BlackRock

Alpha reimagined

How big data, AI and the human element can combine to better pursue consistent alpha

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Contents

01

Redefining investing, reimagining alpha

Investors today are grappling with more than ever – more news, more data and more distractions. On top of that, we're seeing increased volatility across markets as structural mega forces such as artificial intelligence and geopolitical fragmentation upend old certainties.

Data availability has been evolving exponentially in recent years, in line with the rise in computing power. Systematic strategies have been growing through increased use of data-driven techniques that seek to generate consistent alpha – adoption of these strategies, further powered by the rapid growth of active ETFs, is a key market trend. Just looking at the active equity category, for example, we project systematic strategies' market share to grow from 11% to 15% between 2024 and 2030.[1]

For 40 years, BlackRock Systematic has continually redefined investing and adapted to evolving market conditions through a scalable and repeatable process, leveraging the latest advances in data and technology. The goal: consistent delivery of alpha across asset classes.

Our approach over these four decades is characterized by continuous innovation to pursue an informational advantage. In today's dynamic and data-filled market, using technologies such as machine learning and large language models is ever more critical to pursuing robust investment returns.

BlackRock is at the forefront of data science and investing. We believe this is the future of modern active management and delivering alpha for clients.

Richard Kushel

Head of the Portfolio Management Group

Raffaele Savi

Global Head of BlackRock Systematic and Co-CIO and Co-Head of Systematic Equities

Note: 40-year history includes predecessor firms. Source: 1. BlackRock, as of June 2025. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There is no guarantee that a positive investment outcome will be achieved..

Key takeaways

- In a world of uncertainty, volatility and dispersion, we believe it's time to reimagine alpha.
- Clients are increasingly adopting more investment strategies that aim to deliver steady, consistent returns. Many systematic strategies specialize in this.
- The flexibility of systematic processes allow managers to apply their investment skill at scale to deliver desired client outcomes, from income to diversification to core exposures.
- Today's data rich environment gives power to systematic managers who use large language models (LLMs) and machine learning algorithms to extract signals from a sea of data.
- In our view, having professional investors at every step of the process is essential, combining human expertise with technology to bring together the art and the science of investing.

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BlackRock as of June 2025. Any opinions or forecasts represent an assessment of the market environment at a specific time and is not a guarantee of future results. This information should not be relied upon by the reader as research, investment advice or a recommendation.

02

The power of seeking consistent alpha

Every investor wants alpha. Generating returns in excess of the market is a goal for many who put their capital to work.

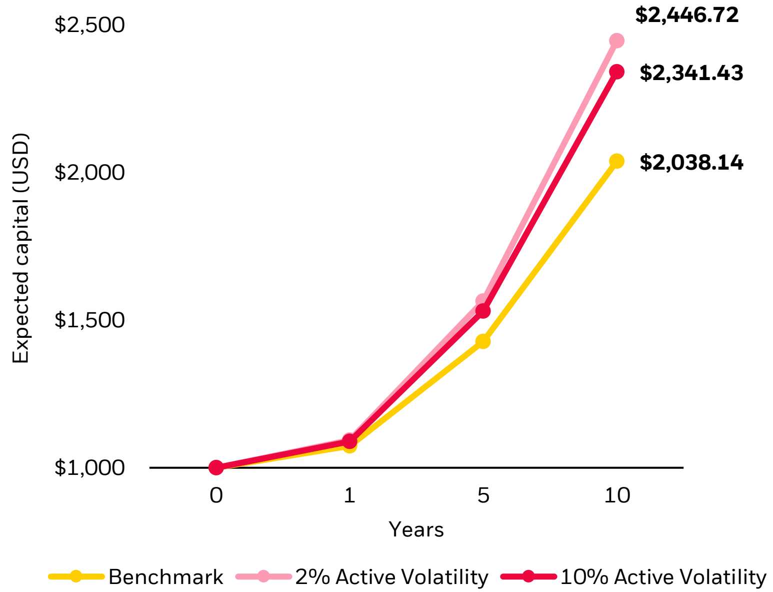
Alpha generation can be rare and difficult to repeat. Through disciplined risk management, however, investors can target a moderate range of alpha without greatly increasing risk in their portfolio – which may make a significant difference over a longer time horizon. In other words, we believe consistently delivering small wins pay off.

This is illustrated in the chart on the right. The red and pink lines both represent a hypothetical investment delivering an average annual outperformance versus its benchmark of 2% over a 10-year period. However, the pink line is an investment that saw less volatile returns over the 10 years, while the red line represents an investment whose performance swung more wildly, with bigger gains some years, but much smaller gains or even losses in others. Over time in this illustration, the more consistent investment comes out ahead.

