NORTHERN TRUST
ASSET MANAGEMENT

RISK INSIGHTS SERIES

THE RISK REPORT

2022 EDITION

Key findings from our six-year analysis of institutional portfolios:

1,300+
INVESTMENT STRATEGIES

$250+ billion
EQUITY PORTFOLIO ASSETS

88 institutional
INVESTORS

As an investment manager who employs a quantitative risk-aware approach, institutional investors and their consultants regularly partner with Northern Trust Asset Management to gain a distinct analysis of underlying risk components impacting their portfolio's ability to achieve intended outcomes.

Initially published in 2020, the inaugural Risk Report surfaced six common drivers of unexpected results. Two years later, with the additional analysis of $50 billion of assets, this new edition provides an updated view on how institutional portfolios have evolved in a vastly different market environment.

Each of the institutional portfolios analyzed were built over time and had grown increasingly complex. They were all designed to deliver upon specific objectives; however, intended outcomes were not always achieved and typically experienced two reoccurring problems.

MAIN PROBLEMS COMMONLY CITED BY INSTITUTIONS

1 UNDERPERFORMANCE

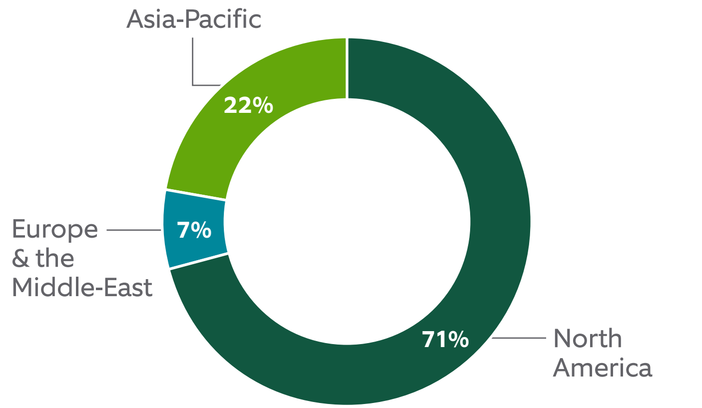
2 OUTCOMES THAT DIFFER FROM THE INTENDED RESULT

Our analyses focused on identifying compensated and uncompensated risks in equity portfolios to help inform adjustments needed to meet desired expectations.

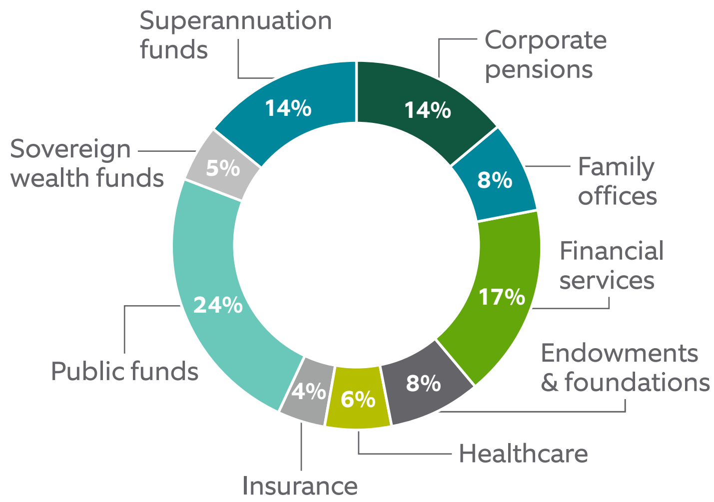
Here's what we found

REPORT DEMOGRAPHICS

INVESTOR GEOGRAPHY



INVESTOR TYPE



Source: Northern Trust Asset Management. Data collected and analyzed from December 31, 2015 to December 31, 2021.

KEY DISCOVERIES

Our comprehensive work with large institutions across the globe provided a distinct opportunity to uncover key trends across various asset pools. The aggregation of this analysis has led to six key discoveries.

1 Institutions had nearly 2x more *uncompensated* vs. *compensated* risk.

2 Underlying portfolio holdings canceled each other out — and hurt performance.

3 Hidden portfolio risks caused unintended outcomes.

4 Conventional style investing led to index-like performance with higher fees.

5 Over-diversification diluted performance.

6 Possible attempts to “time” manager changes may have proved costly.

INSTITUTIONS HAD NEARLY 2X MORE UNCOMPENSATED VS. COMPENSATED RISK

Portfolios became overcrowded with uncompensated risks that may have diluted the potential for excess returns.

Active risk is necessary to generate excess returns, but not all risks are created equally. Some have been historically proven to generate excess returns over long periods (compensated risks) and some have not (uncompensated risks).

In 2020 and 2021, portfolio active risk rose by over 50% versus prior year averages as investors likely sought to recoup losses driven by the COVID-19 related market drawdown. But while active risk meaningfully increased, there was a commensurate increase in uncompensated risks.

Historically uncompensated risks:

- **Currency —** exposure to changes in foreign currencies
- **Style —** high-volatility, low-dividend, low-value (expensive), low-quality, low-momentum or large-size securities
- **Country —** specific exposures to countries or regions
- **Sector —** significant over/under-weights to sectors

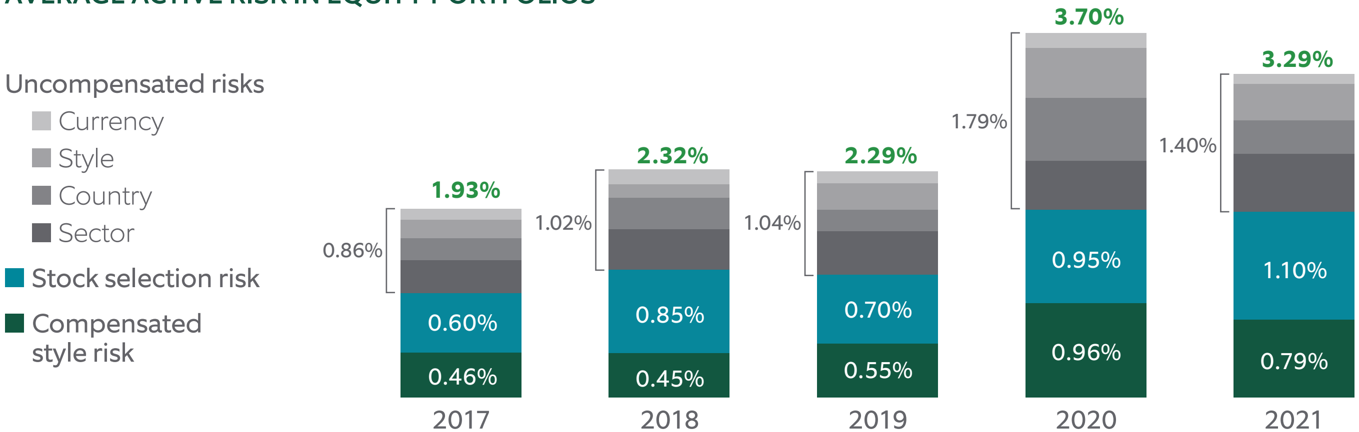
Stock-selection risk:

