

OMI Advisory

Regimes, Systematic Models and the Power of Prediction

March, 2025

Time to read: 12 minutes

Authors

Amara Mulliner
Quantitative Researcher,
Man AHL

Campbell R. Harvey
Investment Strategy
Advisor, Man Group

Chao Xia, PhD, CFA, FRM
Senior Quantitative
Researcher, Man Numeric

Ed Fang, PhD, CFA
Director of Research,
Man Numeric

Otto van Hemert, PhD
Director of Core Strategies,
Man AHL

Key takeaways:

- Exploring how economic regimes inform investment returns has been integral to our research for many years. Here, we use systematic analysis to identify regimes and then propose a strategy for timing investments based on these periods
- Having established our systematic regime model we apply it by examining the historical returns of six long-short equity factors. We propose taking a long position if the average performance of a factor during similar market regimes was positive, and a short position if not
- We find that this strategy performs better during similar regimes, and worse during different periods, thereby affirming our 'regime model'

Introduction

Not that long ago, we hardly heard the word 'regime' mentioned in the markets. Then came the post-COVID inflationary spike, and suddenly they were 'flavour of the month'. In fact, we've long thought that regimes – specific market environments characterised by distinct macroeconomic, financial and geopolitical conditions over a set time period – offer a useful perspective on performance and risk that is unfettered from the days and months of the calendar.

We began this paper having already spent a good deal of time working on regimes, both within Man Numeric's Macroscopic models¹ and in the Fire and Ice framework² that has guided our approach to inflation modelling. We wanted to use these different approaches to identification and implementation to think about regimes from the bottom up, constructing a simple model that characterises markets by their similarity or difference when compared to historical periods.

The existing research on regimes is useful in constructing a balanced portfolio that is robust against different regimes. By contrast, the aim of this paper is to provide a point-in-time metric for timing investments. It does so by proposing a systematic approach to regime selection (a 'Regime Model').

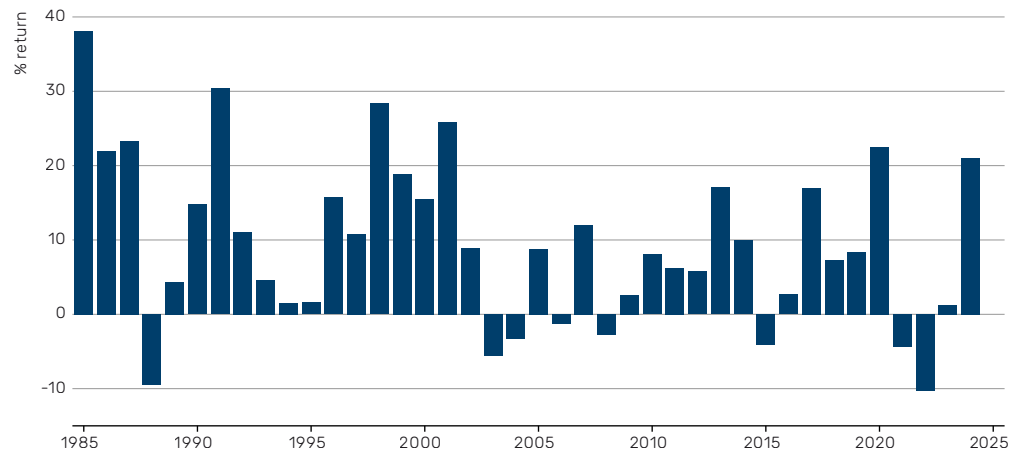
The main contribution of our paper is methodological. However, we do apply our Regime Model to six popular long-short equity factors. We look at historical factor returns and go long a factor if the historical return subsequent to observing the regime at the investment date is positive, and short otherwise.

We document a positive relation between the returns on this type of strategy, and similarity. Indeed, the least similar historical dates do the worst in terms of performance. The alpha of being long the most similar and short the least similar is a statistically significant three standard deviations from zero. Exhibit 1 suggests that the strategy is also a consistent performer.

¹ See [Views from the Floor 2001 Redux? Today's Economy Shows Eerie Parallels to Post-Dot-Com Crash | Man Group](#) for example. ² See [Fire, Then Ice | Man Group](#) or [10 for 10: Themes for the Next Decade | Man Group](#).

Exhibit 1. Long similarity and short dissimilarity

Yearly returns from regime model implementation at 15 volatility



Source: Man Group internal data as at 2025. For a full list of data sources, please see Exhibit 2.