Adding steady performance to a portfolio can help to not only boost returns but also reduce overall risk and volatility – both of which are desirable outcomes during any market cycle and especially appealing amid today's uncertainties.

Consistent returns

Over time, the less volatile fund may generate higher returns



Source: Based on the value of US$1,000 invested in the benchmark compared to the expected value of US$1,000 invested in the active portfolios. Assuming no additional investment and alpha at 2% with varying active risk levels. Benchmark expected return is 9% (roughly 5% risk premium and 4% risk-free). The performance shown does not reflect the deduction of any fees or expenses, including advisory, management and performance fees, as well as brokerage fees, commissions and other expenses that might normally apply. Performance shown above is hypothetical and does not represent the investment performance or actual accounts of any investor. The hypothetical performance returns are provided for illustrative purposes only. **Past hypothetical performance results are not indicative of future returns**. The allocation decisions reflected in the hypothetical returns were not made under actual market conditions and cannot completely account for the impact of financial risk in actual portfolio management. There are frequently sharp differences between a hypothetical performance record and the actual record subsequently achieved. Therefore, hypothetical performance records invariably show positive rates of return. Hypothetical volatility drag model available upon request. 'Active Volatility' refers to % active risk or standard deviation of the difference between the portfolio and index returns.

Seeking consistency through scale

We believe the most efficient way to seek consistent alpha is **investing at scale**. That's because we have found that consistently achieving alpha is more attainable when hundreds of securities are combined: The breadth of holdings can reduce the risk of a single loss dragging down performance.

Building such a varied portfolio requires going broader and deeper than the typical investment process, in our view. By leveraging technologies such as machine learning and large language models, investors can harness unique insights that go beyond the scope of traditional financial metrics to achieve a deeper, more nuanced analysis – uncovering granular and potentially actionable insights that were previously out of reach.

Systematic investing uses data and technology to bring rigorous research and measurement techniques to all aspects of the investment process. Think of it as quantifying human insights.

Importantly, systematic teams typically seek out and use proprietary sources of information for their investment processes (see page 13 for more details). Finding differentiated sources of investment information can help boost portfolios by targeting differentiated alpha – returns that aren't closely correlated with broad markets.

We believe systematic strategies are poised to play a bigger role in portfolios, as they are well-positioned to take advantage of the digital age that has created an ocean of information. If harnessed correctly, that information can better inform decision-making and potentially new sources of alpha.

"

Data is the oxygen of our process. We rigorously test thousands of datasets each year with a constant drive to uncover the next source of insight."

Jeff Shen, PhD
Co- CIO of Systematic Active Equity

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03

Applying systematic strategies

Systematic strategies can address needs across many different use cases.

Whether used as the building block of a portfolio, a potential source of consistent income or for targeting high alpha generation and diversification, the systematic principles of investing at scale with big data, technology and human insight may serve many different needs:

- As low-cost asset allocation building blocks for those looking to add alpha at the core of their portfolio.
- To help seek consistent high income without taking on additional expected risk.
- Alternative strategies — such as market neutral and multi-strategy hedge funds — can enhance portfolio diversification by offering potential return streams that are less correlated with traditional markets.

Seek consistent alpha at the core	**Income as alpha opportunity**	**Portfolio diversifier with alpha potential**

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Potential client use cases

Seeking consistent alpha at the core

- These strategies, such as enhanced and rotation, can be **portfolio building blocks** for those who are **seeking consistent alpha opportunities** at typically lower fees compared to other active strategies that take on more risk.
- For institutions that are particularly **sensitive to fees and performance**, enhanced strategies can be utilized to replace or complement existing active and/or index strategies.
- Strategies that dynamically rotate among **factors** or **themes** can serve as a core replacement or complement, depending on asset allocation requirements.

Income as alpha opportunity

- An active equity strategy that also aims to **generate income**.
- A potential choice for those looking for **differentiated active management**, while also limiting downside risk.
- For **outcome-driven** portfolio sleeves that have a focus on seeking high income generation.

Portfolio diversifier with alpha potential

- Liquid alternatives and hedge funds can provide **differentiated strategies** while also aiming for higher alpha generation than traditional asset classes.
- Alternative strategies such a market neutral can also provide **downside mitigation** to portfolios.
- Suited for parts of a portfolio that can accommodate higher risk exposure in return for seeking **greater returns** over longer periods.
- Utilized by clients within their alternative parts of their portfolio, or as **equity or fixed income replacements**.

