

WHAT YOU NEED TO KNOW WHEN BUILDING FACTOR-BASED PORTFOLIOS

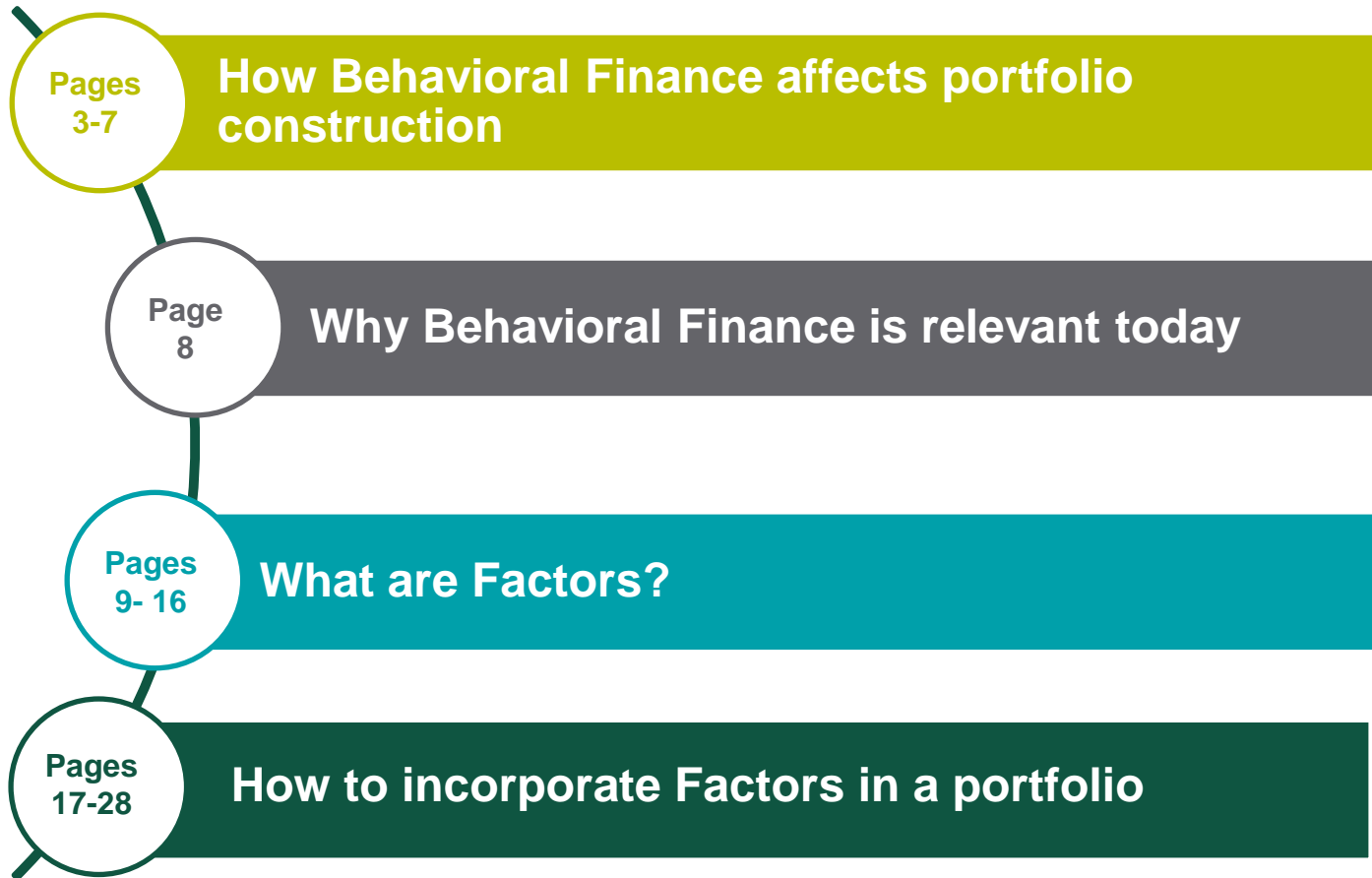
Prepared for Bankers Trust Forum

Meggan Friedman
Senior Investment Strategist
Northern Trust Asset Management



NORTHERN TRUST

TODAY'S AGENDA



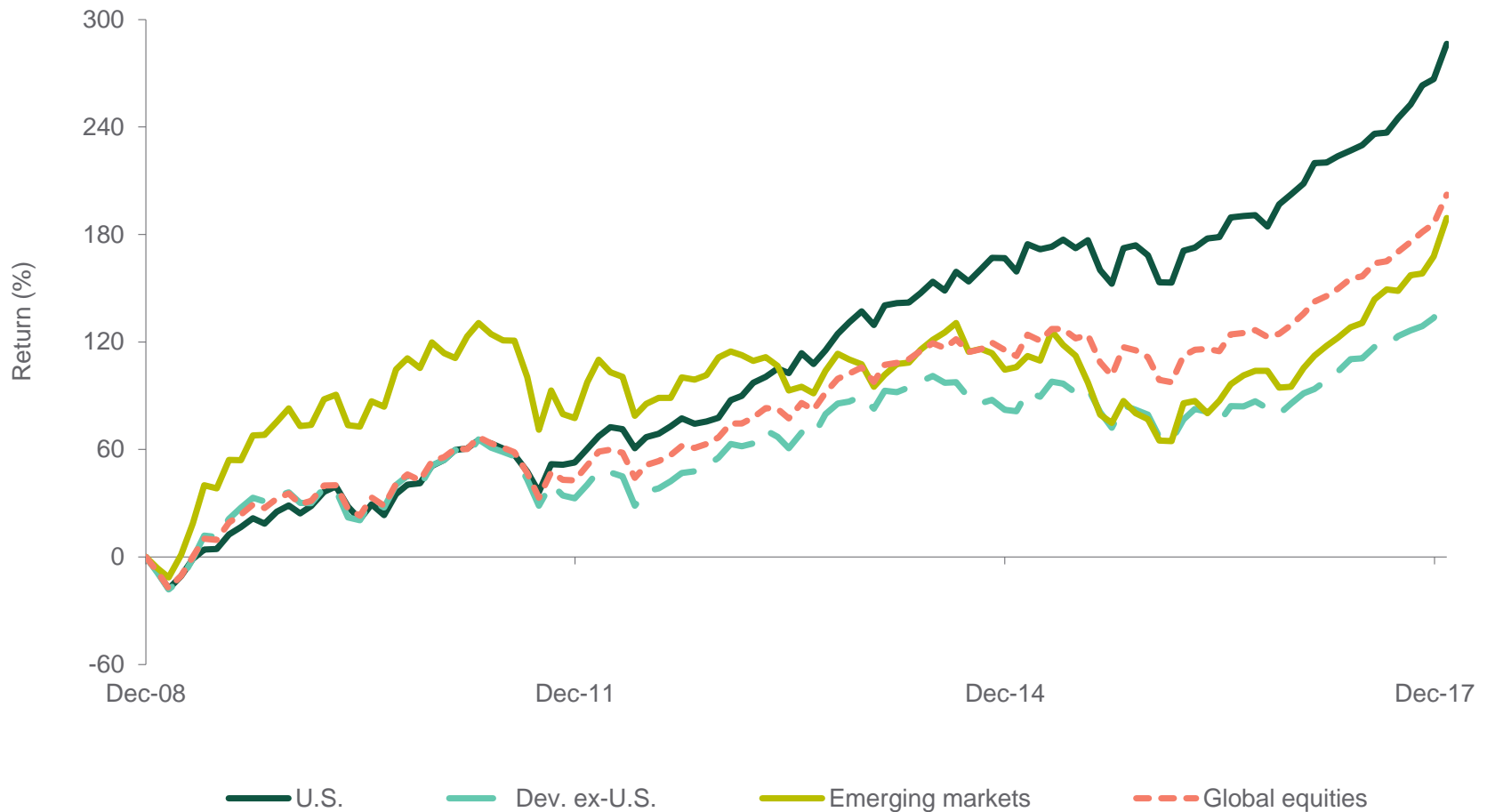
ABOUT BEHAVIOR CONCEPTS:

When the **market is behaving** and
your **clients are not**.

WHAT IS BEHAVIORAL FINANCE?



GLOBAL EQUITIES PERFORMANCE



Source: Northern Trust Investment Strategy, Index data for the various return calculations above are as follows: U.S. is the MSCI U.S. Equities IMI; Emerging Markets is the MSCI Emerging Market Equities Index; Dev. ex-U.S. is the MSCI World ex-U.S. IMI; Global Equities is the MSCI ACWI (All Country World Index) and is a market capitalization weighted index designed to provide a broad measure of equity-market performance throughout the world. Indexes are gross of fees and indexes cannot be invested in directly. Past returns are no guarantee of future results. Charts are as of December 31, 2017.

COMMON PITFALLS CLIENTS FACE



- Anchoring
- Herd Mentality
(aka “FOMO”)
- Regret Maximization

1 Image Source: <http://content.time.com/time/magazine/article/0,9171,2099712,00.html>

2 Image Source: www.rolandberger.com/en/Blog/Buying-into-simplicity.html

COMMON PITFALLS PORTFOLIO MANAGERS FACE



- Sunk Cost
- Representativeness
- “Recency” Bias
- Catering

1 Image Source: <http://content.time.com/time/magazine/article/0,9171,2099712,00.html>

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THE PROBLEM

PERFORMANCE AROUND HIRING/FIRING OF MANAGER

3 Year Information Ratios (1994 to 2003)



From Goyal, A. and Wahal, S., "The Selection and Termination of Investment Managers by Plan Sponsors," Journal of Finance 63(4) 1805–1847, 2008
Data based on 3400 plan sponsors between 1994 and 2003

WHY IS BEHAVIORAL FINANCE A RELEVANT DISCUSSION TODAY?



- It's Managed in Portfolios
- It's Not Just Theory vs. Practical Application
- Assets Could be at Risk
- Pricing Pressures

What Are Factors?

DEFINING FACTOR INVESTING

Factor investing seeks to identify and target these drivers of return through systematic strategies that can be implemented in risk-controlled portfolios.

