ROBECO
The Investment Engineers

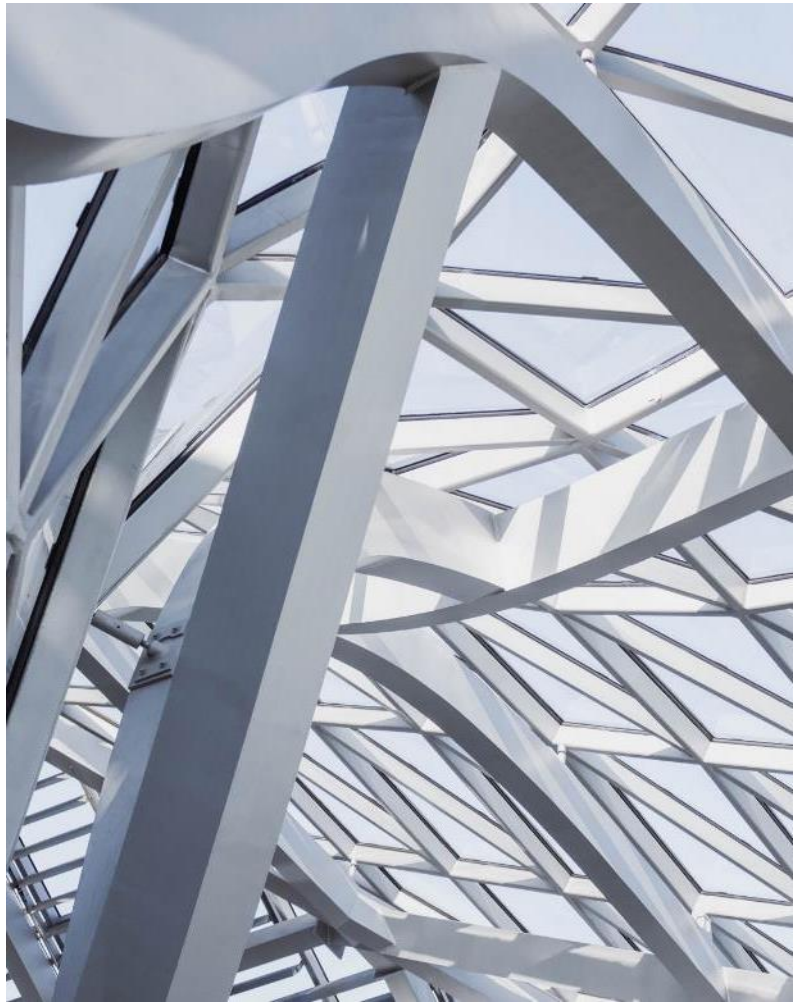
Harvesting factor premiums in the corporate bond market

# Robeco QI Global Multi-Factor Credits

Marketing materials for professional investors, not for onward distribution.

Sustainable Investing Expertise by
ROBECOSAM

# Content

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# Key highlights: A complementary offering

**Capturing factor premiums beyond the market premium**

Diversified portfolio of global credits managed in a highly systematic way

Balanced exposure to enhanced factors: Low-Risk, Quality, Value, Momentum, and Size

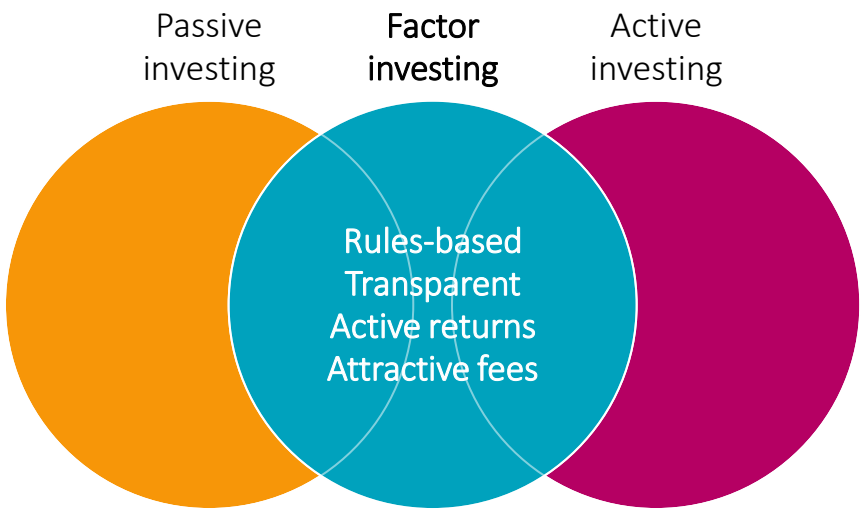
Sustainability integration, embedded liquidity management and fundamental checks in the investment process