Source: BlackRock, as of June 2025. For illustrative purposes only. There is no guarantee that a positive investment outcome will be achieved.

04

Investing in a data-rich world

Data creation and storage has exploded in recent years, increasing by a factor of 100 over the past 15 years.[1] There are limits to how much of this humans by themselves can track.

The numbers help tell the story: at BlackRock, our Systematic team analyzes 15,000 global equities each day, as well as 3,000 global credit issuers – and these are just examples of traditional financial metrics. There are tens of thousands of more inputs beyond these. We believe analyzing, processing and understanding this data is a critical basis for investing at scale.[2]

The age-old questions that have guided investors for generations remain unchanged. However, the depth and scale of systematic analysis has revolutionized how quickly and precisely these insights can be brought to market. We believe that today's world requires investors to reimagine traditional methods of investing by seeking alpha through continuous and relentless innovation. And for those who want to capture as much information as possible before making decisions, systematic strategies are essential, in our view.

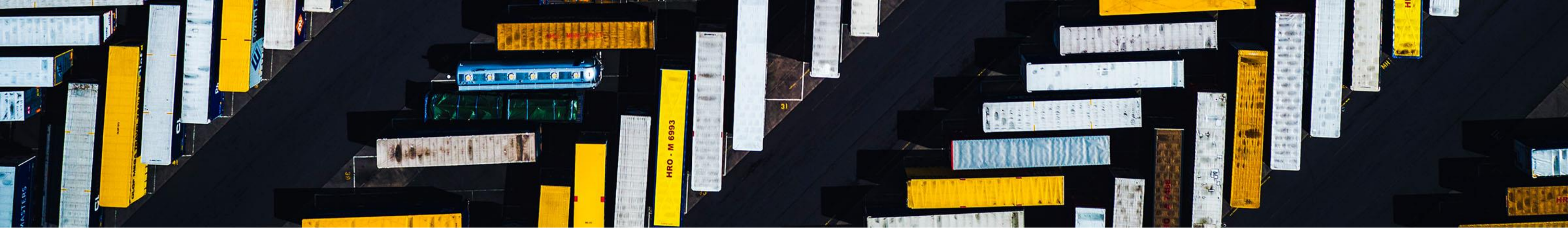
Source: 1. IDC, as of May 2024. 2. BlackRock, as of June 2025. Any opinions or forecasts represent an assessment of the market environment at a specific time and is not a guarantee of future results. This information should not be relied upon by the reader as research, investment advice or a recommendation.

What is an investment signal?

An investment signal is a piece or series of data that can help inform an investment decision. In some cases, the signal is public or at least broadly available. In other cases, it's proprietary information.

Some signals can be built to capture non-traditional measurements, such as company sentiment. For example, applying text analysis algorithms to analyst reports can provide greater insight into whether analysts have positive or negative views of the firm.

Signals can also capture alternative quality measures, such as the number of web searches for a specific company's products. This signal can help to evaluate consumer interest and potentially forecast where sales, profits, and company margins may be headed.



Seeking consistency through scale

It's not just about the quantity of data processed; it's how the data is used in investment decision-making.

We believe systematic managers can prove themselves in their ability to make sense of and gain meaningful insights from the volumes of data that surround today's markets.

But systematic strategies aren't purely about computers and numbers.

We cannot find new insights and create models that can capture them without the skill of human experts – data scientists, mathematicians and investment professionals are essential to the process.

One area where the combination of technology and human insight can be exemplified is investment signals.

There's been an explosion in potential investment data. In the 1980s, investment insights were drawn largely from readily available company financial reports and industry analyst opinions (see timeline on page 12).

But in 2025, ideas can originate just about anywhere, from social media and online search activity to text-mining patent applications or analyzing company job postings.

Technology is needed to analyze and process these signals – but it requires human insights, expertise and sense-testing to make the best use of the data.

“We work hard to turn innovation into consistency.”