Specific risk from individual securities, generally derived from fundamental active investment strategies

Compensated style risk:

Exposures such as small-size, low-volatility, high-momentum, high-value, high-dividend and high-quality securities that have historically outperformed over time, based on academic studies*

AVERAGE ACTIVE RISK IN EQUITY PORTFOLIOS



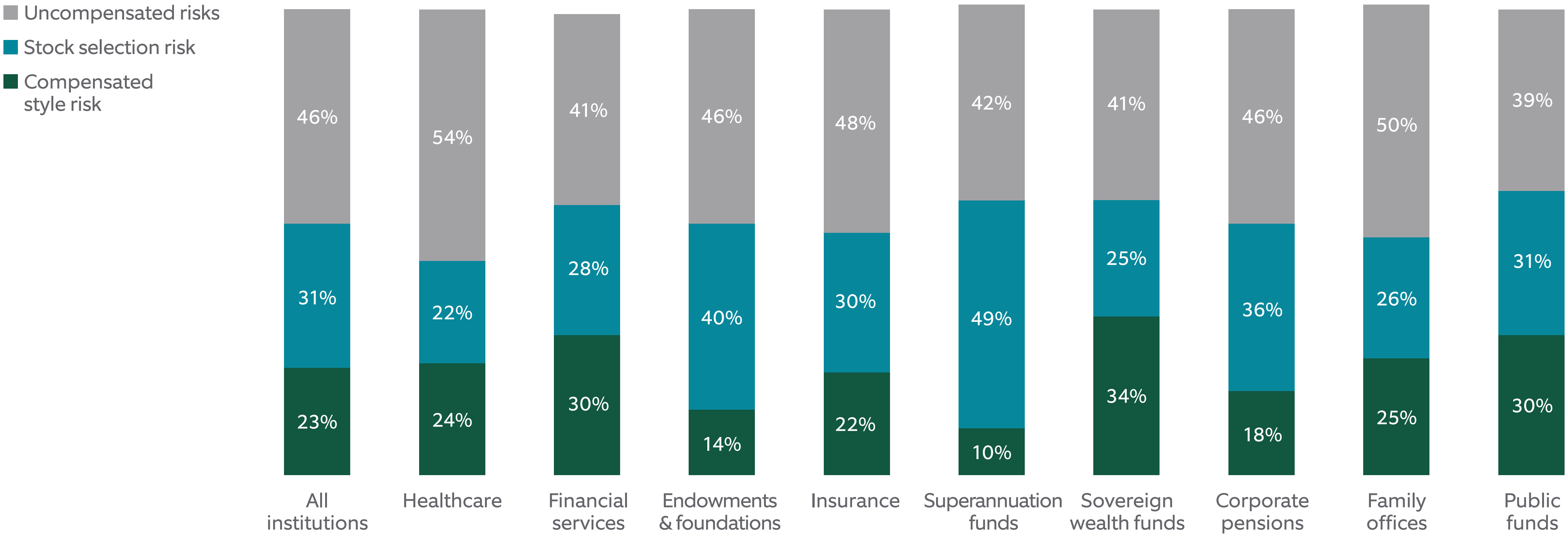
	2017	2018	2019	2020	2021
% OF ACTIVE RISK THAT IS UNCOMPENSATED	45%	44%	45%	49%	43%

* Choi, James R and Zhao, Kevin. "Did Mutual Fund Return Persistence Persist?" *The National Bureau of Economic Research*. Issued January 2020.

Source: Northern Trust Asset Management.

ALL INSTITUTIONAL INVESTOR SEGMENTS HAD UNCOMPENSATED RISKS

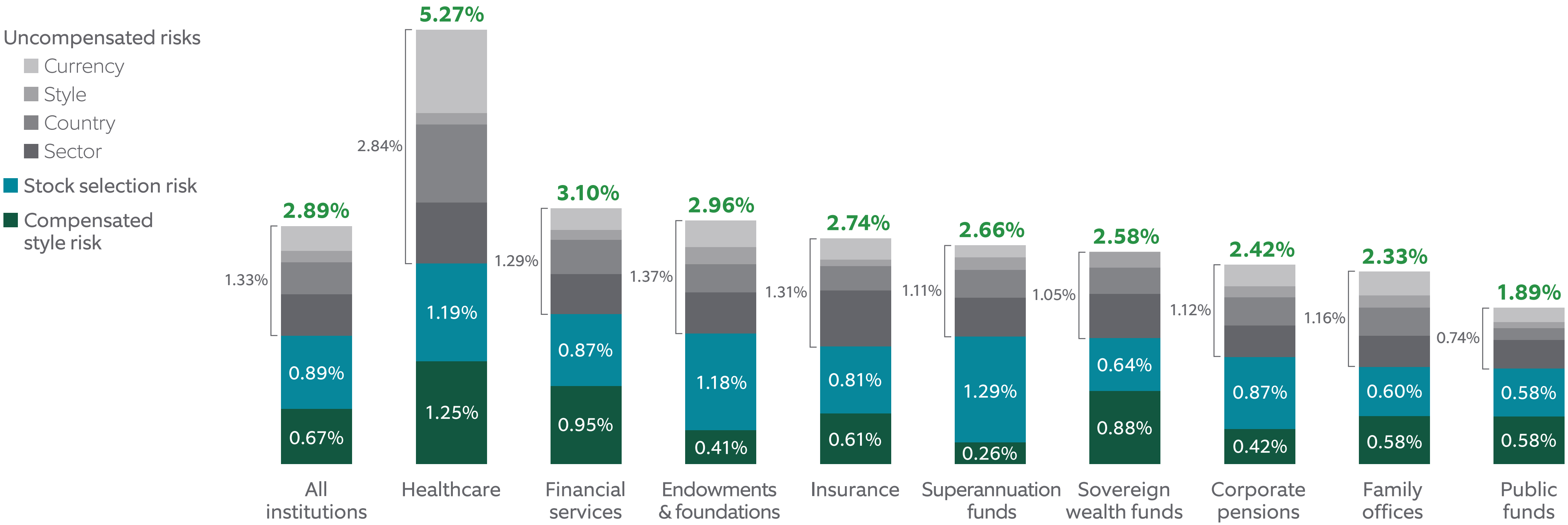
ACTIVE RISK BREAKDOWN BY INVESTOR SEGMENT (2016–2021)