**Attractive proposition for investors looking for**

Attractive and stable performance delivery

Style diversification with traditional active credit managers

Application of factor investing beyond equities

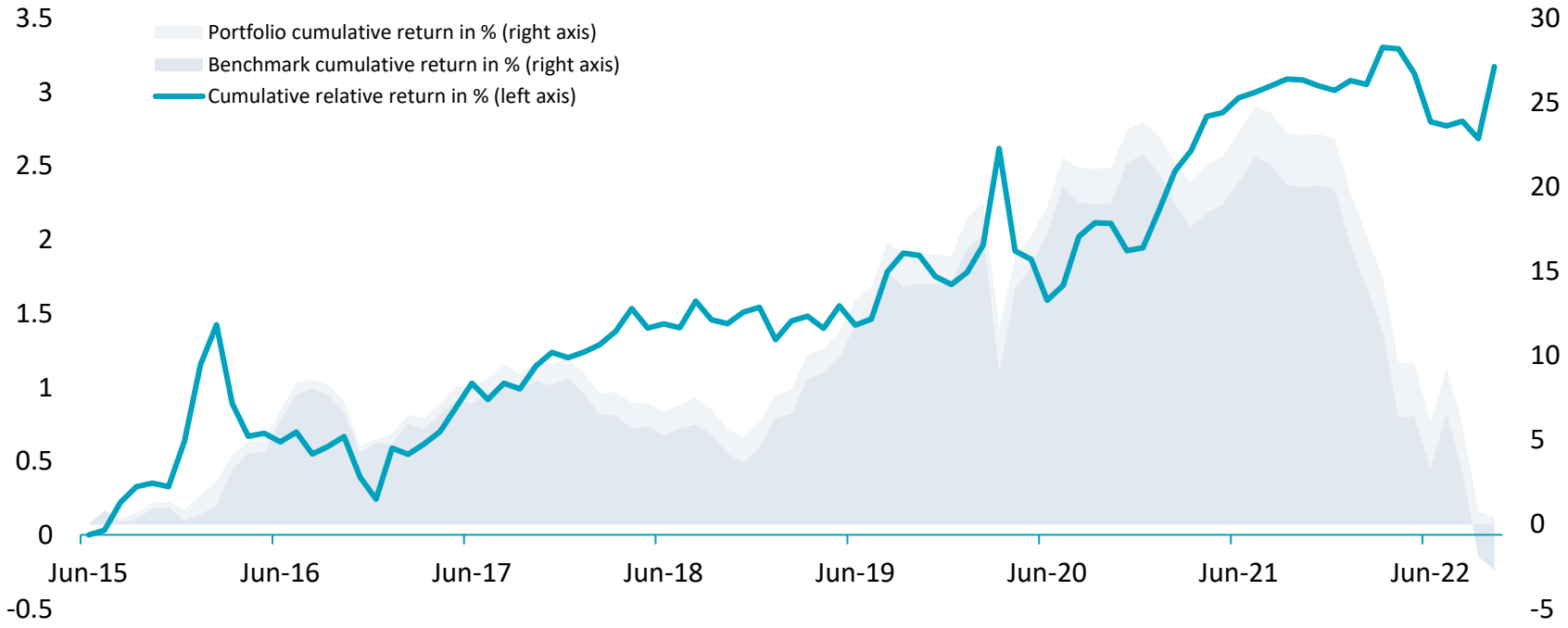


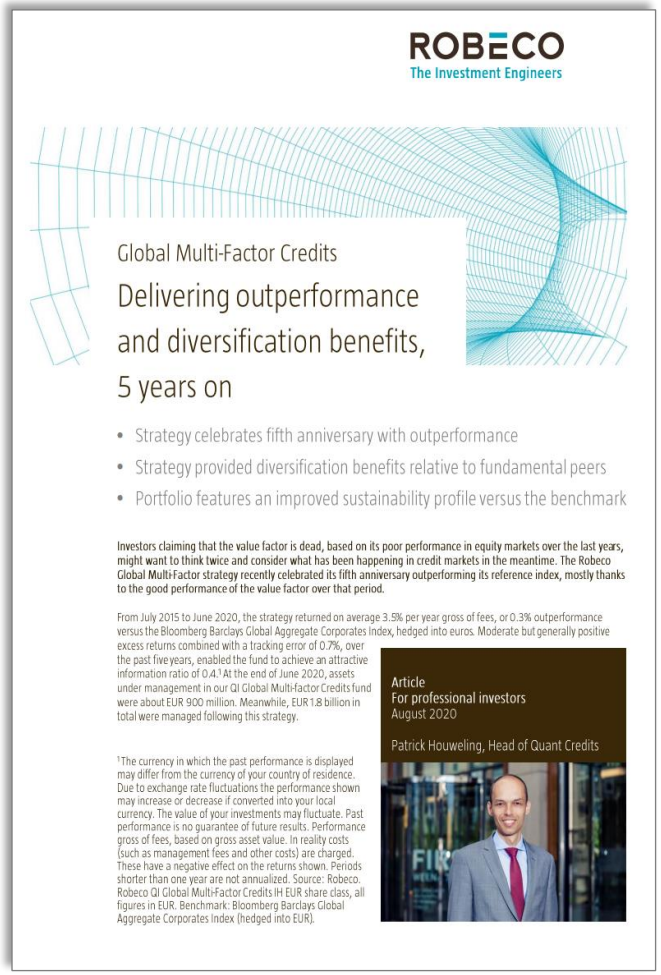

Source: "Foundations of Factor Investing", MSCI Research Insight, December 2013

# Attractive and stable performance delivery

- Attractive relative returns since inception
- Low variation in relative return (0.66% ex post TE since inception)
- Outperformance in five of the six calendar years since inception in 2015

## Cumulative return



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Global Multi-Factor Credits

Delivering outperformance and diversification benefits, 5 years on

- Strategy celebrates fifth anniversary with outperformance
- Strategy provided diversification benefits relative to fundamental peers
- Portfolio features an improved sustainability profile versus the benchmark

**Investors claiming that the value factor is dead, based on its poor performance in equity markets over the last years, might want to think twice and consider what has been happening in credit markets in the meantime. The Robeco Global Multi-Factor strategy recently celebrated its fifth anniversary outperforming its reference index, mostly thanks to the good performance of the value factor over that period.**

From July 2015 to June 2020, the strategy returned on average 3.5% per year gross of fees, or 0.3% outperformance versus the Bloomberg Barclays Global Aggregate Corporates Index, hedged into euros. Moderate but generally positive excess returns combined with a tracking error of 0.7%, over the past five years, enabled the fund to achieve an attractive information ratio of 0.4.[1] At the end of June 2020, assets under management in our QI Global Multi-Factor Credits fund were about EUR 900 million. Meanwhile, EUR 1.8 billion in total were managed following this strategy.

Article
For professional investors
August 2020

Patrick Houweling, Head of Quant Credits

[1] The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. The value of your investments may fluctuate. Past performance is no guarantee of future results. Performance gross of fees, based on gross asset value. In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown. Periods shorter than one year are not annualized. Source: Robeco. Robeco QI Global Multi-Factor Credits IH EUR share class, all figures in EUR. Benchmark: Bloomberg Barclays Global Aggregate Corporates Index (hedged into EUR).