In writing this paper, we have reviewed and learnt on much of the existing research on regimes. For example, Kaya et al. (2010)³ offer a useful early model, recognising in their paper that emphasising current conditions rather than preset regime characteristics is a more useful way of considering a market landscape which is in constant evolutionary flux. However, unlike the prior studies, which either impose discrete regime classifications or rely on statistical models with predefined transitions, our approach allows for a more flexible definition of regimes by directly measuring historical similarity across multiple economic variables.

We should say here that this paper is not intended to be either complex or comprehensive. The driving idea behind our research was to establish a framework and model that were both intuitive and flexible and could therefore be used as the basis for further research.

The Regime Model methodology

The user of our Regime Model needs to specify a set of economic variables, and in this paper, we consider a constellation of seven variables. We transform these variables to look at annual changes and compute a z-score. Then, variable by variable, we investigate the past and identify regimes that are similar.⁴ Looking at every historical date, we aggregate the distances at each date across our seven variables. We refer to the aggregated similarity score as the 'Global Score'. Those historical dates with the smallest aggregate distances are our definition of similar regimes. Once we have established similar dates in the past for a particular asset, we look at subsequent returns. Importantly, once the historical regimes are established, we can apply this method to any asset class.

Our Regime Model has several advantages. First, the method is systematic, in that the regime classifications are automatic. Second, the method can easily be applied to a much larger set of economic variables. Third, our method is simple, relying only on z-scores.

That said, in any systematic model, choices need to be made. In our method, the economic state variables need to be chosen (which itself induces look-ahead bias). Second, there is a choice as to how to represent the variable (e.g., what horizon for rate of change?). Third, we need to agree the degree of similarity. Fourth, we need to decide on the length of the observation period after the similar historical regime. Finally, how should we weight the economic variables?

³ Kaya, Hakan, Wai Lee, and Bobby Pornrojngkool. "The Journal of Portfolio Management." *The Journal of Portfolio Management*, vol. 36, no. 2, Winter 2010, pp. 94–105. DOI: 10.3905/JPM.2010.36.2.094. ⁴ Our measure of similarity is the squared distance of today's value to each historical observation. For example, if the z-score today is 2.5, we look at historically similar times where the z-score is close to 2.5. If the value on a particular historical date was exactly 2.5, the squared distance would be zero.

Economic state variables

Identification of variables

We use the seven economic state variables detailed in Exhibit 2:⁵

Exhibit 2. Economic state variables and sources

Variable	Proxy	Data source	Start date
Market	S&P 500	Bloomberg	1927
Yield curve	US 10-year minus US 3-month yield	Internal data & St Louis FRED	1962
Oil	WTI spot crude oil price	St Louis FRED	1946
Copper	Copper futures price	Internal data	1959
Monetary policy	US 3-month yield	St Louis FRED	1954
Volatility	Realised volatility of S&P 500 stitched with the VIX Index (from 1990)	Bloomberg	1929
Stock-bond correlation	S&P 500 and US 10-year yield	Bloomberg & internal data	1962

Our chosen economic state variables are all financial variables that embed macroeconomic information. Again, this is our choice, and the user of our method could add a range of different macroeconomic variables.

For each variable, we take a 12-month change and then normalise it by computing the z-score over a rolling 10 years, capped to be within minus three and three.⁶ Next, we compute an adjustment similar to a z-score, whereby we divide the one-year difference by the standard deviation of the rolling one-year differences, computed over 10 years. We finish by winsorizing at three to remove outliers, thereby creating the transformed economic state variables.

Descriptive statistics

We are now able to assess the properties of the transformed series of variables. We do this both individually (autocorrelations) and across series (correlations). As expected, the autocorrelation largely vanishes by 12 months. The cross-correlations of the variables are generally low (with the highest positive correlation occurring between the two commodities – oil and copper – at 0.36). The low average absolute cross-correlations suggest that the seven economic variables contain independent information. This provides some diversification, and, in a way, these variables deliver a non-parametric basis for a signal (i.e. it doesn't contain pre-defined assumptions, is flexible and any conclusions are only derived from the data itself).

