield	-0.03%	-0.06	-0.86
Emerging Market Sensitivity	-0.04%	0.01	-1.08
Exchange Rate Sensitivity	-0.01%	-0.01	-0.40
Growth	-0.01%	0.12	-0.29
Leverage	-0.08%	-0.05	-1.93
Liquidity	0.04%	0.01	1.52
Market Sensitivity	-0.08%	0.02	-0.59
Medium-Term Momentum	-0.06%	0.03	-0.42
Profitability	0.05%	0.04	1.68
Size	0.21%	-0.08	1.99
Value	-0.15%	-0.11	-2.26
Volatility	**-0.97%**	**0.17**	**-4.38**
Country	0.11%	0.00	0.37
Industry	0.30%	0.00	0.97
Currency	0.40%	0.00	1.36
Local	-0.01%	0.00	-1.49
Market	0.02%	0.00	1.06
Sectors	0.30%	0.00	0.97

Attribution Analysis

- Axioma style factors were the source of the shortfall

- Positive exposure to volatility was the biggest detractor

- Country, currency, & industry bets helped returns

Can we lower the volatility exposure without changing the nature of the portfolio?

Case Study: Optimization

Manage

Original Portfolio (not "risk aware")

Optimizer

- Minimize risk relative to original
- Only allow existing holdings
- Weights within 25 bps of original
- Reduce exposures to certain risk factors, aka "unintended bets"

Optimized Portfolio

- Fewer names - eliminated those that were <25 bps
- Correlation of weights ~ 90%
- Same level of turnover

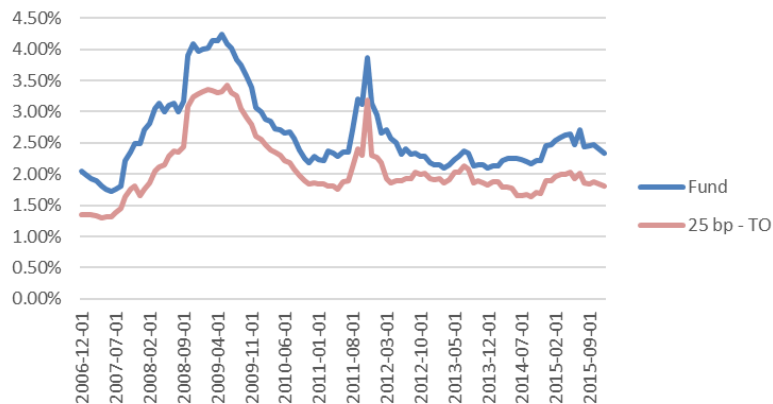Portfolio reflects PM's views without unintended bets!

An optimizer considers all possible combinations of stocks that meet your objectives, and tells you which one maximizes return or minimizes risk

Case Study: Optimized Risk Analysis
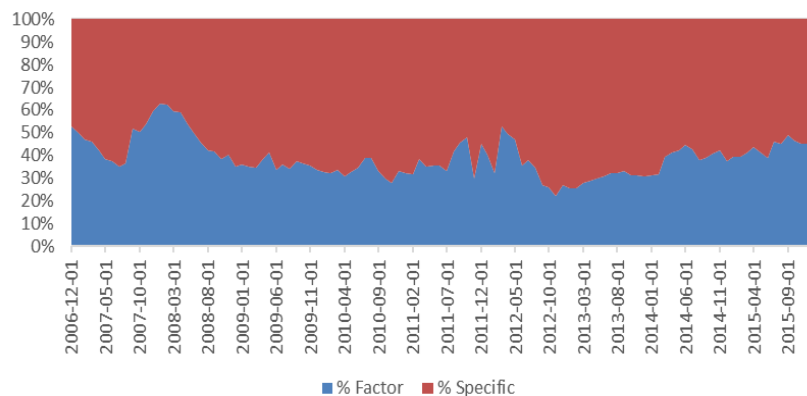
Predicted Active Risk

Predicted Active Risk

Fund

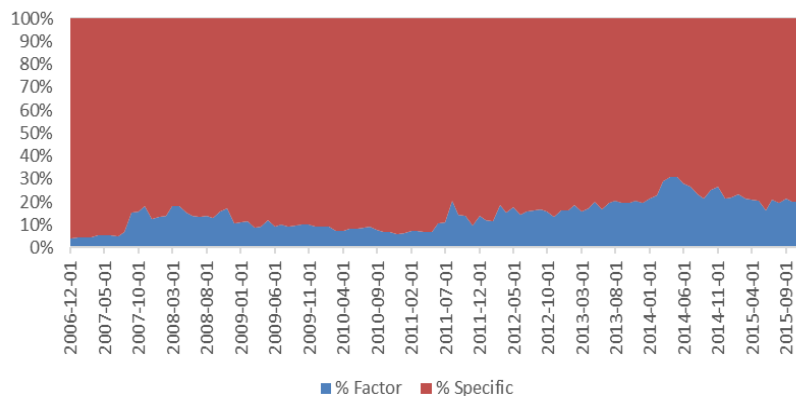25 bp - TO

Other differences

- Predicted active risk falls
- Risk breakdown shifts from factor to specific

Risk Breakdown

Fund: % of Active Risk
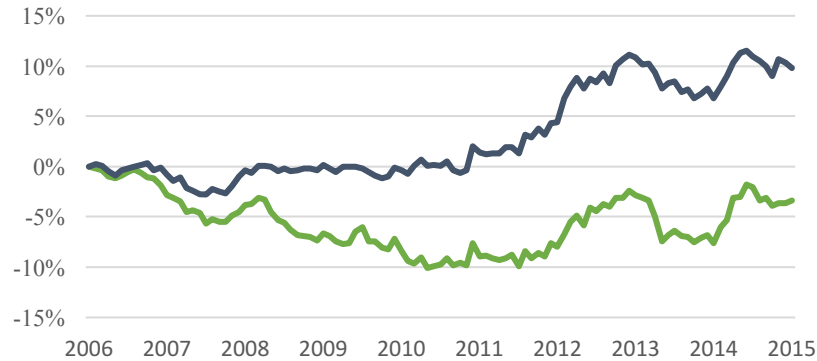
25 bp - TO: % of Active Variance