Quality

Value

**Low
Volatility**

**Dividend
Yield**

Size

Momentum

FACTORS HAVE DRIVEN EXCESS RETURNS FOR 50 YEARS

Common
Style Factor
Exposure

Skill
“Stock Picking”

Annual
Excess Return¹

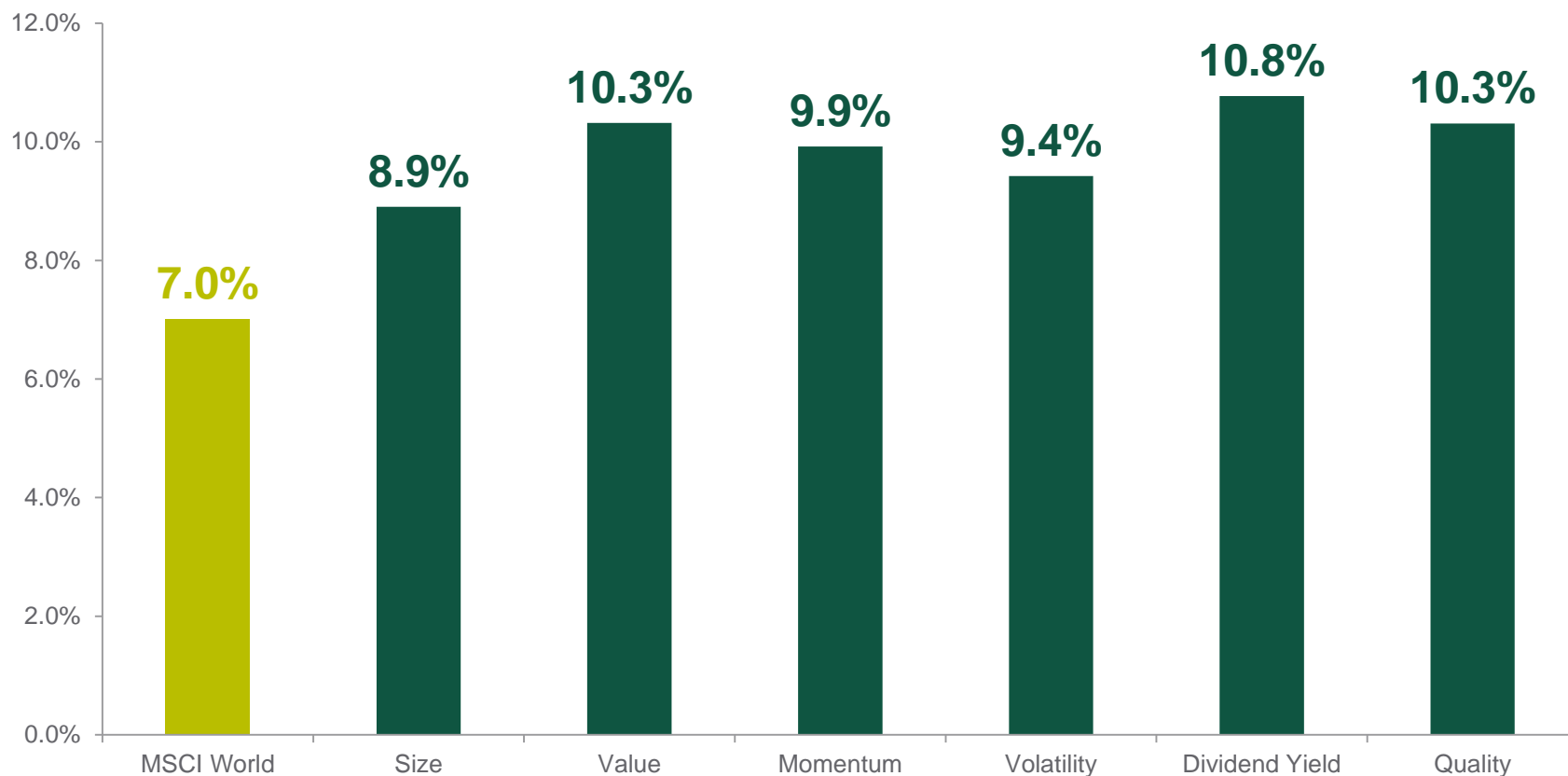
$$6.60\% + -1.56\% = 4.94\%$$

¹Excess monthly returns over T-Bills, annualized.

Source: Carhart, Mark M. “On persistence in mutual fund performance.” The Journal of Finance 52.1 (1997): 57–82.

FACTORS AND THEIR RISK PREMIUMS

ANNUALIZED RETURN OF COMMON FACTORS (1997–2017)