Source: Northern Trust Asset Management.

UNCOMPENSATED RISKS MADE UP NEARLY 50% OF TOTAL ACTIVE RISK

ACTIVE RISK TAKEN BY INVESTOR SEGMENT (2016–2021)



CONCLUSION

The result of uncompensated risks comprising nearly 50% of total portfolio active risk was generally benchmark-like returns or underperformance. While sometimes these risks were taken intentionally, we found that many institutions were surprised when they saw the actual numbers.

Source: Northern Trust Asset Management.

UNDERLYING PORTFOLIO HOLDINGS CANCELED EACH OTHER OUT — AND HURT PERFORMANCE

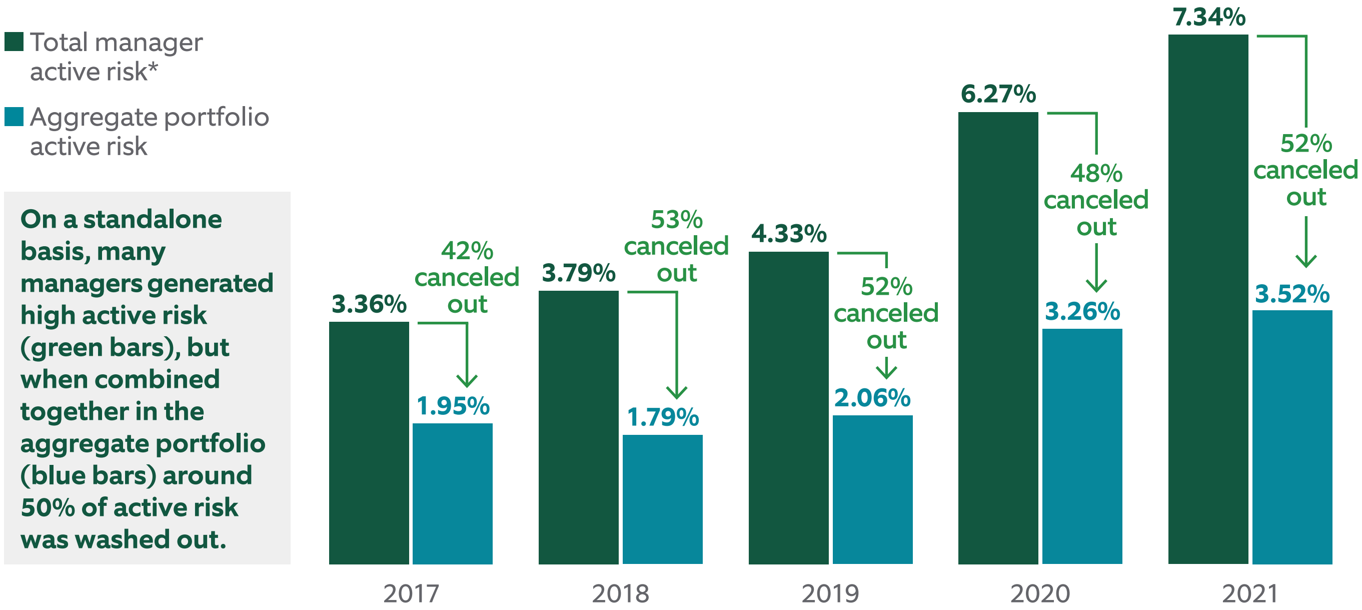
A cancellation effect caused by unknown, offsetting exposures among underlying holdings continued to deteriorate away the ability to generate excess returns.

This *cancellation effect* occurs when investment managers within a portfolio take opposing positions that ultimately offset one-another.

For example:

- One manager may take a 3% overweight in a company while the other manager takes a 3% underweight, effectively canceling out the views of both managers.
- The high value bias in one strategy is offset by high growth in another strategy.
- Underweights and overweights to sectors among strategies cancel each other out.