% Factor

% Specific

Case Study: Optimized Attribution
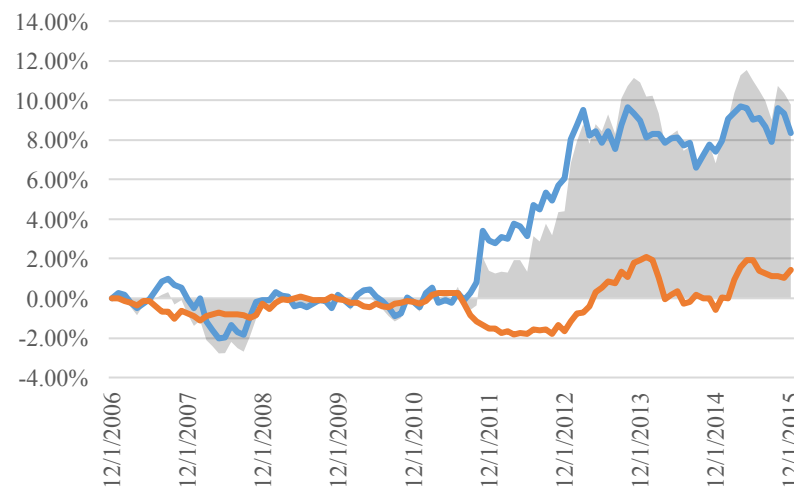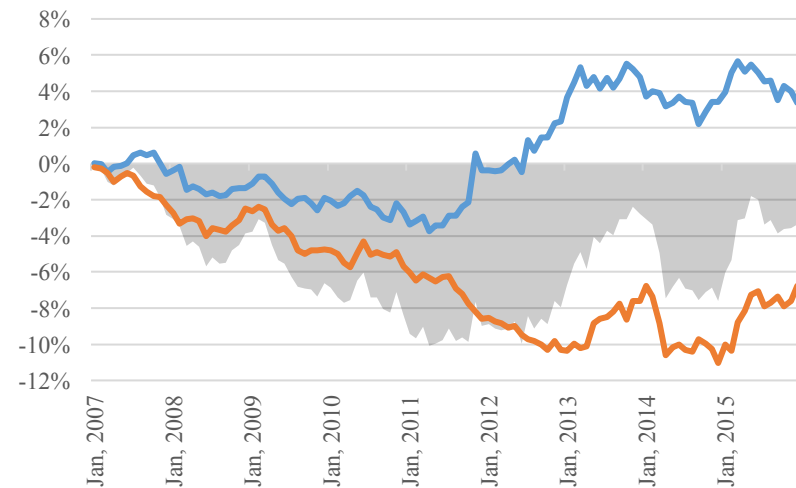
Cumulative Active Return

Original

Optimized

New portfolio looks much like the old, but performs much better!

Factor drag nearly eliminated, and specific return much higher.

Attribution: Original & Optimized

Factor Return

Specific Return

Active Return

Case Study: Optimized Factors

Customize

Source of Return	Original	Optimized	Change
Portfolio	3.58%	4.64%	1.06%
Benchmark	3.86%	3.86%	0.00%
Active	-0.28%	0.78%	1.06%
Specific Return	0.28%	0.66%	**0.39%**
Factor Contribution	-0.56%	0.12%	0.68%
Axioma Style	**-1.37%**	**-0.54%**	**0.83%**
Dividend Yield	-0.25%	-0.19%	0.06%
Earnings Yield	-0.03%	-0.01%	0.01%
Emerging Market Sensitivity	-0.04%	0.02%	0.06%
Exchange Rate Sensitivity	-0.01%	0.00%	0.00%
Growth	-0.01%	-0.02%	-0.01%
Leverage	-0.08%	0.00%	0.07%
Liquidity	0.04%	0.02%	-0.02%
Market Sensitivity	-0.08%	0.00%	0.08%
Medium-Term Momentum	-0.06%	0.03%	0.09%
Profitability	0.05%	0.03%	-0.02%
Size	0.21%	0.13%	-0.09%
Value	-0.15%	-0.08%	0.08%
Volatility	**-0.97%**	**-0.45%**	**0.52%**
Country	0.11%	0.09%	-0.02%
Industry	0.30%	0.41%	0.12%
Currency	0.40%	0.14%	-0.26%
Local	-0.01%	-0.01%	0.00%
Market	0.02%	0.02%	0.00%

Almost all sources of return improved

- Active return 100 bps higher
- More return is specific
- Factor contribution goes from negative to positive
  - Style contribution much less negative
  - Only currency contribution deteriorates slightly

Conclusion

What (factors) you don't know can hurt you, but they don't have to

Take Away

Easily incorporate factors into your workflow

1. Educate yourself on factors

2. Take Action

   Hire a team of quants

   …and/or…

   Off-the-shelf solutions

3. Focus on Your Alpha!

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