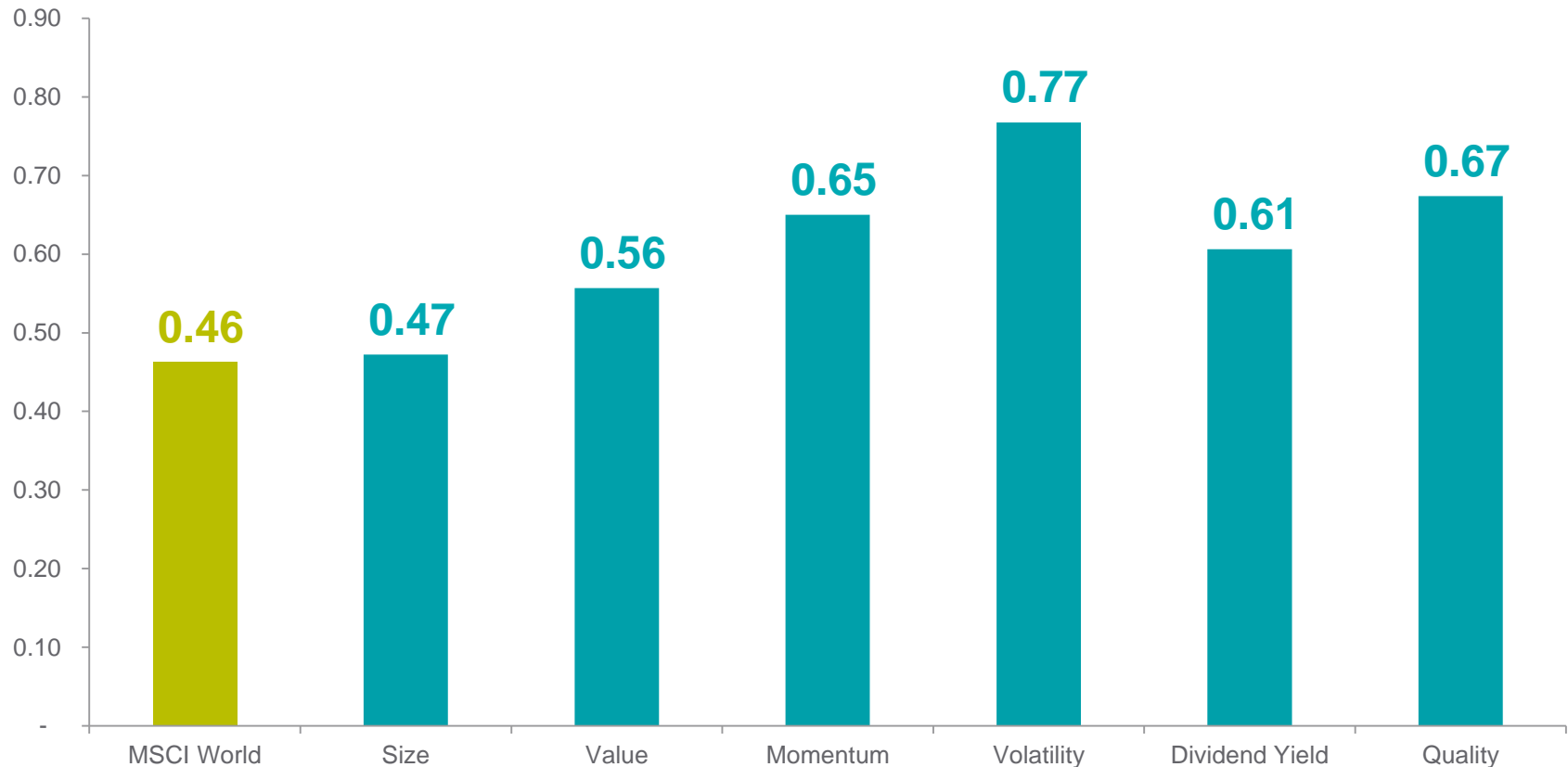


Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Factor returns are defined as the equally weighted top or bottom 40% of the MSCI World Index. Ranking is based on exposure to factor as defined by Barra (Value, Momentum, Volatility, Dividend Yield, Size) and Northern Trust Quality Score. Factors are winsorized to remove extreme 5% of outliers.

Source: Northern Trust Quantitative Research, Data as of 12/31/2017

FACTORS AND THEIR RISK PREMIUMS

SHARPE RATIOS OF COMMON FACTORS (1997–2017)



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Source: Northern Trust Quantitative Research, Data as of 12/31/2017

FACTOR RATIONALES

Factor	Behavioral Explanations
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Low Volatility	<ul style="list-style-type: none">• Lottery effect
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Value	<ul style="list-style-type: none">• Overconfidence• Representativeness• Anchoring
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Size	<ul style="list-style-type: none">• Overlooked• Neglected
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Momentum	<ul style="list-style-type: none">• Over/under-reaction to negative/positive news
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Quality	<ul style="list-style-type: none">• Lottery effect• Overconfidence
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**Are you currently
engaged in
factor investing?**

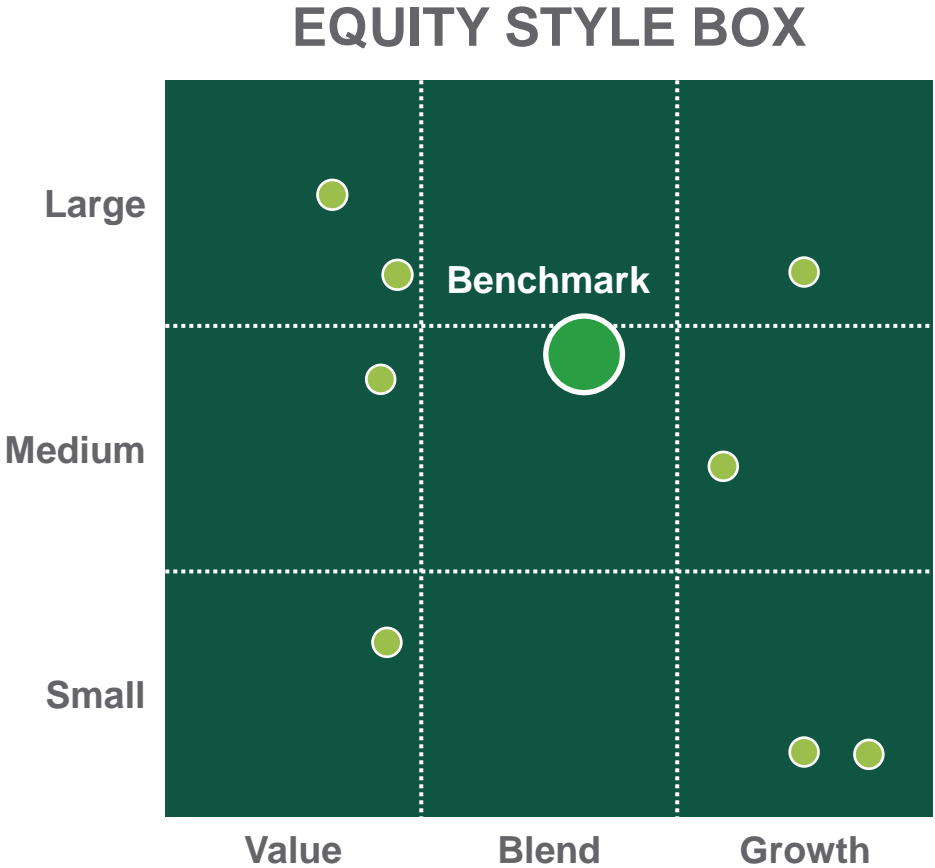
**Do you use a Morningstar
Style Box Approach?**