Determining similar dates

We now apply our distance-based similarity metric. This runs on an iterative basis, whereby each month we compute the Euclidean distance – the distance 'as the crow flies' between two points – between each historical month and the month in question. We are then able to aggregate across our variables, to obtain one Global Score.⁷ Historical months with smaller similarity scores are the most similar to today.⁸

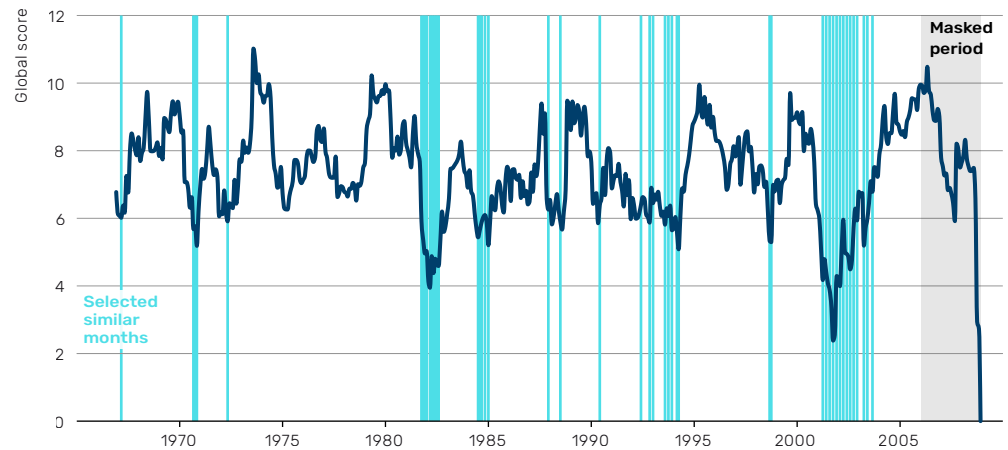
5. These were selected after a systematic process to establish which variables were the most important driver of equity returns. **6.** We use monthly data so that we can extend our history as far back as possible. For the correlation series we use a rolling three-year metric. We run this on daily data before converting to monthly. **7.** The Euclidean distance, d , is defined by: $d_{it} = \sqrt{(\sum_v (x_{iv} - x_{tv})^2)}$. On a selected month T , for every historical month i , we calculate a sum of squares of the V transformed variables. We do so by computing the absolute difference between the value of each variable at month i , x_{iv} , and the value of each variable at month T , x_{tv} . We sum across variables before taking the square root, to give us our similarity score, d_{it} , for every month up to month T . **8.** This calculation must be done historically for every historical month. For example, if the variable has a score of 2.5 in December 2024, we calculate the distance between each historical month and 2.5. If the score was 2.1 in November 2024, we need to again calculate the difference between all historical months and the score of 2.1.

Similarity in action: Three crisis periods

To illustrate how our Regime Model works, we choose three different situations of stress: the Global Financial Crisis (GFC), COVID-19, and the 2022 inflation surge. For specific months, we examine the full history and pick the 15% most similar months (i.e., the 15% of months with the lowest values of the Global Score). We exclude the last three years (36 observations) when measuring similarity, as this helps us to avoid loading up on momentum.

Referring to the GFC, Exhibit 3 considers the global score as of January 2009. The time series measures the similarity between all historical dates and January 2009. The most similar dates have the lowest values and include all observed recessions. To preview our trading strategy, we would take a long position in an asset in February 2009 that exhibits positive returns after historically similar regimes.

Exhibit 3. Historical similarity to January 2009 during the Global Financial Crisis



Source: Man Group internal data as at 2025. For a full list of data sources, please see Exhibit 2.

Secondly, the COVID-19 period was a period of a large drawdown and a sharp recovery. This time series reveals no obvious visual patterns, and this is likely because the COVID-19 crisis was so unique (at least in the last 100 years).

Finally, we look at the inflation surge of 2022, particularly August 2022. In contrast to COVID-19, there is plenty of experience with inflation within our sample. Our model shows this month most similar to the inflation period following the Iranian revolution of 1977-1980.⁹