Raffaele Savi
Global Head of
BlackRock Systematic

Using AI to seek investment returns

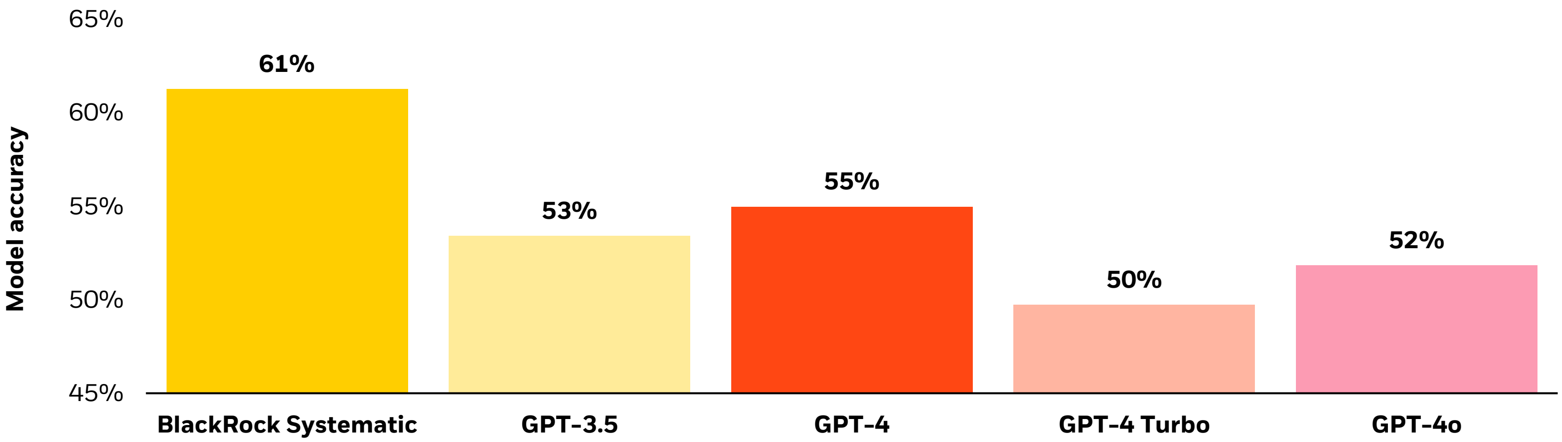
Artificial Intelligence is set to change how many industries work, and asset management is no exception. While we believe that AI will soon be mature enough to assist investors and analysts across different phases of the investment process, investors are already using large language models in their work.

LLMs are known to the general public thanks to tools such as ChatGPT. For systematic investors, LLMs are being used to help inform investment decisions and identify market-relevant themes. For instance, they synthesize information from a variety of text sources, including analyst reports, corporate earnings call transcripts, news articles and social media to help inform investment forecasts and uncover potential alpha opportunities.

BlackRock Systematic has trained open and closed source models with large quantities of high-quality* domain datasets – including trillions of finance-related text tokens – in an effort to better predict post-earnings markets (see chart below).

Predictive value

BlackRock Systematics' earnings call model has been fine-tuned, seeking to predict post-earnings market reactions with a high level of accuracy.



Source: BlackRock Systematic, as of May 2024. Using a sample of 500 earnings calls from Q1 2024 (40-days post earnings), this analysis computes the prediction for each model and compares it to 40-day forward returns. The level of accuracy is the fraction of predictions that were correct for each model. The models used for the analysis are GPT-3.5 (March 2023), GPT-4 (June 2023), GPT-4 Turbo (Jan 2024), GPT-4o (May 2024), and the BlackRock Systematic model (Dec 2023). Provided for illustrative purposes only to demonstrate the capabilities of the BlackRock Systematic Investing Group. Models and forecasts are based on estimates and assumptions and actual results may vary significantly and may not be achieved. Note: *High-quality datasets are used to train effective AI models. It determines how well the model learns and performs in real-world applications. What makes data high-quality is its relevance, accuracy, completeness and its consistency across datasets.

05

Delivering systematic solutions

BlackRock Systematic has sought to deliver consistent alpha for clients for the past 40 years.

Research is at the heart of what we do. Our team aims to transform data and insights into alpha, uncovering informational advantages others overlook. Staying ahead in equity markets demands strategies that are designed to be as dynamic and nimble as the news and events shaping them.

Whether it's a family office that is seeking dynamic factor and theme exposure for diversification and risk management, or an insurer looking for a source of income that also targets high, consistent income generation. We believe that systematic strategies offer the speed, granularity and scale that is a requisite for success in today's fast-evolving investment landscape.

Our history of innovation

Systematic investing has evolved to use large amounts of data that has become increasingly available

1985 1990 1995 2000 2005 2010 2015 2020 2025

- Evaluating **fundamental value** in financial statements.
- Using **analyst sentiment** to gauge the behavior of market participants.
- Measuring **earnings quality** to identify companies poised to beat estimates.
- Deciphering short-term sentiment from **asset flows**.
- Analyzing **macro themes** to harness global opportunities.
- Using new and **unstructured data** sets to uncover alpha opportunities.
- Using **AI/machine learning** to build models that adapt and learn.
- Exploring **ESG data** in an effort to find alpha.
- Evolving beyond sectors and regional exposure, to **themes**.
- **Private markets** insights with alternative data.