Intentionally or Unintentionally?

Are you being **compensated** for it?

TAKING INTENTIONAL RISK AND BEING COMPENSATED FOR IT

CLASSIC STYLE BOX CONSTRUCTION APPROACH



Source: Northern Trust Quantitative Research, MSCI Barra. Actual investor data as of March 31, 2016.

CANCELLATION: THE MOST COMMON PROBLEM

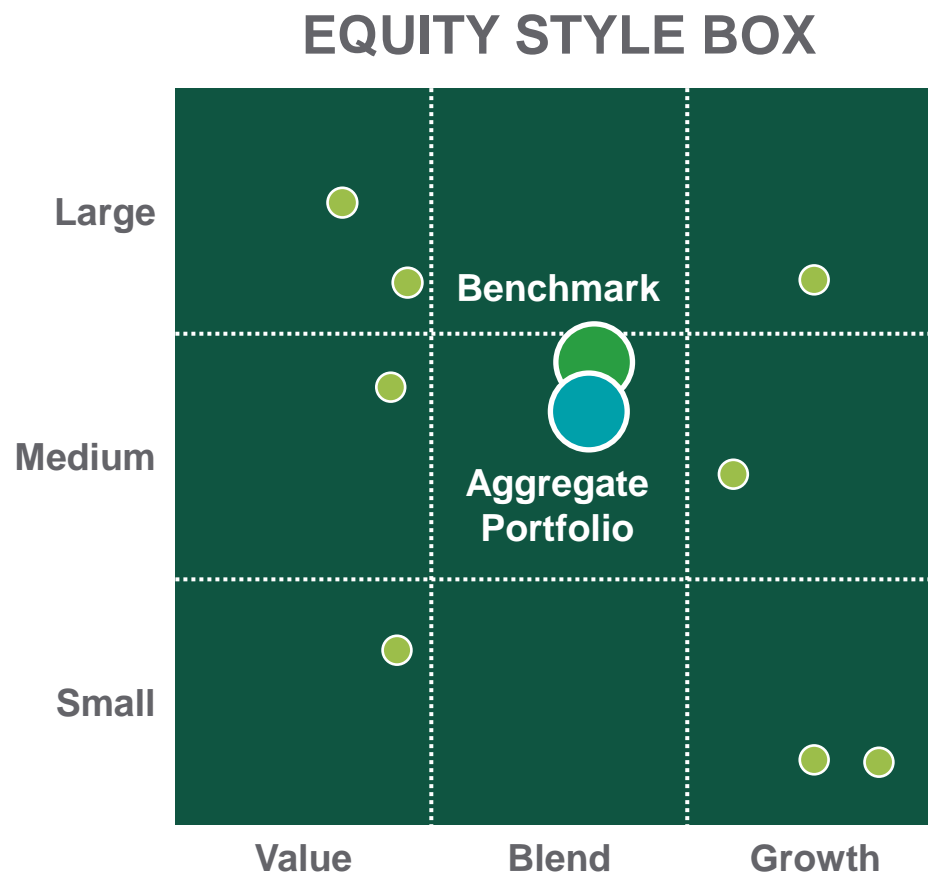
ACTUAL INVESTOR PORTFOLIO EXAMPLE

Strategies	Growth	Value	Momentum	Size	Volatility
Small-Cap Value	—	+	—	+	—
Small-Cap Growth	+	—	+	+	—
Small-Cap Growth	+	—	+	+	—
Mid-Cap Value	—	+	—	—	—
Mid-Cap Growth	+	—	+	+	+
Large-Cap Value	—	+	—	—	—
Large-Cap Value	—	+	—	—	+
Large-Cap Growth	+	—	+	—	+
Aggregate Portfolio Exposure	0	0	0	0	0

Note: “+” denotes an addition to factor exposure, while the “—” denotes a detracting from factor exposure.

Source: Northern Trust Quantitative Research, MSCI Barra. Actual investor data as of March 31, 2016.