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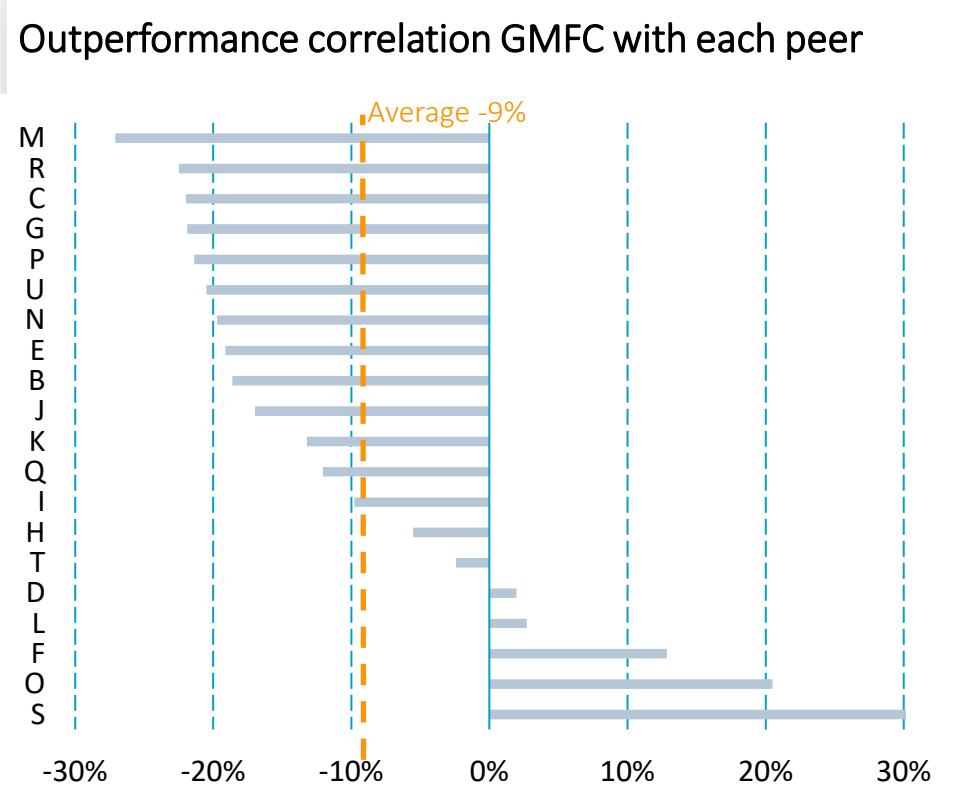
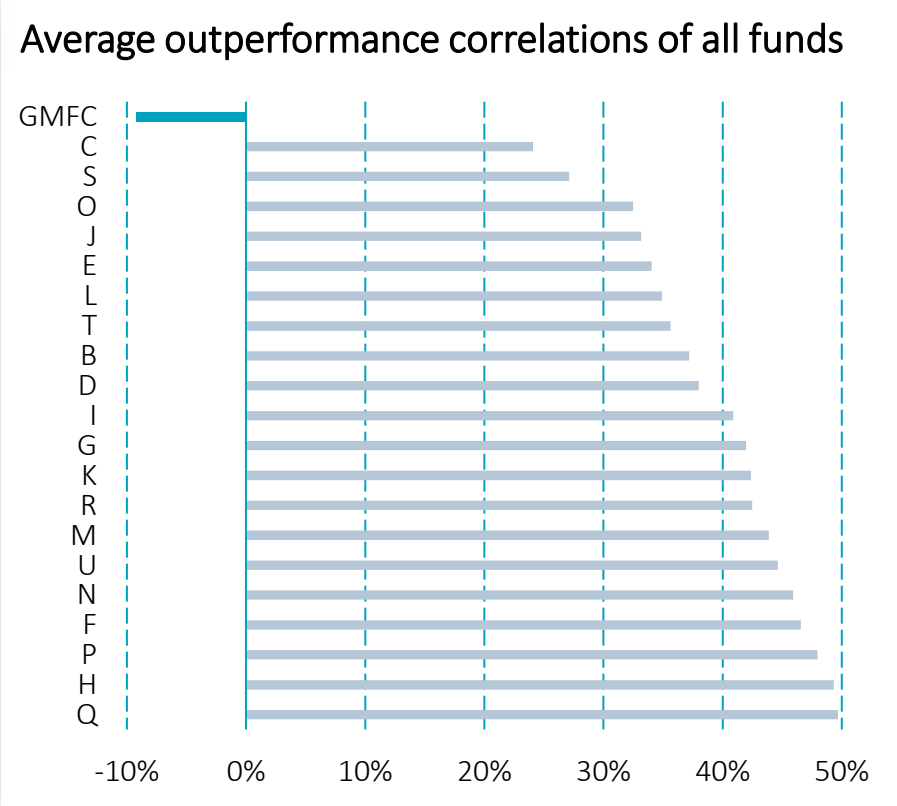
Source: Robeco. Robeco QI Global Multi-Factor Credits IH-EUR share class, based on gross asset value, all figures in EUR. Performance statistics until end October 2022.

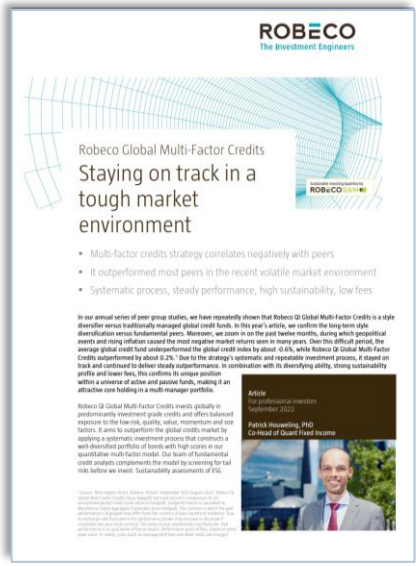
# Style diversification with traditional active credit managers

> Robeco's Global Multi-Factor Credits fund shows a -9% performance correlation with its global credit peers[1]

> Style diversification is larger in times of market stress, e.g. around outbreak of Covid-19 pandemic in March 2020




Source: Morningstar Direct, Bloomberg, Robeco. Period: July 2015-August 2022. GMFC = Robeco QI Global Multi-Factor Credits (euro hedged) live track-record. B to U are 20 anonymized global credit funds (all euro hedged). Outperformance is calculated vs. Bloomberg Global Aggregate Corporates (euro hedged). The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. The value of your investments may fluctuate. Past performance is no guarantee of future results. Performance gross of fees, based on gross asset value. In reality, costs (such as management fees and other costs) are charged.

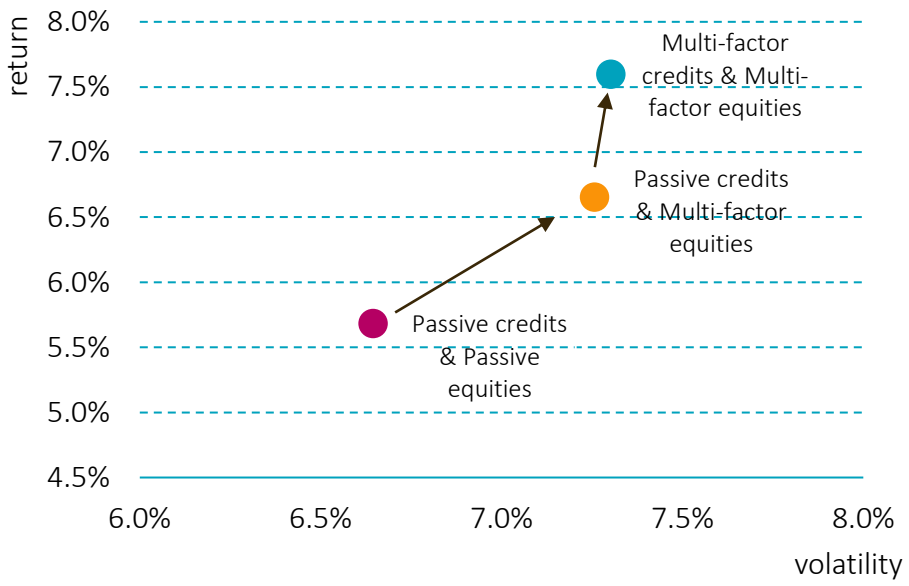
# Added value beyond factor investing in equities