Note: 40-year history includes predecessor firms.
Source: BlackRock as of June 2025. There is no guarantee that a positive investment outcome will be achieved or that research capabilities will contribute to such an outcome.

Building a data library

Investment signals are an essential part of a systematic strategy. When our Systematic team started in 1985, they used three investment signals to help make investment decisions; in the 40 years since, that figure has steadily grown to more than 1,000. This gives our investors an enormous range of possible data sources to use in their investment process.

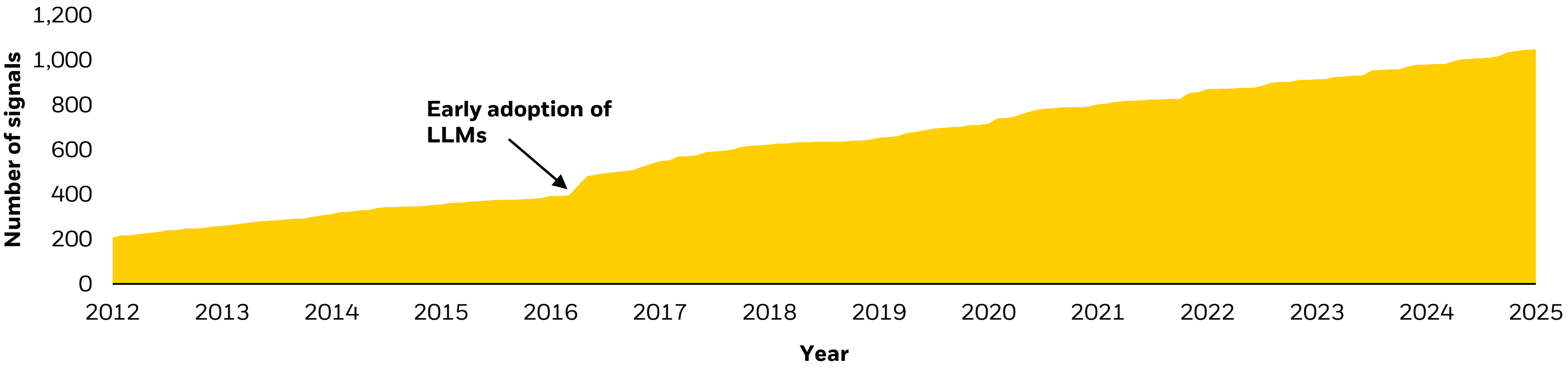
As the chart below shows, our signal library has roughly doubled in size every five years. This is due to a combination of the rise of available signals and technological innovations – the jump in 2016 came after our team's adoption of LLMs.

Use of signals should be tailored to the scenario. For example, traditional valuation measures may be less relevant for biotech firms, many of which report little or no revenues. In this instance, we can consult clinical trial data. And as market environments change or information gets priced in, it's important for managers to innovate to help ensure their signals continue to help identify alpha opportunities.

Our portfolio managers leverage machine learning systems, seeking to accurately weight investment signals – another example of combining the human element with technology. Our portfolio managers customize and specify how we automate, optimize and combine investment signals – helping our teams to make better investment decisions and promoting more effective use of our library of data inputs.

Signal boom

The increase in investment signals used by BlackRock Systematic



Note: 40-year history includes predecessor firms.
Source: BlackRock Systematic investment signal library as of March 31, 2025. For illustrative purposes only.

Real–world signals

How BlackRock Systematic uses investment signals to help target alpha for clients

The following pages provide real-world case studies of investment signals that our investors have used as part of their investment processes. Although these examples are historical, many of the signals continue to play a vital role in our team's investment process today — informing decisions such as assessing recession probabilities.

1. Looking deeper with job postings

In 2020, core systematic models faced new challenges during the pandemic. We found that signals that used traditional accounting data weren't as efficient, making a forward-looking systematic investment approach more relevant.

