

# MULTI-DIMENSIONAL MOMENTUM: DIVERSIFIED SIGNALS, BETTER RISK EFFICIENCY

## EXECUTIVE SUMMARY

Momentum is one of the most persistent and well documented return premia in finance. It has generated economically meaningful, statistically significant excess returns across markets, geographies, sample periods reaching back to the 19th century, and a wide range of portfolio design choices. At the same time, generic momentum, implemented narrowly and without risk controls, has historically been vulnerable to episodic “crashes.” The good news is that the research frontier has moved decisively beyond simple price trends. Today, momentum can be harvested from a richer, more diversified set of signals broadly grouped under fundamental, firm specific, analyst sentiment, network based and others, and engineered with explicit crash mitigation to produce more stable, risk efficient outcomes. These include opportunities created by the latest NLP techniques which allow for processing of thousands of firm filings across the globe, in every language, and in real time.

Our momentum philosophy reflects this evolution. At Northern Trust Asset Management (NTAM), we pursue multi-dimensional momentum that targets underreaction across several information channels, price (adjusted for optionality premia and anchoring bias proxies), analyst sentiment, risk factor dynamics, and multiple network linkages, while systematically removing uncompensated risks. The result is momentum that aims to be effective, diversified, and risk efficient, and designed for integration in our broad suite of systematic strategies.

This white paper distills key insights from our recent publication in The Journal of Portfolio Management, [“Momentum Factor Investing: Evidence and Evolution,”](#)<sup>1</sup> and translates them into how we implement momentum for clients at NTAM.

## WHAT THE EVIDENCE SHOWS: MOMENTUM IS ROBUST AND OLD

Momentum has delivered economically meaningful, statistically significant excess returns across the original Centre for Research in Security Prices (CRSP) era starting in 1926, a deep pre-CRSP sample back to 1866, and international markets (developed ex-US and emerging), indicating a long-lived, pervasive premium rather than a backtest artifact.

Since 1960s, the academic literature has evolved beyond the early work focusing on simple price trends to much more sophisticated measures of momentum extracted from firm fundamentals, analyst forecasts, idiosyncratic stock returns and, more recently, applications of artificial intelligence and alternative datasets to uncover hidden connections between companies and momentum spillovers. Exhibit 1, adapted from our journal publication, shows the key milestones in

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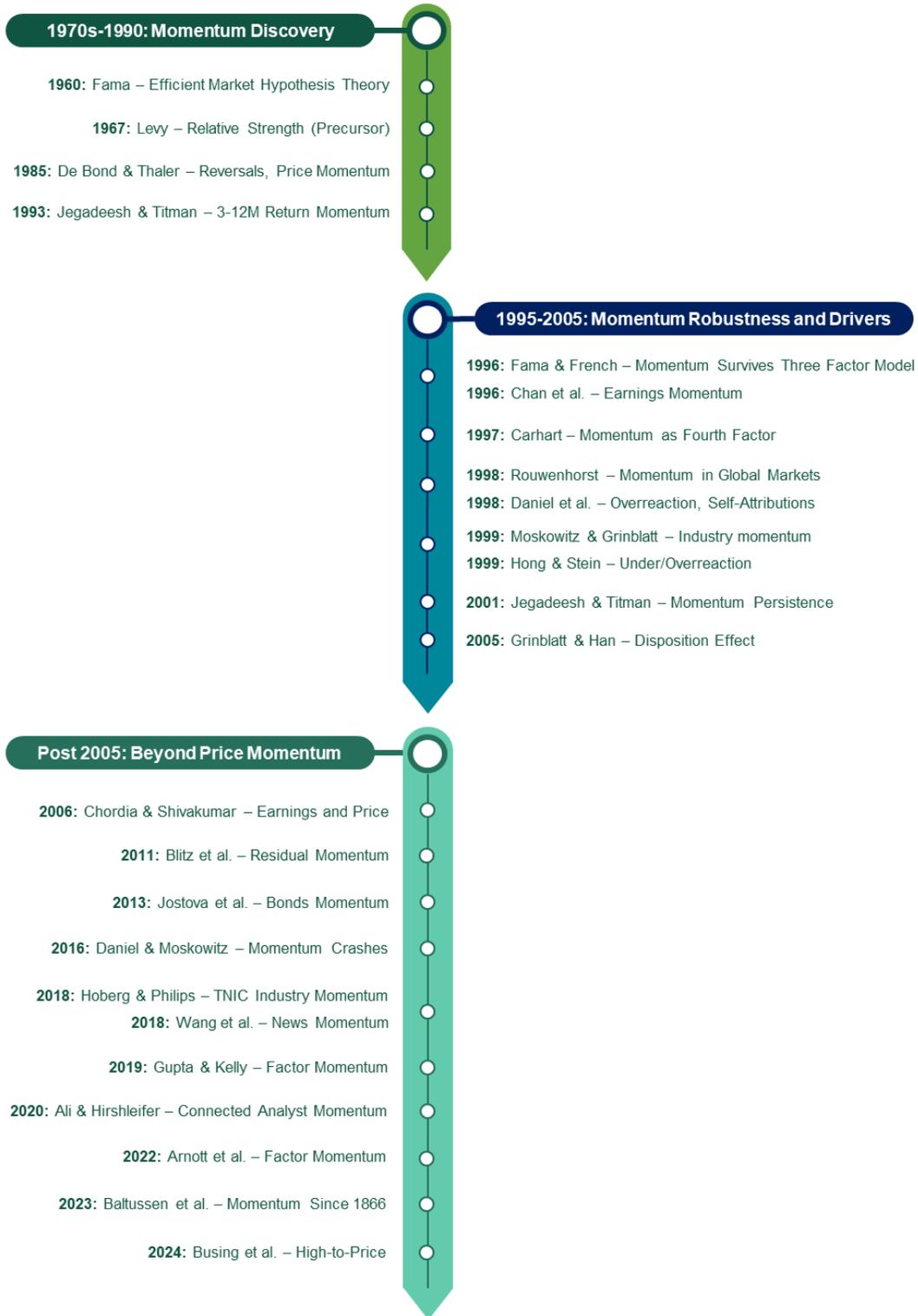
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<sup>1</sup>.Guido Baltussen, M. Sipke Dom, Bart van Vliet, Milan Vidojevic, [Momentum Factor Investing: Evidence and Evolution](#), The Journal of Portfolio Management, Volume 52, Issue 3