## Multi-asset portfolios benefit from factor investing

> Applying factor investing in both markets improves Sharpe ratio beyond single-market application

> Compared to equity-only application: 1% additional alpha at similar risk

### Risk-return passive and multi-factor portfolios




### Correlations between credit and equity factor alphas:

| | Investment Grade | High Yield |
|---|---|---|
| Low-Risk | 16% | 21% |
| Value | 45% | 52% |
| Momentum | 10% | 24% |
| Size | 4% | 28% |

Research

Factor Investing in the Corporate Bond Market

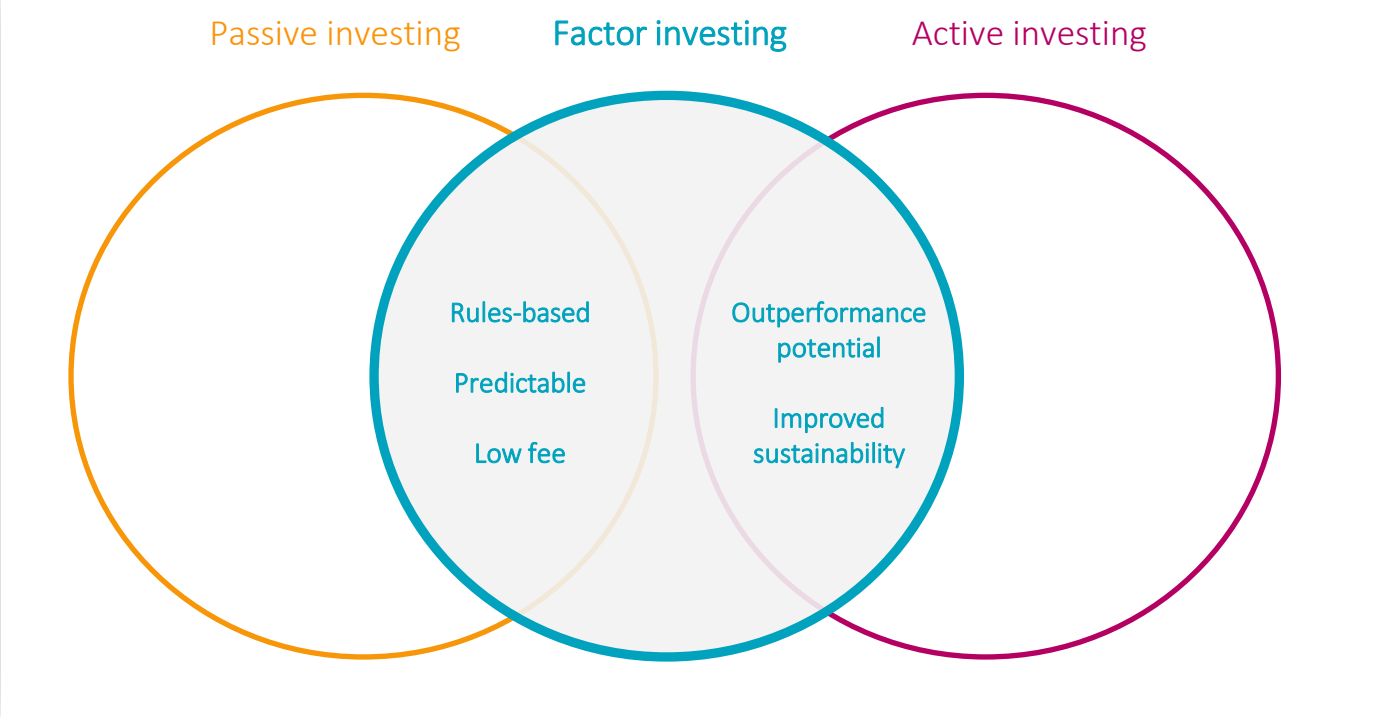
Patrick Houweling and Jeroen van Zundert, CFA

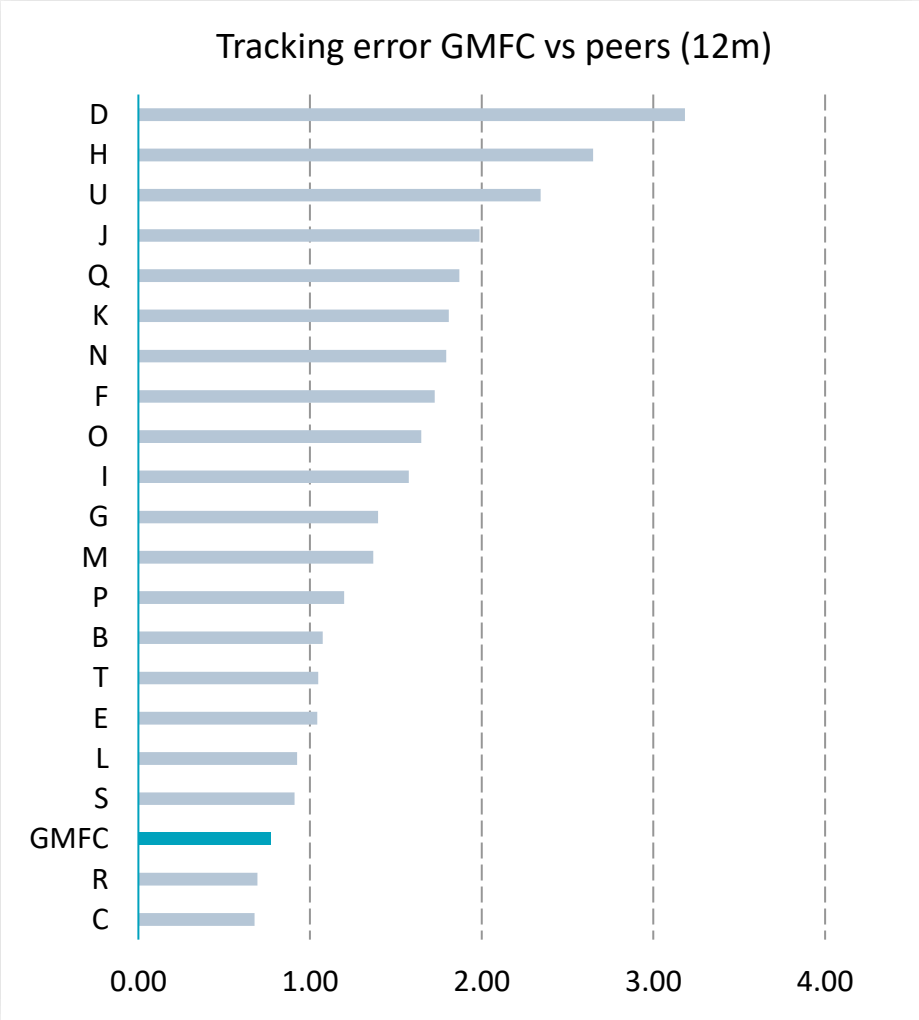
Source: Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in Financial Analysts Journal in 2017. Left chart: extended sample period until December 2020. Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy. Research setup left chart: Asset classes: 25% allocations to Treasuries, Investment Grade, High Yield, Equities. Either invest in passive market index or multi-factor portfolio. Excess returns over risk-free rate.