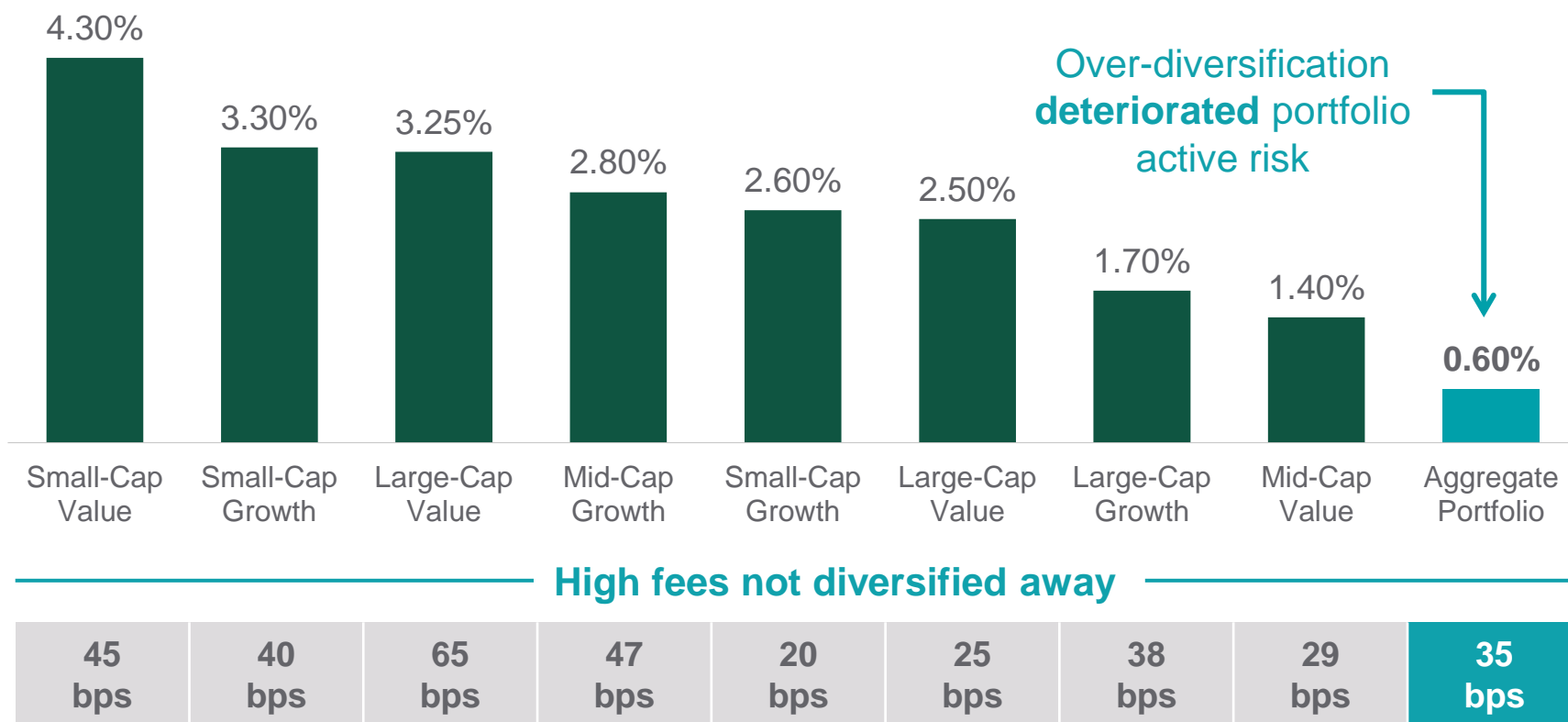
COMPLEX APPROACH TO MIMIC AN INDEX



Source: Northern Trust Quantitative Research, MSCI Barra. Actual investor data as of March 31, 2016.

THE RESULT: LOW ACTIVE RISK AT A HIGH FEE

ACTIVE RISK NET OF FACTOR EXPOSURE



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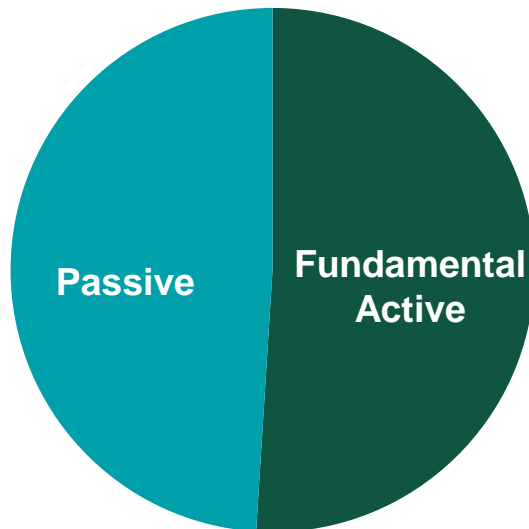
Source: Northern Trust Quantitative Research, Data as of 12/31/2016