momentum research, highlighting the breadth of work into not only uncovering new momentum signals, but also understanding the sources behind momentum profits.

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### EXHIBIT 1: KEY MILESTONES IN MOMENTUM RESEARCH



Source: Baltussen, G., Dom, M. S., van Vliet, B., & Vidojevic, M. (2026).

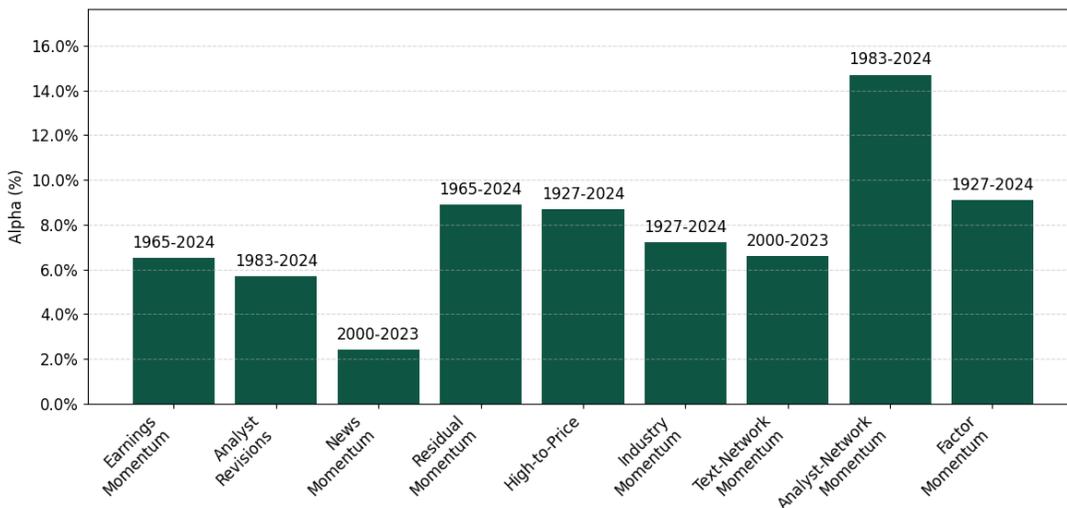
### THE RESEARCH FRONTIER: FROM PRICE TO MULTI-DIMENSIONAL MOMENTUM

Momentum has moved beyond a single price signal to a compact set of complementary signals. A multi-dimensional approach broadens the opportunity set and stabilizes outcomes relative to price only implementations.

In practice, this includes fundamental momentum (earnings surprises and analyst revisions that travel slowly, especially in smaller firms); firm specific momentum that strips out broad factor co movements to improve risk efficiency; anchor aware momentum linked to reference points like the 52-week high to reflect behavioral anchoring; and industry/network momentum that tracks information spillovers across text based peers, competitors, and customer–supplier links that standard classifications miss. There is also factor momentum, tilting toward stocks with exposures to recently outperforming styles.

Empirically, these signals are positively but not perfectly correlated with classical price momentum and add incremental alpha in spanning tests; when combined, they raise Sharpe ratios and temper drawdowns versus price only momentum. Exhibit 2, adapted from the aforementioned journal publication, shows the annualized alpha of the alternative momentum signals controlling for price momentum over the maximum available sample period for each signal, indicating high value add from diversifying the price momentum signal.