# Combining the best of passive and active

> Like passive: rules-based, predictable risk/return, low fee

> Like active: outperformance potential, improved sustainability




Left image: Source: "Foundations of Factor Investing", MSCI Research Insight, December 2013. Right chart: Source: Morningstar Direct, Bloomberg, Robeco. Period: July 2015-August 2022. GMFC = Robeco QI Global Multi-Factor Credits (euro hedged) live track-record. B to U are 20 anonymized global credit funds (all euro hedged). Tracking error is calculated vs. Bloomberg Global Aggregate Corporates (euro hedged).

# Robeco Quant Fixed Income

# Facts and figures

AuM:
**EUR 173 billion**

**EUR 69.4 billion***
managed based
on quant models

**1,028**
employees

**EUR 169 billion**
managed in ESG
integrated assets

**300**
investment professionals

**A+**
in PRI assessment

Offices in
**13 countries**
around the world

AuM figures as of September 2022, * excludes EUR 1.3 billion from reinvesting.
Personnel figures as of June 2022.

## Fixed income investing

Extensive experience in the main fixed income segments and a history of continuous innovation

1974

EUR 56 bln AuM

>100

## Quant investing

Proprietary research, models and software and a strong academic profile

1991

EUR 69 bln AuM

> 40

## Sustainable investing

Highest possible A+ PRI score and ranked 1st in ShareAction survey

1995

EUR 164 bln AuM

>100

Source: Robeco. AuM data end of September 2022.
Source PRI score: PRI Assessment report 2020. Please also see the Public Transparency Report for Robeco at unpri.org: https://www.unpri.org/signatory-directory/robeco/1717.article .
Source ShareAction survey: 202 ranking by the Asset Owners Disclosure Project (AODP), a project managed by the responsible investment organization ShareAction. Full report can be downloaded here: https://shareaction.org/reports/point-of-no-returns-a-ranking-of-75-of-the-worlds-asset-managers-approaches-to-responsible-investment

# Robeco Quant Fixed Income

## Credible offering

- Seasoned team of 16 PMs & researchers with strong academic credentials
- Six capabilities and EUR 6.7 billion in funds and customized mandates

## Long experience

- In-house quant research: rates since 1991 and credits since 1999
- Long track-records; rates since 1998 and credits since 2012

## Building on fundamental fixed income expertise

- Fundamental expertise in research, execution and sustainability
- Human oversight for practicalities and risks beyond scope of models

Source: Robeco. AuM data end of December 2022.

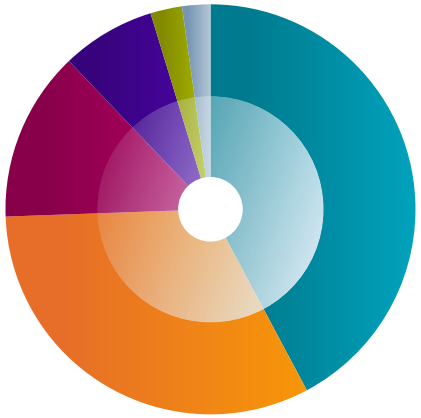
# Overview capabilities related to Quant Fixed Income

## Quantitative Investing* - EUR 69.1 billion

| | |
|---|---|
| Core Quant Equities (2002) | 33.5 billion |
| Factor Investing Equities (2012) | 17.8 billion |
| Conservative Equities (2006) | 12.5 billion |
| Quant Fixed Income (1998) | 6.7 billion |

*Excludes 1.3 billion from reinvesting

## Quant Fixed Income - EUR 6.7 billion



| | |
|---|---|
| Multi-Factor Credits (2015) | 2.8 billion |
| Dynamic Duration (1998) | 2.1 billion |
| Multi-Factor High Yield (2005) | 894 million |
| Conservative Credits (2012) | 493 million |
| Multi-Factor Bonds (2019) | 166 million |
| Dynamic High Yield (2014) | 148 million |

## Fixed Income - EUR 56 billion

| | |
|---|---|
| Credits - Investment Grade | 28.6 billion |
| Government | 15.8 billion |
| Credits - High Yield | 9.1 billion |
| Aggregate | 2.4 billion |

Source: Robeco. Quant and Quant Fixed Income data end of December 2022. Fixed Income data end of September 2022.
Quant and Quant Fixed Income figures based on preliminary data.

# Experienced team responsible for Quant Fixed Income strategies

## Portfolio Management

**Patrick Houweling, PhD**
Co-head Quant FI
Portfolio Manager
Industry: 24 years

**Guido Baltussen, PhD**
Co-head Quant FI
Portfolio Manager
Industry: 19 years

**Olaf Penninga**
Portfolio Manager
Industry: 24 years

**Mark Whirdy**
Portfolio Manager
Industry: 18 years

**Johan Duyvesteyn, PhD, CFA**
Portfolio Manager
Industry: 23 years

**Lodewijk van der Linden**
Portfolio Manager
Industry: 10 years

## Research

**Martin Martens, PhD**
Researcher
Industry: 29 years

**Thibault Lair, PhD, CFA, FRM**
Researcher
Industry: 16 years

**Philip Messow, PhD**
Researcher
Industry: 12 years

**Frederik Muskens, CFA**
Researcher
Industry: 11 years

**Casper Zomerdijk, CFA**
Researcher
Industry: 9 years

**Joris Blonk, CFA**
Researcher
Industry: 9 years

**Robbert-Jan 't Hoen, CFA**
Researcher
Industry: 5 years

**Fabio Martinetti**
Researcher
Industry: 3 years

**Luca Giorgianni**
Researcher
Industry: 1 years

**Vacancy**
Researcher

## Client Portfolio Management

**Ralph Berkien**
Client Portfolio Manager
Industry: 21 years

**Rupeng Chen**
Client Portfolio Manager
Industry: 17 years

**Jan Rohof**
Client Portfolio Manager
Industry: 8 years

## Quant Equity Research (18)

**David Blitz, PhD**
Chief Researcher
Industry: 27 years

**Weili Zhou, CFA**
Head Quant Equity Research
Industry: 20 years

Quant Equity Research
18 Investment Professionals
9 years average experience

## Data Science (15)

**Jacob Buitelaar**
Data Science
Industry: 16 years

**Paul Beekhuizen, PhD**
Data Science
Industry: 13 years

Data Science
15 Investment Professionals
9 years average experience

## Sustainability (~50)

**Carola van Lamoen**
Head of Sustainable Investing
Industry: 21 years

**Malene Christensen**
Sustainable Investing
Client Portfolio Manager
Industry: 4 years

Sustainability
~50 Investment Professionals
12 years average experience

## Fundamental Credit Analysts (28)

**Taeke Wiersma**
Head Credit Research
Industry: 27 years

**Jankees Ruizeveld**
Co-head Credit Research
Industry: 28 years

Fundamental Credit Analysts
27 Investment Professionals
18 years average experience