ASSET MANAGEMENT

THE SOLUTION

PORTFOLIO ANALYSIS — CASE STUDY

ORIGINAL PORTFOLIO



Expected Alpha	1.8%
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Expected Active Risk	4.4%
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Expected Information Ratio	0.41
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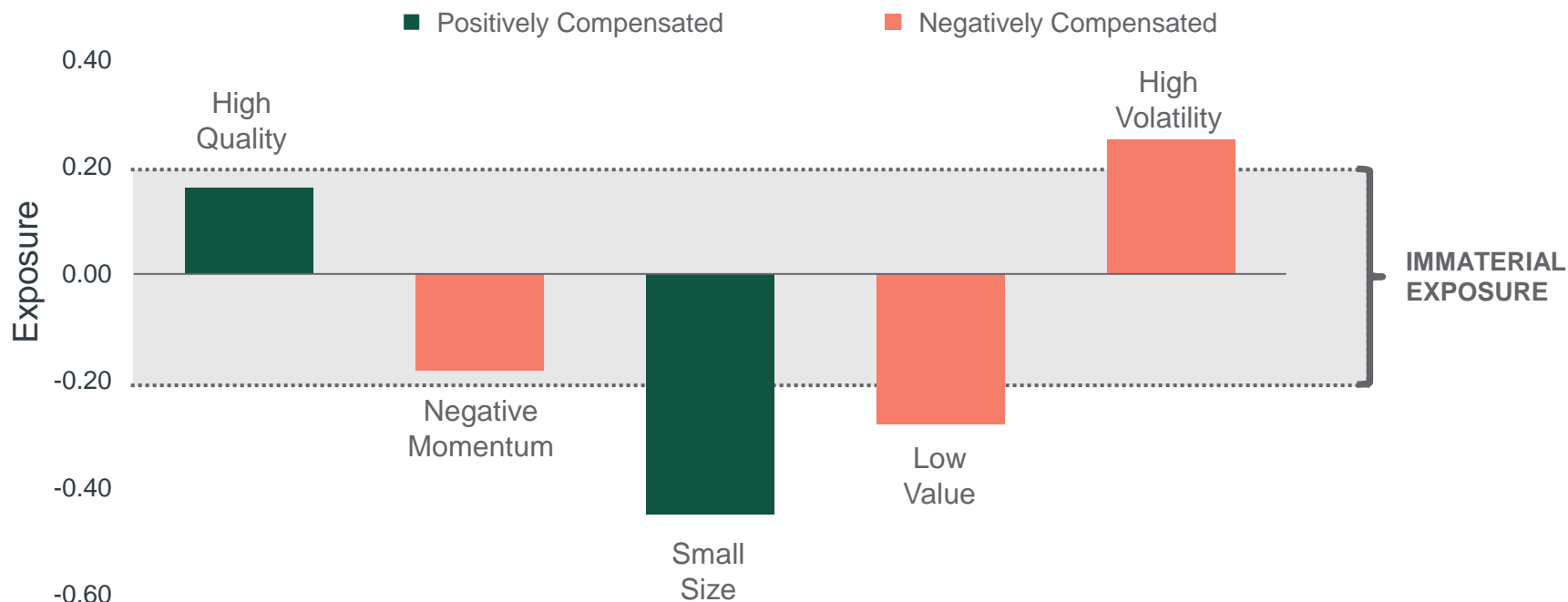
Note: This representative portfolio analysis was selected in order to illustrate how factors have been implemented in this unique equal weighting approach that uses passive, fundamental active, and factor-based management.

Source: Northern Trust Quantitative Research, MSCI, Barra (USE3/GEM2 used for domestic/global, respectively), Russell. Please see important information on Hypothetical Returns at the end of this presentation. For illustrative purposes only. **Past performance is not indicative of future results.** Returns reflect the reinvestment of dividends and other earnings and are shown before the deduction of investment management fees. Returns of the indexes also do not typically reflect the deduction of investment management fees, trading costs or other expenses. It is not possible to invest directly in an index. Indexes are the property of their respective owners, all rights reserved.

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PORTFOLIO ANALYSIS — CASE STUDY

ORIGINAL PORTFOLIO FACTOR EXPOSURE



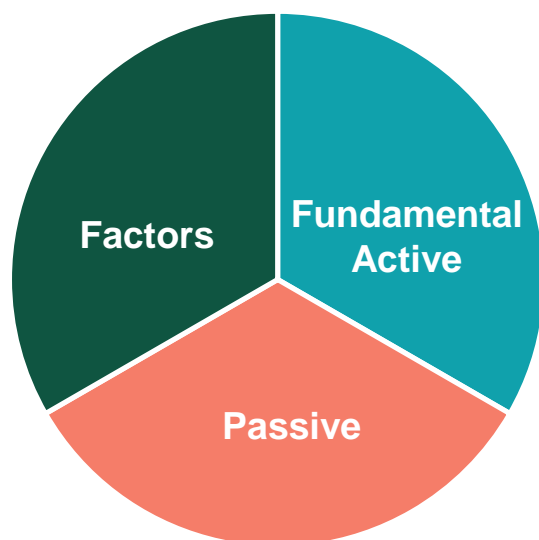
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SOLUTION: TARGETED RISK EXPOSURES