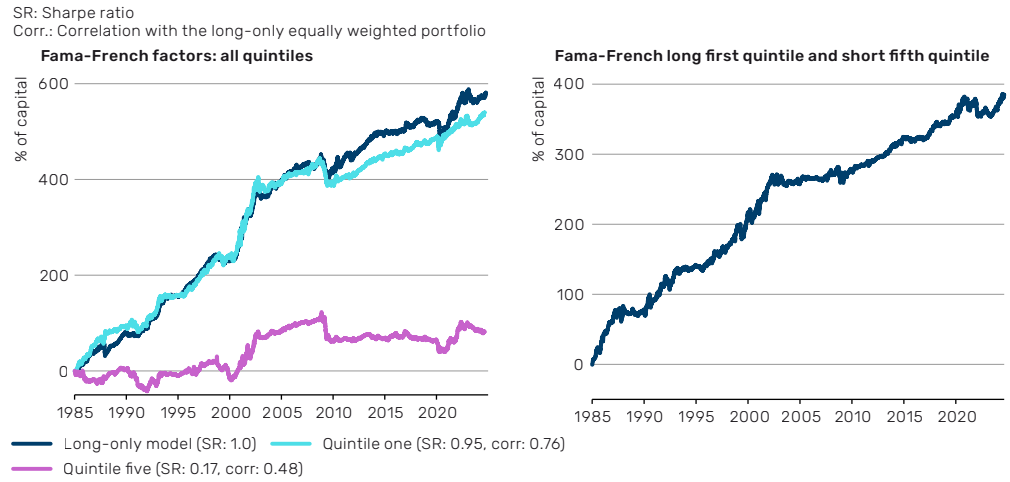
Assessing the predictive power of the Regime Model

We illustrate the efficacy of our methodology on six long-short stock factors: using the Fama-French five research factors (Market, Size, Value, Profitability and Investment) plus the 12-month Momentum factor.

Exhibit 4 shows the performance of investing in the six factors using the 20% most similar historical dates (quintile one). We are long a factor if the average of returns after the most similar dates was positive, and short if it was negative. So, we are using the Regime Model to “time” the factors. The performance shown is when aggregating across the six timed factors on an equally weighted basis. We repeat this exercise for the other quintiles, and so quintile five utilises the 20% most *dissimilar* dates. On the left-hand chart in Exhibit 4, we have included the performance of quintile one and quintile five (alongside a representative long-only model (LO model) which serves as a proxy for a traditional long-only portfolio). We have only included quintiles one and five because our analysis shows that, of the five quintiles, quintile one performs best and quintile five performs worst. While you can see that the LO model performs slightly better than quintile one over time, it brings with it significantly worse drawdowns during crisis periods.

⁹ It also loads onto a few months from the 1966-1970 inflation period associated with the ending of the Bretton Woods, the OPEC oil embargo inflation period of 1972-1974 and Reagan's boom between 1987 and 1990.

Exhibit 4. Assessing the predictability using six long-short stock factors¹⁰



Source: Man Group internal data as at 2025. For a full list of data sources, please see Exhibit 2.

As factors tend to have positive returns on average, the timed portfolio is far more likely to be long a factor. Indeed, the first-quintile returns are 0.76 correlated to a static long-only portfolio, going long all six factors all the time. The other quintiles' returns have a positive correlation to the long-only portfolio as well. This means we can create a less correlated 'difference' portfolio by going long the quintile-one portfolio and short the quintile-five portfolio (Exhibit 4, right-hand chart). This portfolio has an impressive 0.82 Sharpe ratio, while only being 0.37 correlated to the long-only portfolio. The alpha is significant, being three standard errors from zero.

The difference portfolio combines two elements: returns today that are most similar to returns subsequent to similar dates in the past and returns today that are most *dissimilar* to returns subsequent to past *dissimilar* dates.

Conclusion: Diversification via multiple variables

We present a systematic method to identify economic regimes. Our Regime Model assesses the similarity of any month to the history of a selection of economic time series. The user specifies the economic time series as well as the tolerance for similarity. The method is non-parametric, using simple z-scores to measure how similar a month is compared to each historical month. The user can specify many economic variables to achieve a type of diversification that is not possible with a single or even dual variable method.

We use our method to actively time six well-known factors. We aggregate all factors and find there is important information in the similarity. The strategy based on the most similar periods does well. We also find that in the anti-regime months (the most dissimilar), the performance is poor.

There are many research enhancements that are possible here. Currently, we equally weight all economic variables. One can imagine a dynamic weighting based on predictive performance. Further, we assess similarity with respect to particular months. If the investment horizon is longer than a month, it might be reasonable to look at similarity relative to a quarter or even longer. These and related ideas are for future research into economic regimes.

The authors would like to thank Alex Preston for his valuable comments.

¹⁰. The performance of investing in six long-short stock factors (Market, Size, Value, Profitability, Investment, Momentum). For the quintile one portfolio, the direction taking in a factor is based on returns subsequent to the 20% most similar historical dates. The quintile five portfolio utilizes the 20% most dissimilar returns. The long-only portfolio is long all six factors throughout. Performance is shown for 1985-2024. Input data starts well before 1985 to allow for rolling-window calibrations.