## Fundamental Credit Portfolio Managers (11)

**Victor Verberk**
Co-head Credit team
Portfolio Manager
Industry: 25 years

**Sander Bus**
Co-head Credit team
Portfolio Manager
Industry: 27 years

Fundamental Credit PMs
11 Investment Professionals
23 years average experience

## Fundamental FI Macro PMs & Strategists (8)

**Jamie Stuttard**
Head Global Macro team
Portfolio Manager
Industry: 25 years

Fundamental FI Macro PMs
4 Investment Professionals
24 years average experience

Fundamental FI Macro Strategists
4 Investment Professionals
17 years average experience

## Portfolio Engineering & Trading FI (16)

**Erik van Leeuwen**
Chief Ops Investments
Business Development
Industry: 31 years

**Paul van Overbeek**
Head FI Trading
Industry: 24 years

FI & FX Trading
8 Investment Professionals
23 years average experience

FI Technical & Operational PMs
7 Investment Professionals
25 years average experience

Source: Robeco. Number of investment professionals and experience per department includes the people that are mentioned by name.

# Quant Fixed Income: Selected academic publications

## Academic recognition of our innovative research

Source: Robeco. These examples are for information purposes only and not intended to be an investment advice in any way

# The benefits of a quant approach to fixed income

## Evidence-based investment decisions

- Investment process is based on deep historical research
- Signals are proven, understandable and implementable

## Alternative to passive strategies

- Both: transparent, rules-based, low-cost
- Quant: outperformance potential, improved diversification and sustainability

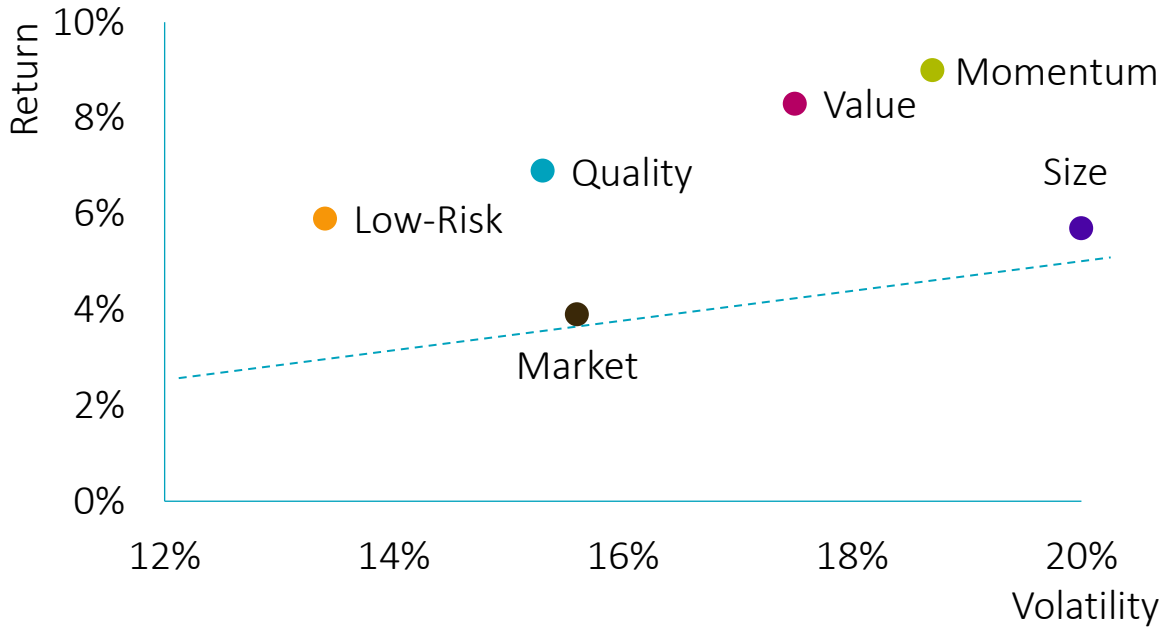
## Style diversification with fundamental strategies

- Both: take active positions with the aim to outperform
- Quant: multiple styles, covers entire universe, free of emotions and biases

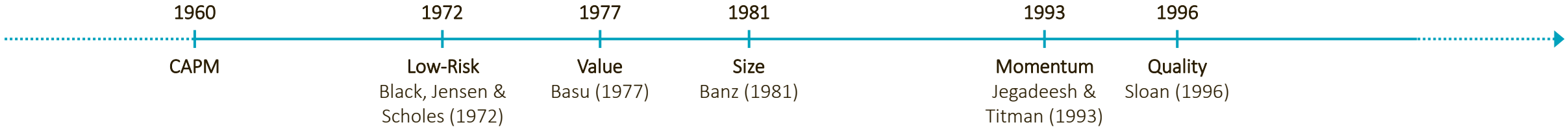
# Introduction to factor investing

# Factor investing for equities: Factor investing gains credibility

**Risk-return***
(US equities, 1963-2014)




- Factor investing backed by forty years of academic evidence
- Research demonstrates that factor exposures explain the majority of outperformance of active managers**
- Factor investing must be a conscious decision and a strategic allocation