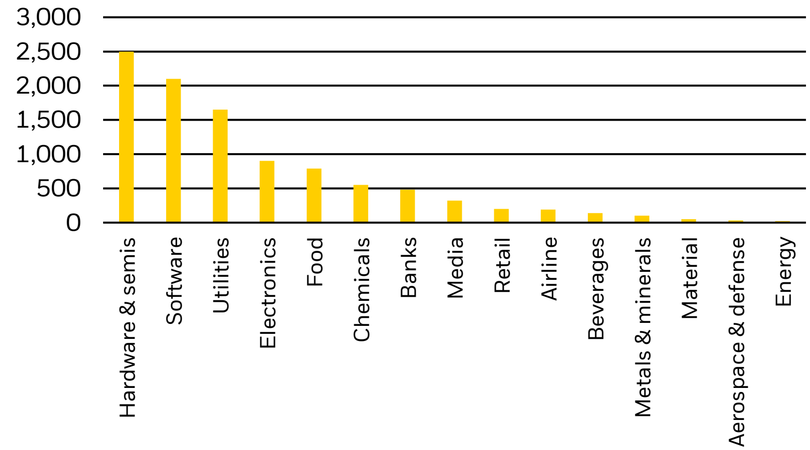
We used data from online jobs postings to understand the associated economic impact on businesses.

Job postings can help investors predict company business conditions ahead of earnings reports. Human resources websites and job forums can inform company, industry and state-level views. Skills and qualifications within job postings can indicate which companies are better positioned in different market regimes.

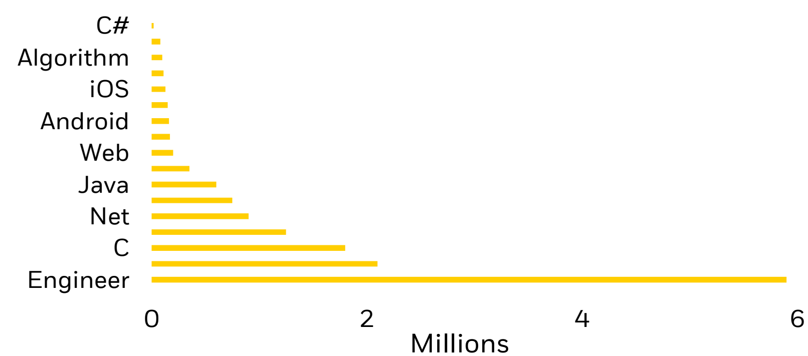
The two charts on the right helped us see that more technology-focused companies were better positioned to navigate a global shutdown, and that tech-related job titles were more in demand as the world started to increasingly rely on digital technology.

While job posting insights have long been applied to publicly listed companies, many of our alternative data sets include private company information. Whether a company is public or private, it has been a positive indicator when there is an increase hiring.

Semiconductors, hardware, and software dominated job postings



Engineering led the way as tech moved into focus



Source: BlackRock Systematic and Burning Glass Technologies as of April 30, 2020. Sample looks at U.S. jobs postings. There is no guarantee that research capabilities will contribute to a positive investment outcome.

2. Loosening the leash: Government eases quarantine mandates

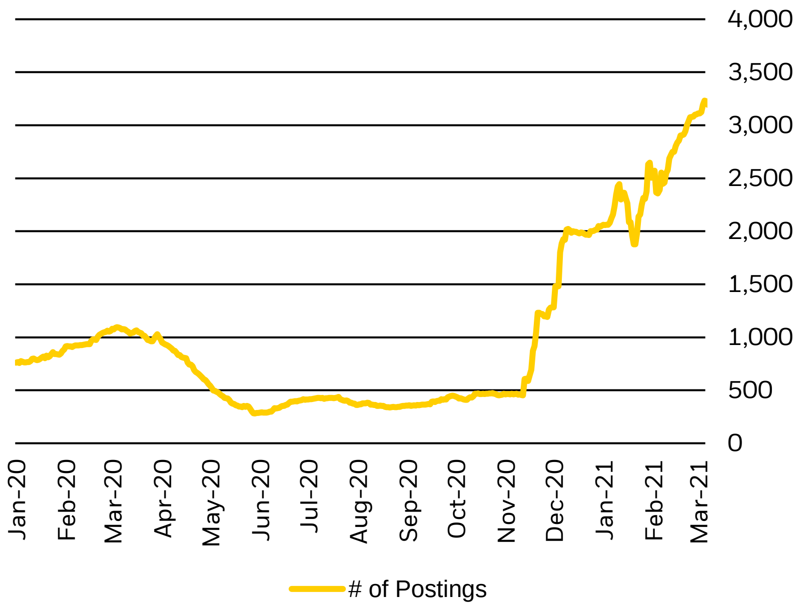
In 2021, investors faced the challenge of pricing in the timing and impact of post-pandemic economic reopening.

We leaned on jobs data to evaluate shifting economic conditions. This time, an uptick in the demand for dog walkers was a significant data point, indicating potential movement toward reopening on a state-by-state level.