Authors



Amara Mulliner
Quantitative Researcher, Man AHL

Amara is a quantitative researcher in the Fast Equities team at Man AHL. Amara joined Man Group in 2020 through the Man Graduate Programme. After rotations in Man FRM and Man GPM, she joined the Macro team in 2021, where she was a quantitative researcher until 2024. Prior to that, Amara gained experience at The D E Shaw Group, Bank of America Merrill Lynch, Credit Suisse and Citi. Amara graduated from the University of Cambridge with a first and as a scholar in Economics.



Campbell R. Harvey
Investment Strategy Advisor, Man Group

Professor Campbell R. Harvey, a leading financial economist, has been Investment Strategy Advisor to Man Group since 2005 and has contributed to both research and product design. He is also an OMI Advisory Fellow. He is Professor of Finance at the Fuqua School of Business, Duke University in Durham, North Carolina as well as a Research Associate of the National Bureau of Economic Research in Cambridge, Massachusetts. He served as Editor of the Journal of Finance for six years and as President of the American Finance Association in 2016. Harvey received the 2015, 2016, 2022 and 2023 Best Paper Awards from The Journal of Portfolio Management. He has also received nine Graham and Dodd Awards/Scrolls for excellence in financial writing from the CFA Institute. He has published over 170 scholarly articles as well as four books on topics spanning active investing, risk management, emerging markets, behavioral finance, financial econometrics and computer science. His book co-authored with Sandy Rattray and Otto van Hemert, Strategic Risk Management, was published in 2021 (John Wiley and Sons). Professor Harvey teaches both an advanced asset management course, as well as an offering that focuses on decentralized technologies and AI. He has served on the faculties of the Stockholm School of Economics, the Helsinki School of Economics, and the Booth School of Business at the University of Chicago. He has also been a visiting scholar at the Board of Governors of the Federal Reserve System. He holds a Ph.D. from the University of Chicago.



Chao Xia, PhD, CFA, FRM

Senior Quantitative Researcher, Man Numeric

Chao Xia is a senior quantitative researcher at Man Numeric. Her research efforts focus on machine learning, factor combination, event strategies, alternative data and macro timing. Chao is also a co-portfolio manager and manages a team of researchers. Prior to joining Man Numeric in 2017, Chao interned at JP Morgan as a research associate. Chao received a bachelor's degree in statistics from University of Science and Technology of China and a doctorate degree in applied mathematics from Brown University. Her thesis focused on applying Kaman Filters in traffic flow forecasts. Chao is a CFA and FRM charterholder.



Ed Fang, PhD, CFA

Director of Research, Man Numeric

Ed Fang is the Director of Research at Man Numeric and serves on Man Numeric's Investment and Management Committees. Prior to his current role, Ed has been overseeing day-to-day firm-wide research at Man Numeric in his capacity as the Deputy Director of Research since 2016. Ed joined Man Numeric in 2005 and has been actively engaged in a broad spectrum of research, ranging from bottom-up alpha models to top-down dynamic asset allocation. He has also been responsible for developing multiple innovation portfolios within Man Numeric's absolute return and alternative risk premium strategies. Ed received a Bachelor of Science degree with honors in Economics and Management Information Science from Fudan University in China. He also received a doctorate degree in financial economics from Duke University. Ed is a CFA® charterholder.



Otto van Hemert, PhD

Director of Core Strategies, Man AHL

Otto van Hemert is Director of Core Strategies and a member of Man AHL's management and investment committees. He was previously Head of Macro Research at Man AHL. Prior to joining Man AHL in 2015, Otto ran a systematic global macro fund at IMC for more than three years. Before that, he headed Fixed Income Arbitrage, Credit, and Volatility strategies at AQR, and was on the Finance Faculty at the New York University Stern School of Business, where he published papers in leading academic finance journals. Otto holds a PhD in Economics and Masters Degrees in Mathematics and Economics.



Important Information

This information is communicated and/or distributed by the relevant Man entity identified below (collectively the 'Company') subject to the following conditions and restriction in their respective jurisdictions.

Opinions expressed are those of the author and may not be shared by all personnel of Man Group plc ('Man'). These opinions are subject to change without notice, are for information purposes only and do not constitute an offer or invitation to make an investment in any financial instrument or in any product to which the Company and/or its affiliates provides investment advisory or any other financial services. Any organisations, financial instrument or products described in this material are mentioned for reference purposes only which should not be considered a recommendation for their purchase or sale. Neither the Company nor the authors shall be liable to any person for any action taken on the basis of the information provided. Some statements contained in this material concerning goals, strategies, outlook or other non-historical matters may be forward-looking statements and are based on current indicators and expectations. These forward-looking statements speak only as of the date on which they are made, and the Company undertakes no obligation to update or revise any forward-looking statements. These forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those contained in the statements. The Company and/or its affiliates may or may not have a position in any financial instrument mentioned and may or may not be actively trading in any such securities. Past performance is not indicative of future results.