ADDING TARGETED FACTORS



Expected Alpha	2.0%
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Expected Active Risk	2.7%
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Expected Information Ratio	0.74
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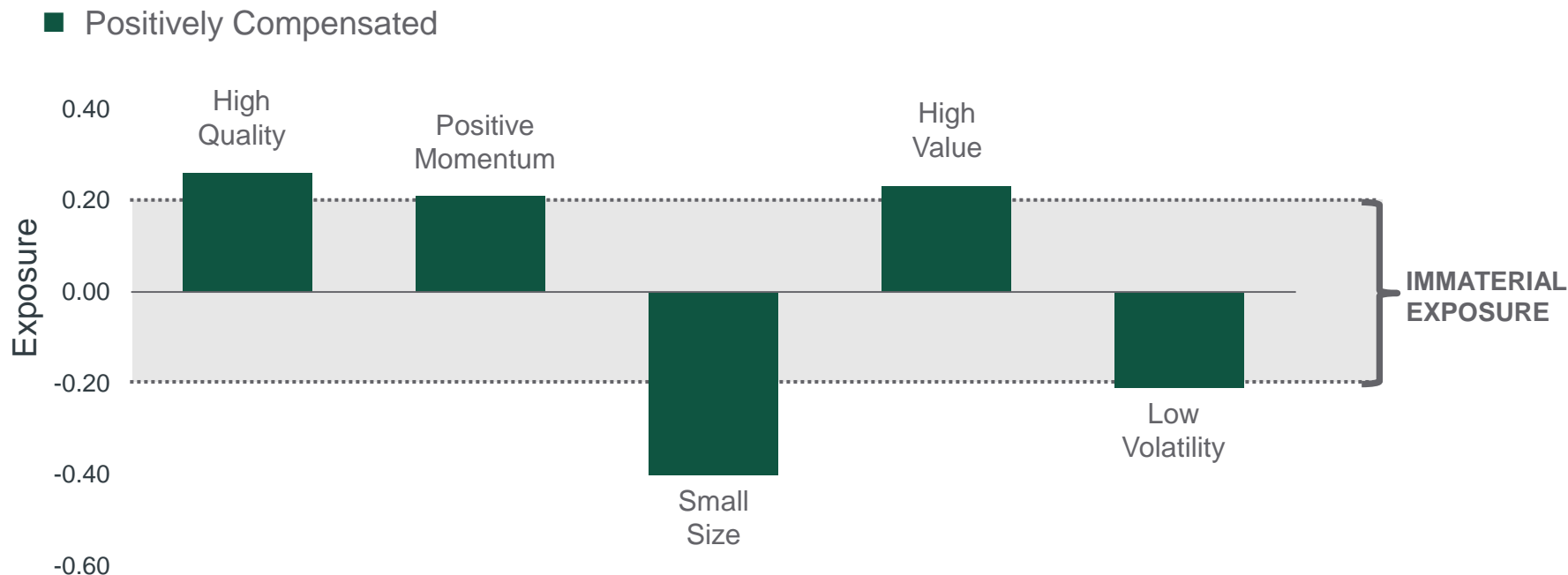
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PORTFOLIO ANALYSIS — CASE STUDY

NEW PORTFOLIO FACTOR EXPOSURE



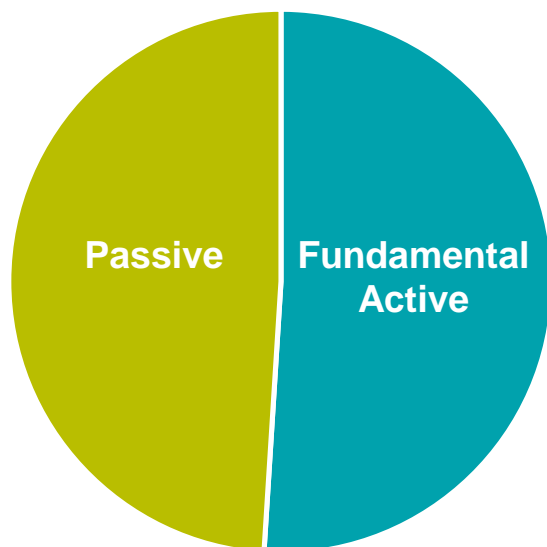
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SOLUTION: TARGETED RISK EXPOSURES

ORIGINAL PORTFOLIO

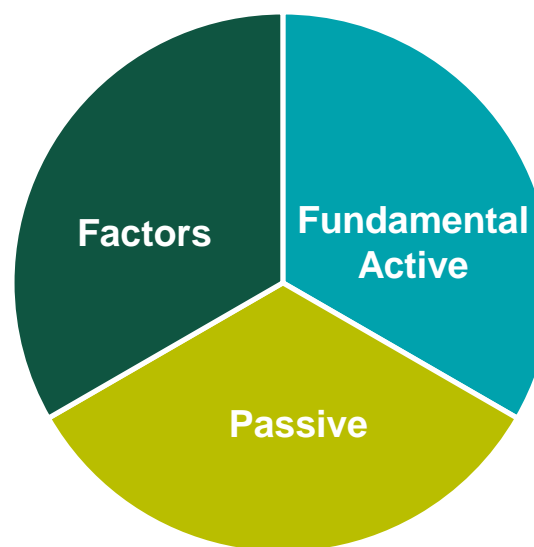


Expected Alpha	1.8%
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Expected Active Risk	4.4%
----------------------	------

Expected Information Ratio	0.41
----------------------------	------

ADDING TARGETED FACTORS



Expected Alpha	2.0%
----------------	------

Expected Active Risk	2.7%
----------------------	------

Expected Information Ratio	0.74
----------------------------	------

Relative
Change

+11%

-38%

+80%

Note: This representative portfolio analysis was selected in order to illustrate how factors have been implemented in this unique equal weighting approach that uses passive, fundamental active, and factor-based management.

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3 Actionable Items



Assess your current risk profile – is it in alignment with your and your clients' risk tolerances?



Assess your current factor exposure – you are probably taking risk, are you being compensated for it?



Examine due diligence process at the asset manager level – looking at factors, identifying premia capture?

CONTACT INFORMATION



Tom Nussbaum

Mutual Fund and SMA Sales
Northern Trust Asset
Management

Phone: 508.272.5533

Email: TAN3@ntrs.com

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