Our data showed a notable spike in demand and wage increases for this position in 2021 that coincided with wider availability of vaccines and return to office mandates. In this instance, dog walking data was able to provide our investors with insight into the direction of the economy as lockdown mandates began to ease.

Consulting alternative data gave us a substantial head start ahead of easing restrictions in cities and a vaccine becoming widely available.

Number of dog-walking postings



Source: BlackRock, Burning Glass Technologies with information as of June 2021. Sample looks at U.S. job postings. There is no guarantee that research capabilities will contribute to a positive investment outcome.

3. Creating real-time inflation forecasts

Food prices, a significant component of the Consumer Price Index (CPI), can be used to measure inflation in day-to-day consumer living expenses.

We apply web-scraping techniques to gain insights into consumer goods prices well ahead of the monthly CPI print.

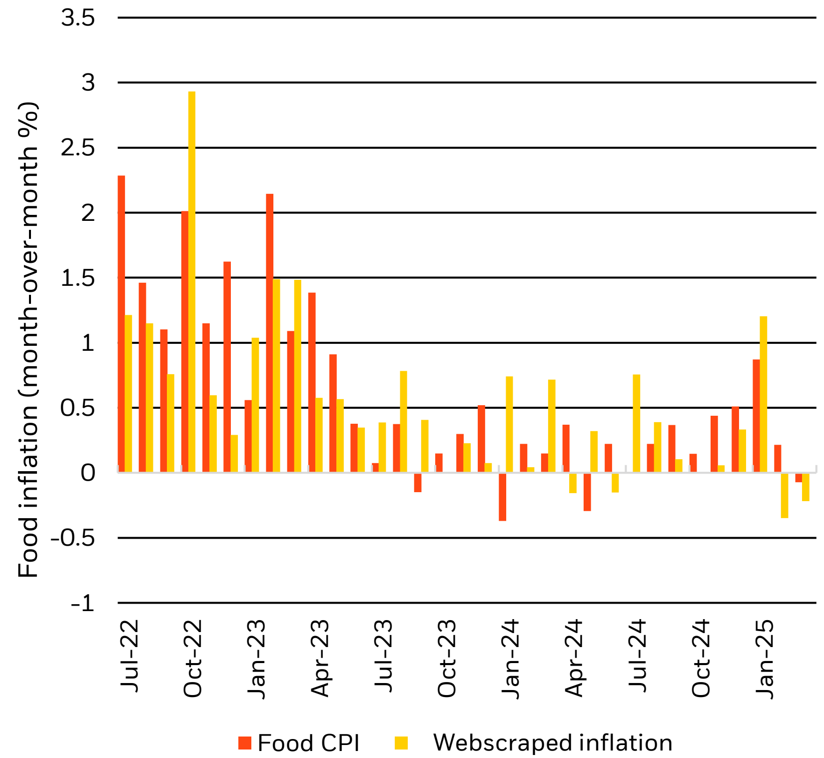
Our team scrapes the web for details on food prices from online retailers and uses that data to build a bottom-up forecast.

This process is illustrated in the chart on the right, where we examine food and non-alcoholic beverage retail prices in the U.K. in comparison to prices scraped from supermarket websites.

The higher frequency of data collection can provide investors with a time advantage, as official CPI reports are published monthly on a lag.

The granularity and real-time assessment of this data enables investors to track underlying drivers and trends in price inflation, informing our inflation forecasts.

Food CPI vs. webscraped data (U.K.)



Source: BlackRock Systematic as of March 31, 2025. CPI is the percent change in Food and non-alcoholic beverages in UK CPI (UKHPCHVK Index) and webscraped data is calculated using prices scraped from supermarket websites. There is no guarantee that research capabilities will contribute to a positive investment outcome.

4. Context clues in local languages

Smaller markets tend to be more affected by local news headlines, in our experience. In Taiwan, where nearly 60% of trading volume is driven by individual investors,[1] headlines can sway investing behavior.

To assess the influence of local headlines in Taiwan, we combined global and local insights. We find that local insights can provide advantages via more specific data, differentiated insights about what's happening in local media coverage, and unique market-specific trends.

We apply natural language processing (NLP) to parse through local news content. Our models are trained on sample words unique to traditional Chinese characters, which are then translated into English to pick up on local market sentiment. As an example, we looked at a popular local financial news publication to learn which headlines may be influencing Taiwanese investors.