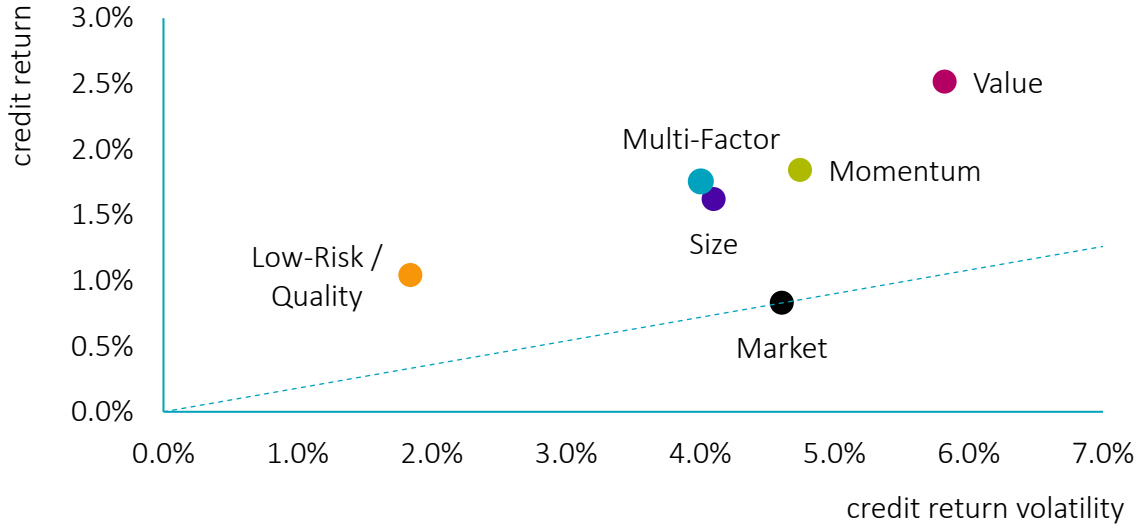

* Source: Performance figures for generic U.S. equally-weighted factor portfolios as in Blitz (2015), "Factor Investing Revisited", Journal of Index Investing. Extended sample period: 1963:07 to 2014:12. ** Ang, Goetzmann & Schaefer (2009). Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Factor investing for credits: Factor portfolios show higher risk-return ratios

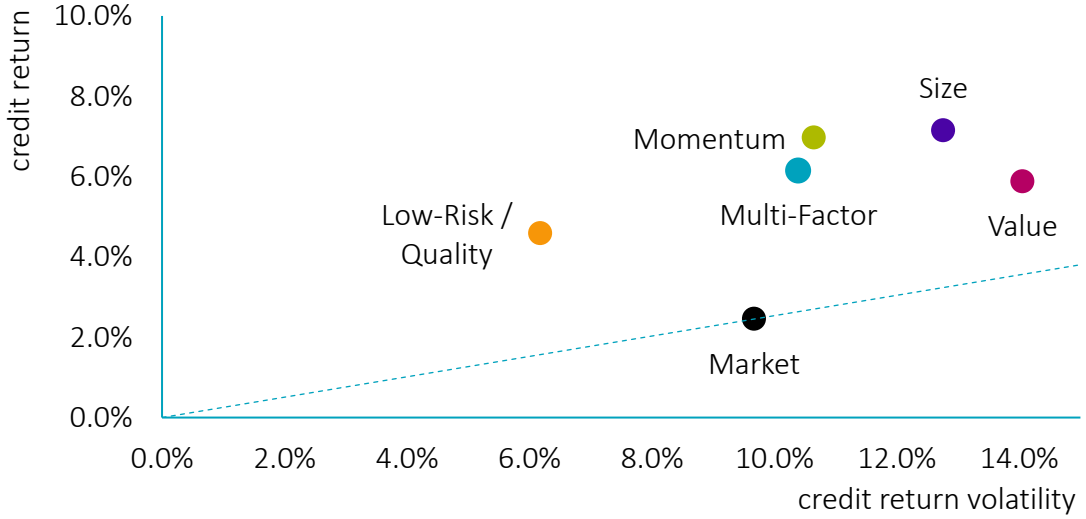
> Academic evidence for factor investing in credits started 15 years ago

> Robeco has been a pioneer in factor investing and contributed significantly to academic research

**Risk-return enhanced factors**
(USD Investment Grade Jan94-Dec20)




**Risk-return enhanced factors**
(USD High Yield ex Financials Jan94-Dec20)




| 2001 | 2004 | 2005 | 2012 | 2014 | 2017 |
|---|---|---|---|---|---|
| 'Successful Factors to Select Outperforming Corporate Bonds' Hottinga, van Leeuwen & van IJserloo (2001) | **Low-Risk** Ilmanen, Byrne, Gunasekera & Minikin (2004) | **Momentum** Gebhardt, Hvidkjaer & Swaminathan (2005) | **Value** Correia, Richardson & Tuna (2012) | 'Factor Investing in the Corporate Bond Market' Houweling & van Zundert (2014) | **Quality** Robeco white paper |

Sources: Robeco, Bloomberg. Decile portfolios constructed using Robeco factor definitions. Credit returns measured over duration-matched government bonds.
Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Factor investing principles apply equally well to equities & credits

- The existence of factor premiums lies in human behavior
- Either irrational behavior, or a rational response to an economic or regulatory incentive
- These drivers apply equally well to equities and credits

| Factor | Explanation |
|---|---|
| Low-Risk | Investors tend to overpay for high-risk assets based on the textbook assumption that they will earn higher returns |
| Quality | Although investors are willing to pay up for stocks and bonds of high-quality firms, they are underpricing these securities versus low-quality firms |
| Value | Investors overreact to news thus creating mispricings in securities, which subsequently mean-revert |
| Momentum | News is slowly incorporated in security prices, so that outperforming securities tend to continue outperforming. Moreover, investors exhibit herding behavior |
| Size | Smaller companies tend to be under-researched, because investors are resource-constrained. Moreover, smaller companies' securities tend to be less liquid. |

Source: Robeco

# Research on factor investing in credits

# Defining the factors in credits

**Robeco's multi-factor research on credits was the first academic study of its kind***

- In the academic paper, generic measures are used for the four well-known factors: Low-Risk, Value, Momentum, Size
- Quality was not investigated in the paper, because it cannot be defined using bond-only information
- The factor definitions Robeco uses in its factor strategies are enhanced to remove unrewarded risks

| | Low-Risk/Quality | Value | Momentum | Size |
|---|---|---|---|---|
| Goal | Select low-risk bonds of low-risk & high-quality issuers | Select bonds that are cheap relative to their risk | Select companies that recently outperformed | Select bonds of small firms |
| Generic definition* | Rating & maturity | Regress credit spread on rating & maturity | Past 6-month bond return | Market value of company in corporate bond index |
| Robeco definition | > Use accounting and equity market data<br>> Combine Low-Risk and Quality variables | > Use accounting and equity market data<br>> Create accurate peer groups | > Use equity momentum<br>> Control for time-varying risk | > Equal overweights |

In April 2018, this paper received a ***Graham and Dodd Scroll Award of Excellence***

Source: Robeco
* Houweling & Van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in *Financial Analysts Journal* in 2017.