**AVERAGE ACTIVE RISK BY CALENDAR YEAR:
UNDERLYING INVESTMENT MANAGERS' VS. AGGREGATE INSTITUTIONAL PORTFOLIO**



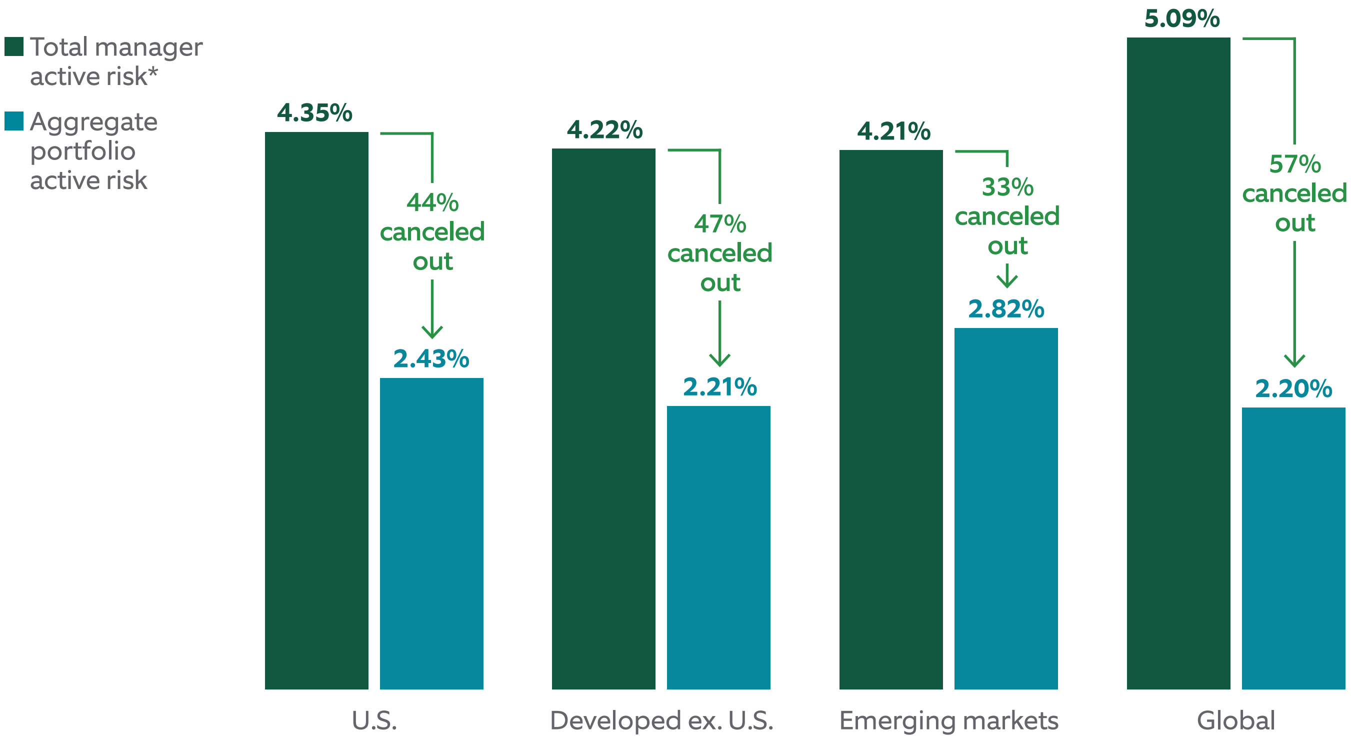
On a standalone basis, many managers generated high active risk (green bars), but when combined together in the aggregate portfolio (blue bars) around 50% of active risk was washed out.

* Total manager active risk is the weighted average active risk of all underlying managers in the aggregate portfolio. The number illustrates what the aggregate portfolios' total active risk would be if there was no cancellation effect among underlying managers (i.e. if the managers were perfectly correlated).

Source: Northern Trust Asset Management. Please note: only portfolios containing two or more investment strategies were considered in the analysis for aggregate portfolio active risk.

THE CANCELLATION EFFECT IMPACTED ALL REGIONAL INVESTMENTS

AVERAGE ACTIVE RISK BY REGION:
UNDERLYING INVESTMENT MANAGERS' VS. AGGREGATE INSTITUTIONAL PORTFOLIO



While the trend remained consistent year-over-year, it was also consistent when looking at managers who target various regional exposures. Equity sleeves targeting emerging markets showed the least amount of active risk cancellation, while global strategies showed the most.

CONCLUSION

Our analysis uncovered a shocking amount of this cancellation effect. **Nearly 50% of manager active risk was lost.** Capturing just 50% of targeted active risk, while paying 100% of the manager fees, effectively translates into paying 2x more for each realized basis point of active risk than originally thought.

* Total manager active risk is the average of all portfolios' total active risk, but removes the presence of the *cancellation effect* by calculating the active risk of the underlying managers within each portfolio as if they were perfectly correlated.

Source: Northern Trust Asset Management. Only portfolios containing two or more investment strategies were considered in this analysis.

HIDDEN PORTFOLIO RISKS CAUSED UNINTENDED OUTCOMES

Style tilts contributed 33% of active risk on average, but some of those bets commonly introduced unintended risks that led to unpredictable portfolio outcomes.

While certain style exposures have shown to be consistent sources of excess return (i.e. compensated risks), we've found that it's the unintended style risks imbedded within various investment strategies that are negatively impacting portfolio performance.

For example, institutions seeking small cap or dividend yield exposure often had portfolios with unexpected low quality and low momentum biases. And while at the individual manager level this effect might not be felt, these occurrences compound at the portfolio level to potentially create unwanted outcomes.

The top style bets remained the same during the period, but the total amount of style bets grew overall and was a higher contributor to total active risk during 2020–2021.