Looking at model performance in this region, local insights often outperformed global insights that include all major news events and headlines regardless of geography.[2] Higher Information Ratio (IR) scores suggest that local context increases the ability to forecast investor behavior.[3]

Key words in local headlines help us identify trends

Sample words unique to traditional Chinese characters are pulled using NLP techniques

Traditional Chinese	Directly simplified characters	Mainland simplified Chinese	English
拉貨動能	拉货动能	N/A	sales momentum
訊號	讯号	信号	signal
當沖	当冲	日间交易	day trade
量縮整理	量缩整理	市场下跌调整	market down & adjust
均線糾結	均线纠结	N/A	short
紓解	纾解	缓解	relief

BlackRock, as of 31 December 2024. For illustrative purposes only and subject to change

Source: 1. International Journal of Economics and Financial Research." International Journal of Economics and Financial Research 7, no. 3 (2021): 82–89. 2. This is a comparison to evaluate our proprietary model performance in Taiwan. Local context has a positive impact on model performance. How we define global insights: all signals in today's alpha model but excluding Taiwan local insights and excluding AIM models. 3. IR measures the adjusted return of an active investment strategy relative to a benchmark index. IR is calculated by subtracting the return of a benchmark/tracking error from the return of a portfolio. There is no guarantee that research capabilities will contribute to a positive investment outcome.

5. Harnessing the potential predictive power of social media

With social media ad spend predicted to reach about US$275 billion this year,[1] many companies are relying on social platforms to drive brand awareness and to increase market share.

Alternative data generated from influencers and targeted advertising can offer powerful insights into consumer preferences and potentially future brand performance.

We can quantify the effect of engagement on brand recognition through posts, likes and web traffic.

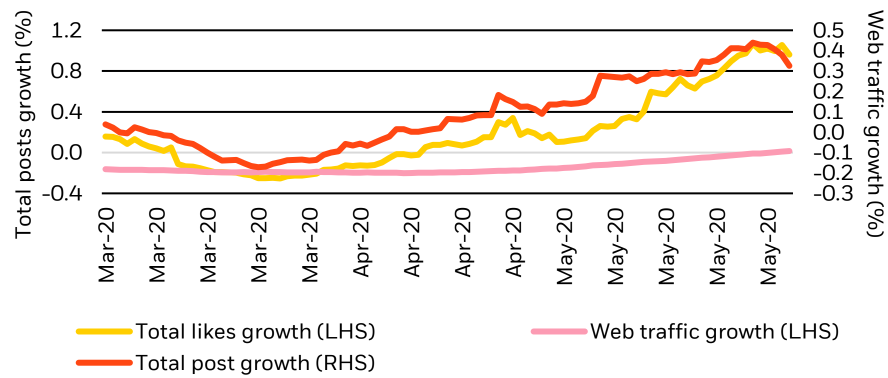
For example, the charts on the right show how amplified social engagement may correlate with a brand's performance.

In this real-world study of a German online retailer, we see the number of likes for, and the number of posts from, the brand increased from March-June 2020. In the same period, web traffic trailed closely behind and experienced a similar level of growth as posts and likes increased in frequency.

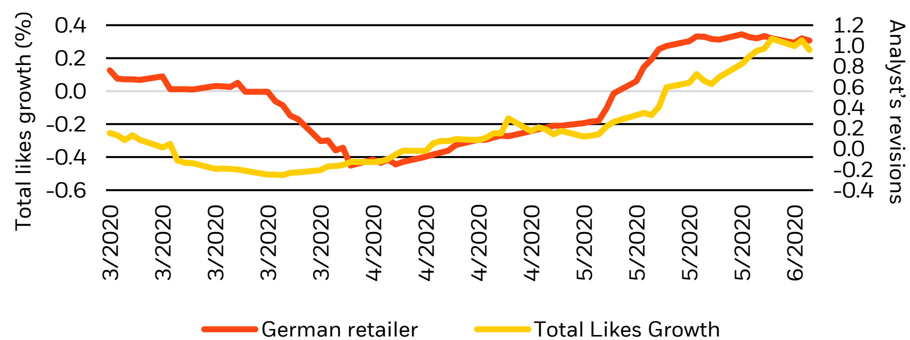
Our team has found that similar positive growth trends have been associated with financial analyst revisions.

Source: 1. Sprout Social. (2025, February 20). *80+ must-know social media marketing statistics for 2025.* https://sproutsocial.com/insights/social-media-statistics/

Increases in posts and likes was associated with future web traffic growth in Germany



Web engagement is positively associated with analyst revisions up to 30 days out



Source: BlackRock Systematic as of June 2024. For illustrative purposes only. There is no guarantee that research capabilities will contribute to a positive investment outcome.

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