Unless stated otherwise this information is communicated by the relevant entity listed below.

Australia: To the extent this material is distributed in Australia it is communicated by Man Investments Australia Limited ABN 47 002 747 480 AFSL 240581, which is regulated by the Australian Securities & Investments Commission (ASIC). This information has been prepared without taking into account anyone's objectives, financial situation or needs.

Austria/Germany/Liechtenstein: To the extent this material is distributed in Austria, Germany and/or Liechtenstein it is communicated by Man (Europe) AG, which is authorised and regulated by the Liechtenstein Financial Market Authority (FMA). Man (Europe) AG is registered in the Principality of Liechtenstein no. FL-0002.420.371-2. Man (Europe) AG is an associated participant in the investor compensation scheme, which is operated by the Deposit Guarantee and Investor Compensation Foundation PCC (FL-0002.039.614-1) and corresponds with EU law. Further information is available on the Foundation's website under www.eas-liechtenstein.li. This material is of a promotional nature.

European Economic Area: Unless indicated otherwise this material is communicated in the European Economic Area by Man Asset Management (Ireland) Limited ('MAMIL') which is registered in Ireland under company number 250493 and has its registered office at 70 Sir John Rogerson's Quay, Grand Canal Dock, Dublin 2, Ireland. MAMIL is authorised and regulated by the Central Bank of Ireland under number C22513.

Hong Kong SAR: To the extent this material is distributed in Hong Kong SAR, this material is communicated by Man Investments (Hong Kong) Limited and has not been reviewed by the Securities and Futures Commission in Hong Kong. This material can only be communicated to intermediaries, and professional clients who are within one of the professional investors exemptions contained in the Securities and Futures Ordinance and must not be relied upon by any other person(s).

Japan: To the extent this material is distributed in Japan it is communicated by Man Group Japan Limited, Financial Instruments Business Operator, Director of Kanto Local Finance Bureau (Financial instruments firms) No. 624 for the purpose of providing information on investment strategies, investment services, etc. provided by Man Group, and is not a disclosure document based on laws and regulations. This material can only be communicated only to professional investors (i.e. specific investors or institutional investors as defined under Financial Instruments Exchange Law) who may have sufficient knowledge and experience of related risks.

Switzerland: To the extent the material is made available in Switzerland the communicating entity is:

- For Clients (as such term is defined in the Swiss Financial Services Act): Man Investments (CH) AG, Huobstrasse 3, 8808 Pfäffikon SZ, Switzerland. Man Investment (CH) AG is regulated by the Swiss Financial Market Supervisory Authority ('FINMA'); and
- For Financial Service Providers (as defined in Art. 3 d. of FINSA, which are not Clients): Man Investments AG, Huobstrasse 3, 8808 Pfäffikon SZ, Switzerland, which is regulated by FINMA.

United Kingdom: Unless indicated otherwise this material is communicated in the United Kingdom by Man Solutions Limited ('MSL') which is a private limited company registered in England and Wales under number 3385362. MSL is authorised and regulated by the UK Financial Conduct Authority (the 'FCA') under number 185637 and has its registered office at Riverbank House, 2 Swan Lane, London, EC4R 3AD, United Kingdom.

United States: To the extent this material is distributed in the United States, it is communicated and distributed by Man Investments, Inc. ('Man Investments'). Man Investments is registered as a broker-dealer with the SEC and is a member of the Financial Industry Regulatory Authority ('FINRA'). Man Investments is also a member of the Securities Investor Protection Corporation ('SIPC'). Man Investments is a wholly owned subsidiary of Man Group plc. The registration and memberships described above in no way imply a certain level of skill or expertise or that the SEC, FINRA or the SIPC have endorsed Man Investments. Man Investments, 1345 Avenue of the Americas, 21st floor, New York, NY 10105.

This material is proprietary information and may not be reproduced or otherwise disseminated in whole or in part without prior written consent.

Any data services and information available from public sources used in the creation of this material are believed to be reliable. However accuracy is not warranted or guaranteed. ©Man 2025

MKT014810/ST/GL/1-1