TOP THREE STYLE BETS

1 SMALL SIZE

2 HIGH DIVIDEND YIELD

3 HIGH VALUE

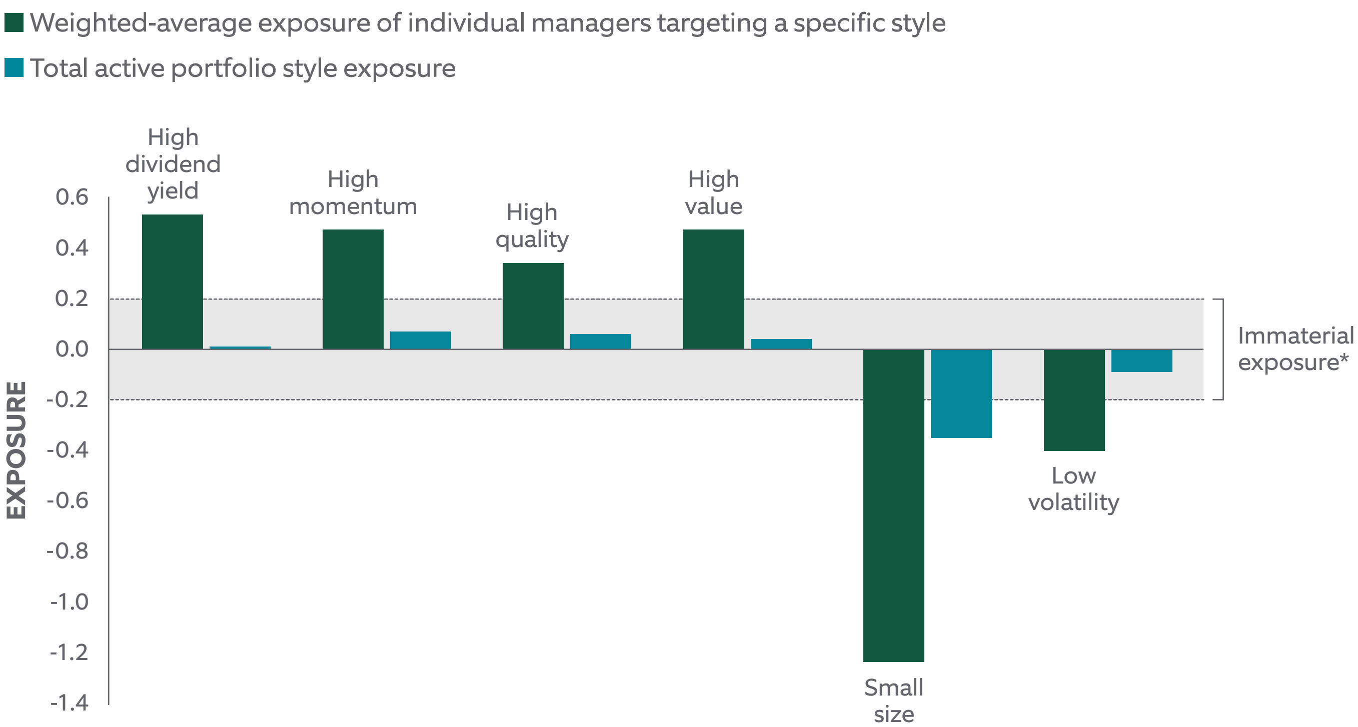
COMMON UNINTENDED EXPOSURES AFFILIATED WITH STYLE TILTS

Intended style exposure	Small size	High dividend yield	High value
Common unintended style exposures associated with above intended outcomes	High volatility	Low momentum	Low quality
	Low quality	Large size	Low momentum

Source: Northern Trust Asset Management.

MEANINGFUL STYLE EXPOSURE WAS LOST IN THE AGGREGATE PORTFOLIO

STYLE EXPOSURE:
UNDERLYING INVESTMENT MANAGER CONTRIBUTION VS. AGGREGATE INSTITUTIONAL PORTFOLIO



While investors are generally surprised to see the magnitude of some unintentional style exposures within their portfolio, the problem often hits home the hardest when they see how little exposure they have to the styles they were targeting. This trend continued to be pervasive in 2021 and 2022.

CONCLUSION

Our research uncovered that 55% of the portfolios had material style conflicts (unchanged from the prior report) — caused by the cancellation effect — that introduced exposures different from the manager's stated objective. These conflicting and unintended style exposures left many portfolios with no material exposure to their intended style tilts.

* "Exposure" is measured by the z-score, which represents the number of standard deviations from the mean data set. Any factor exposure outside of +/- 0.20 indicates that the portfolio's exposure to that factor is likely intentional and not random. For a well-diversified portfolio, when looking at exposures using standardized factor models (mean = 0; standard deviation = 1), 0.20 represents a two standard deviation portfolio level exposure. From a performance standpoint, exposures have a linear impact to return regardless of their statistical significance.

Source: Northern Trust Asset Management.

CONVENTIONAL STYLE INVESTING LED TO INDEX-LIKE PERFORMANCE WITH HIGHER FEES

One of the leading causes of the performance hindering *cancellation effect* were portfolios that showed signs of being built around the conventional "style box."

And while many investors may not admit to using this approach, our research uncovered that it was still quite common.

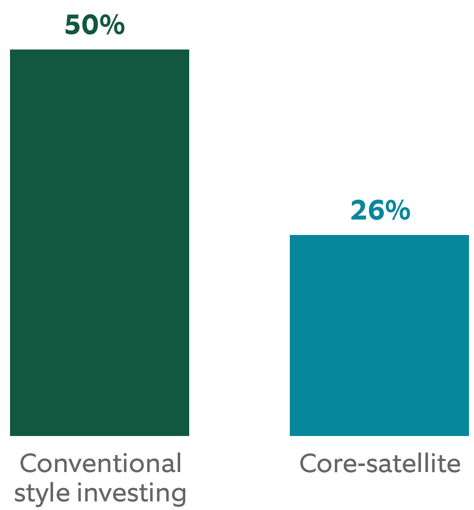
These portfolios generally contained a diversified group of managers that, when combined, resulted in a portfolio that mimicked the benchmark, but with a higher fee.

Portfolios showing signs of a conventional style investing approach, as well as those showing signs of a core-satellite approach, tended to be directly correlated with portfolios that suffered from the cancellation effect. In our analysis, two performance-hindering themes emerged:

1 **Active managers taking opposing bets on specific securities or sectors canceled each other out or were diluted by the large passive allocations.**

2 **Investors hired two or more managers to generate exposure that could be delivered by one. For example, portfolios that held both the Russell 1000 Value and Russell 1000 Growth netted out to exactly deliver the Russell 1000 (but at a higher fee).**