**EXHIBIT 2: ALPHA OF VARIOUS MOMENTUM SIGNALS CONTROLLING FOR PRICE MOMENTUM**



Source: Baltussen, G., Dom, M. S., van Vliet, B., & Vidojevic, M. (2026). Figure shows full sample (indicated above bars) annualized alpha of equal-weighted portfolios based on various momentum signals in the US equity universe.

## THE RISK REALITY: GENERIC MOMENTUM CAN CRASH

The same return persistence that makes momentum rewarding most of the time can reverse abruptly around regime shifts, e.g., sharp market rebounds following prolonged drawdowns. Historically, price only, long short momentum has exhibited left skewness, fat tails, and severe peak to trough drawdowns (e.g., post 2008 reversal), validating the need for explicit risk management. Our review shows that volatility scaling and multi-dimensional signal blending materially dampen these crash dynamics and improve the return distribution (higher Sharpe, less tail risk) without sacrificing expected premium.

## NTAM'S APPROACH: CAPTURING UNDERREACTION, AVOIDING UNCOMPENSATED RISK

Our momentum implementation is intentionally multi-dimensional and risk-efficient, built to capture underreaction to information, the most durable economic driver of momentum, while minimizing exposure to uncompensated risks. In practice, that means we do not rely on a single, price-only signal. Instead, we integrate multiple sources of information that propagate and persist at different speeds: price trends (explicitly adjusted for optionality premia and anchoring-bias proxies), analyst-driven sentiment, risk factor dynamics, and a rich set of network-based linkages. By diversifying the way we observe and time trends, we target the less obvious, slower-diffusing signals that traditional momentum screens tend to miss, precisely the patterns most consistent with investor underreaction.

Networks are particularly powerful in surfacing these low-salience connections. We map text-based peer relationships (e.g., embeddings-derived industry similarity), competitive sets, and customer and supplier linkages to identify how information transmits across economically related firms that may not share a conventional industry code. These network channels have shown strong efficacy in our research and in the academic literature, complementing classical industry momentum by revealing information spillovers that other signals only partially capture. That said, care is required to embed NLP networks in a risk-efficient momentum approach. Common pitfalls are hallucinations, false context, and linguistic biases resulting in unintentional portfolio bets. In the *Journal of Portfolio Management* publication "[Natural Language Processing for Asset Managers: Turning Text into Alpha](#),"<sup>2</sup> we outline our approach to best apply NLP.

The result is a broader, more stable momentum footprint that leans into trend persistence arising from gradual information diffusion rather than overt price chases. For a more detailed discussion on the applications of networks at NTAM, please see our white paper "[Uncovering Alpha In The Networked Economy](#)."<sup>3</sup>

<sup>2</sup> Guido Baltussen, Gijsbert de Lange, Ashraf Mansur, Oliverra Rakic, Machiel Westerdijk, "[Natural Language Processing for Asset Managers: Turning Text into Alpha](#)", *The Journal of Portfolio Management*, Volume 52, Issue 2

<sup>3</sup> Gijsbert de Lange, Jan Rohof, Guido Baltussen, Sri Kancharla, "[Uncovering Alpha in the Networked Economy](#)", Northern Trust, 09 October, 2025

Risk efficiency is engineered into the process. We emphasize firm-specific momentum to reduce incidental exposure to broad risk factors. We also diversify horizons and apply prudent rebalancing to control turnover and transaction costs, aligning the implementation with real-world constraints while preserving the premium. Together, these design choices improve the shape of the return distribution, higher risk-adjusted returns, less left-tail risk, and more resilient drawdowns, so that clients can access momentum's long-run benefits without taking on avoidable forms of risk.

## IMPORTANT INFORMATION

Northern Trust Asset Management (NTAM) is composed of Northern Trust Investments, Inc., Northern Trust Global Investments Limited, Northern Trust Fund Managers (Ireland) Limited, Northern Trust Global Investments Japan, K.K, NT Global Advisors, Inc., 50 South Capital Advisors, LLC, Northern Trust Asset Management Australia Pty Ltd, and investment personnel of The Northern Trust Company of Hong Kong Limited and The Northern Trust Company.

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Artificial Intelligence (AI): AI refers to computational systems designed to perform tasks that typically require human intelligence, such as pattern recognition, decision-making, and prediction. In investment management, AI may be used to support portfolio construction, risk assessment, and trading strategies.

Machine Learning (ML): ML is a subset of AI that enables systems to identify patterns based on data inputs without being explicitly programmed. ML models may be used in stock selection to identify investment opportunities based on historical and real-time data.

Natural Language Processing (NLP): NLP is a field of AI focused on the interpretation and generation of human language by machines. In financial contexts, NLP may be applied to analyze textual data such as earnings reports to inform investment decisions.

Large Language Models (LLMs): LLMs are advanced NLP systems trained on extensive datasets to understand and generate human-like text. In investment management, LLMs may assist in synthesizing qualitative information or generating insights, but do not independently make investment decisions.