PORTFOLIO CONSTRUCTION METHODS OBSERVED*

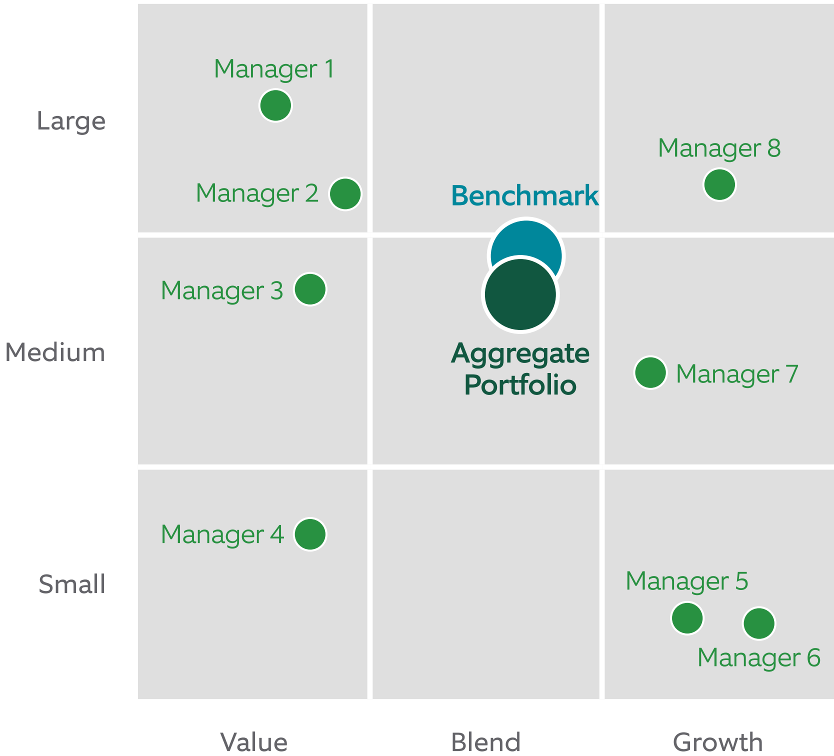


* Portfolios must have at least four managers to be considered for the portfolio construction analysis. "Core-Satellite" is defined as 50% or more of portfolio assets by weight were passively invested, as defined by an overall active risk of less than 2.5%. "Conventional style investing" is defined as at least three of the strategies were Large Cap Value, Large Cap Growth, Small Cap Growth and Small Cap Value oriented as calculated by their material exposure (measured by z-score) to those factors greater than 0.20.

Source: Northern Trust Asset Management.

A COMMON RESULT OF A CONVENTIONAL STYLE APPROACH

REPRESENTATIVE EXAMPLE OF AN ACTUAL INVESTOR PORTFOLIO



Portfolios that showed signs of either conventional style investing and core-satellite approaches generally ended up looking like the exhibit to the left.

The mix of managers selected to be diversified across size, style and region resulted in a portfolio with very few differentiating qualities relative to the policy benchmark.

CONCLUSION

Conventional style investing, whether intentional or not, created a mix of managers that closely mimicked the benchmark and left little chance to outperform.

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

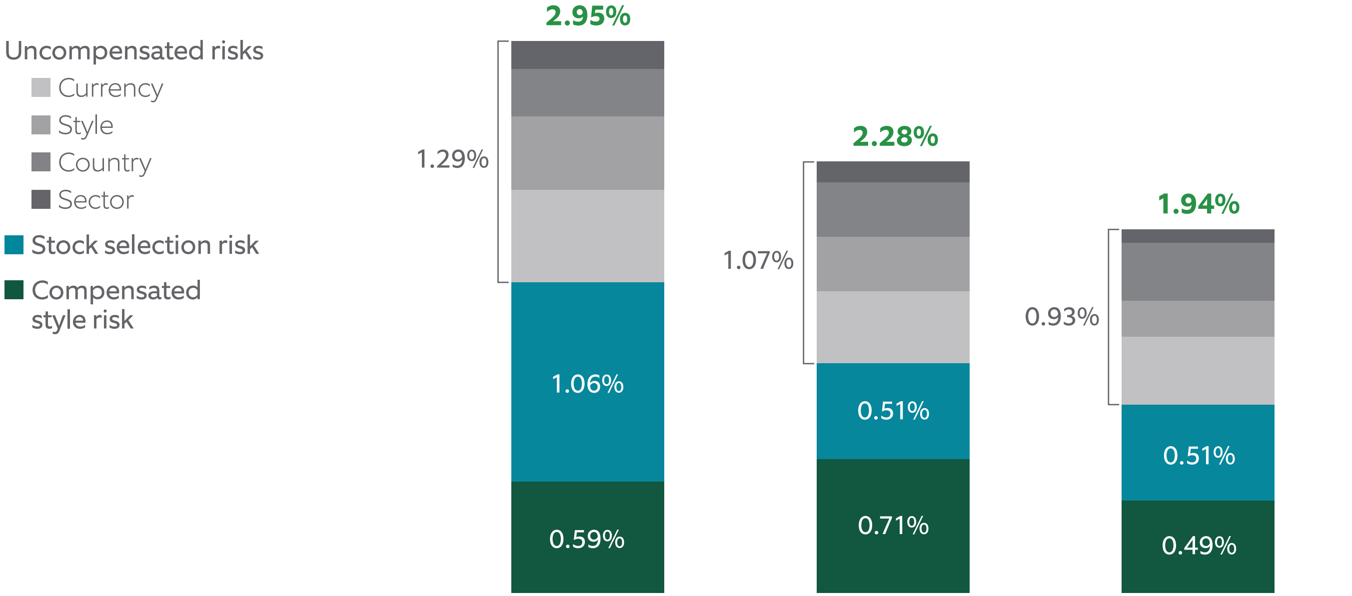
OVER-DIVERSIFICATION DILUTED PERFORMANCE

Given the size of many institutional portfolios, it's hard to avoid over-diversification. However, hiring too many managers or building equity portfolios with thousands of securities took a significant toll on performance.

While adding managers into the portfolio lineup can potentially reduce overall risk, our analysis showed the risks that were ultimately reduced were often different than what was intended. This trend continued in 2020 and 2021 at a similar rate.

For example, relative portfolio active risk contributions from compensated style risks stayed relatively stable as more managers were introduced, while stock selection risk deteriorated rapidly. This means the main contribution these additional managers were making is lowering the chances of earning excess returns, while potentially increasing overall fees.

AVERAGE PORTFOLIO ACTIVE RISK BY NUMBER OF MANAGERS

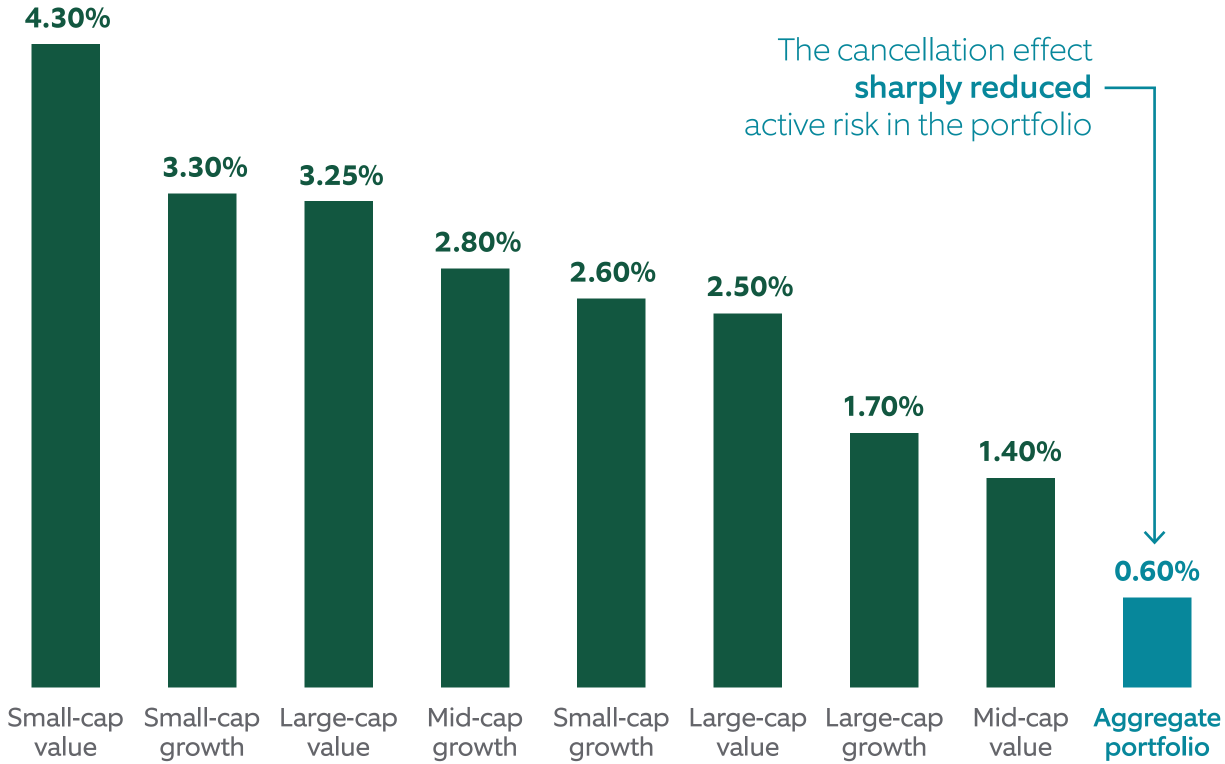


	Less than 5 managers	5–9 managers	10 or more managers
% OF ACTIVE RISK THAT IS UNCOMPENSATED	44%	47%	48%

Source: Northern Trust Asset Management.

THE IMPACT OF INDIVIDUAL ACTIVE MANAGERS WAS LOST AT THE AGGREGATE PORTFOLIO LEVEL

ACTIVE RISK CONTRIBUTION NET OF COMPENSATED STYLE EXPOSURE (BY MANAGER)



MANAGER FEES	45 bps	40 bps	65 bps	47 bps	20 bps	25 bps	38 bps	29 bps	35 bps

In this example, an investor blended high and low concentration active managers to generate alpha, but ended up with only 60 basis points of active risk at the portfolio level, while paying 35 basis points in total fees.

This ultimately led to net-of-fee returns that were below targets.

CONCLUSION

While there are many approaches to generating excess returns, our research suggests that a greater focus on eliminating uncompensated risks is a critical first step toward potentially increasing a portfolio's ability to outperform.

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

POSSIBLE ATTEMPTS TO "TIME" MANAGER CHANGES MAY HAVE PROVED COSTLY

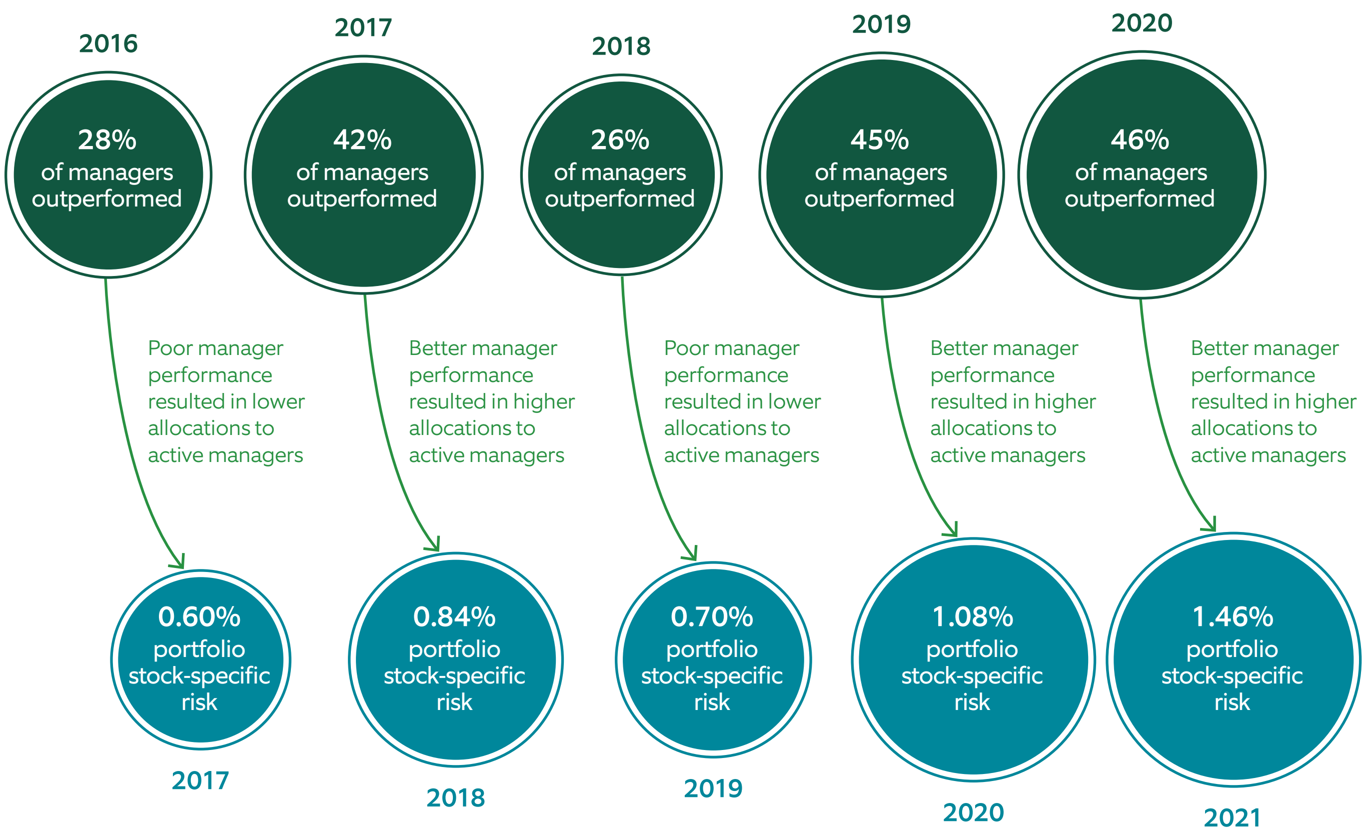
Using the amount of average stock-specific risk in a portfolio as a proxy for how prevalent correlation can be found between manager performance and their hiring/firing cycle.

As shown on the right, institutions saw material increases in their stock-specific risk in 2018 (blue circles) — following a year of strong performance in 2017 by active managers (green circles) — but were ultimately left dealing with the lackluster performance that followed (26% of managers outperformed).

CONCLUSION

Finding a manager that consistently delivers on their investment objectives is certainly important, but it should not be the only area of focus. As evidenced through the preceding discoveries of this report, knowing how a manager will interact with the rest of your portfolio can ultimately be much more impactful over time.

ALLOCATION TO ACTIVE MANAGERS AFTER PERIODS OF OUTPERFORMANCE



Source: Northern Trust Asset Management, S&P Dow Jones Indices: SPIVA© *U.S. Scorecard,* 2021. Manager outperformance data is calculated as the simple average U.S. domestic, global, international and emerging market fund categories within the SPIVA report sourced above. Indexes used in each category: All Domestic Funds = S&P Composite 1500, Global Funds = S&P Global 1200, Emerging Markets = S&P/IFCI Composite.

ABOUT NORTHERN TRUST ASSET MANAGEMENT

Northern Trust Asset Management is a global investment manager that helps investors navigate changing market environments, so they can confidently realize their long-term objectives.

Entrusted with nearly $1.0 trillion in assets,* we understand that investing ultimately serves a greater purpose. We believe investors should be compensated for the risks they take — in all market environments and any investment strategy. That's why we combine robust capital markets research, expert portfolio construction and comprehensive risk management to craft innovative and efficient solutions that deliver targeted investment outcomes.

As engaged contributors to our communities, we consider it a great privilege to serve our investors and our communities with integrity, respect and transparency.

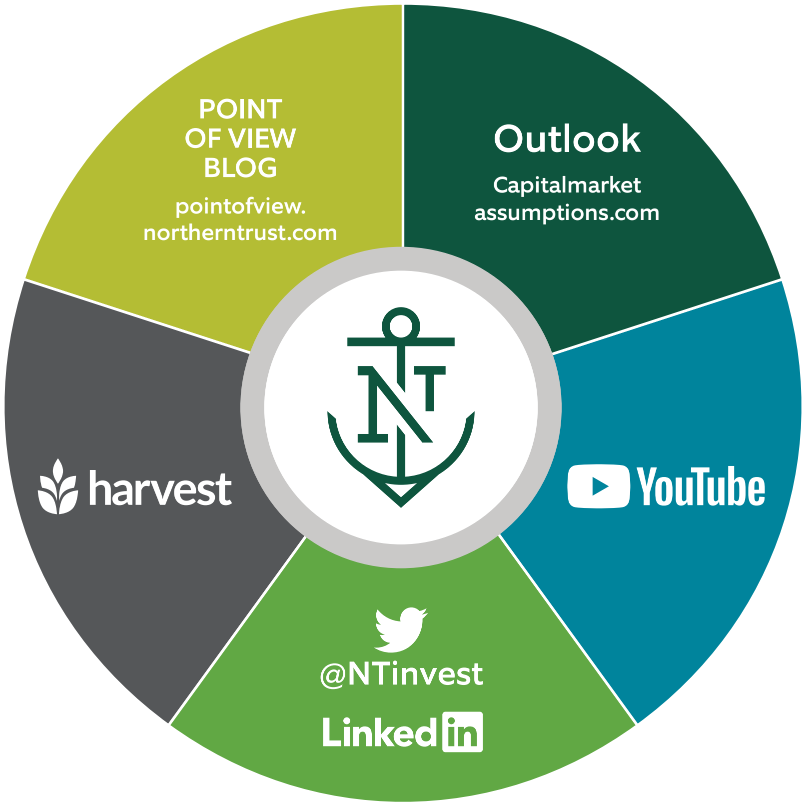
*Assets under management were $999.1 billion as of September 30, 2022.

How helpful is this content?

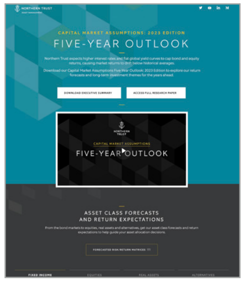
OUR INVESTMENT PHILOSOPHY

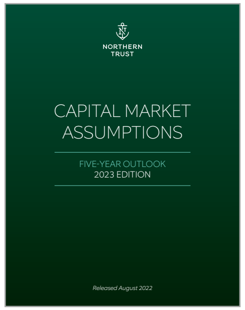
We believe investors should be compensated for the risks they take — in all market environments and any investment strategy.

ACCESSING OUR GLOBAL INVESTMENT INSIGHTS

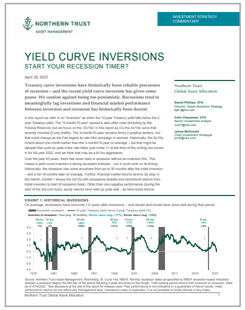


FIVE-YEAR OUTLOOK



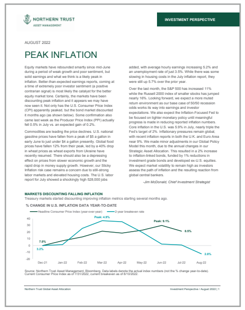


INVESTMENT STRATEGY COMMENTARY



PERSPECTIVE

Monthly Tactical Updates



MARKETSCAPE

Meaningful Insights in Less Than 3 Minutes

BLOG

Timely Market Perspectives

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