# Factor investing generates superior Sharpe ratios

## Results for generic factors

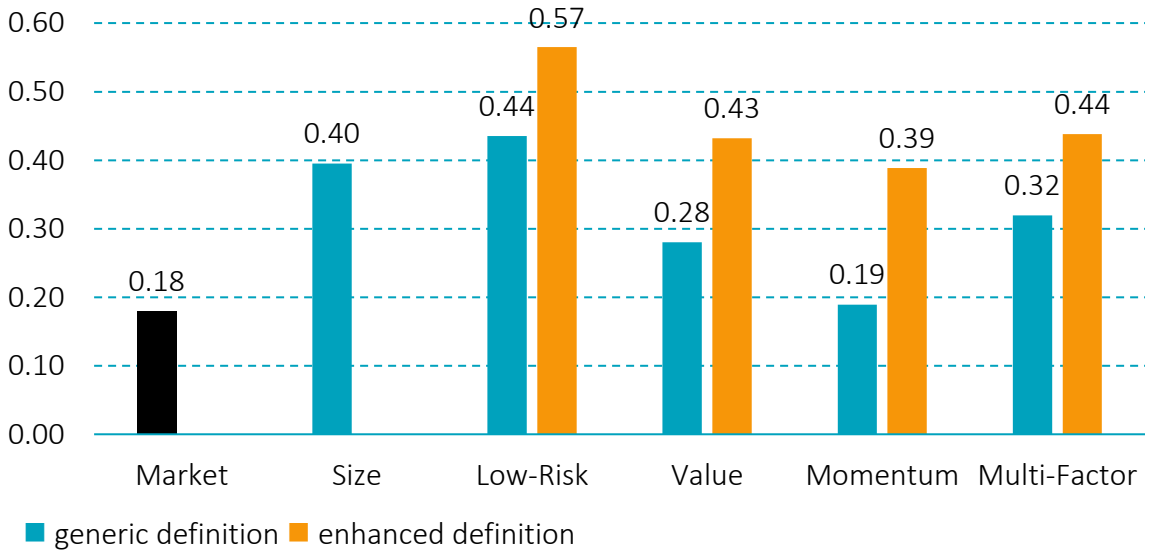
> Sharpe ratios of single-factor portfolios are significantly higher than the market

> Sharpe ratio of a multi-factor portfolio is twice as large as the market

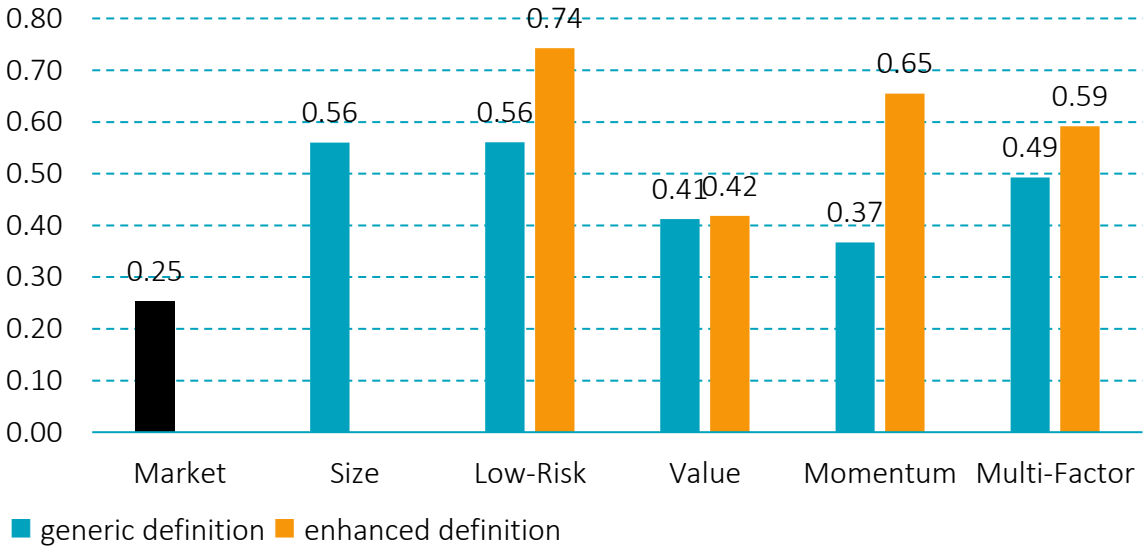
## Results for Robeco factors

> Sharpe ratios of Robeco defined factors are all 0.1 to 0.2 higher than those of the generic factors

### Sharpe ratios generic and enhanced factors
(USD Investment Grade Jan94-Dec20)




### Sharpe ratios generic and enhanced factors
(USD High Yield ex Financials Jan94-Dec20)



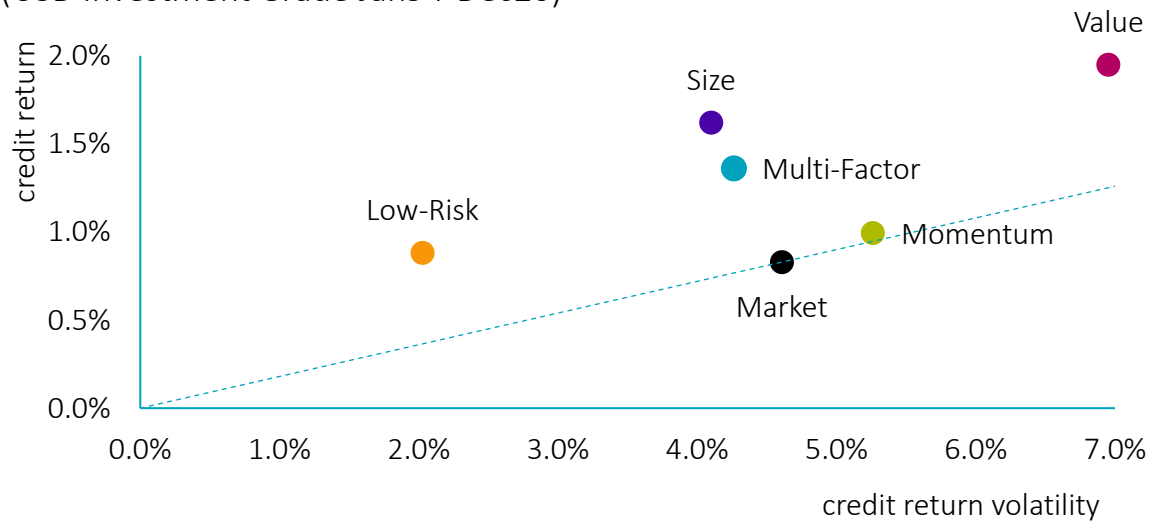

Sources: Robeco, Bloomberg. Generic factor definitions as in Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in *Financial Analysts Journal* in 2017.
Extended sample period until December 2020. Credit returns measured over duration-matched government bonds.
Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Risk-return of single-factor and multi-factor portfolios

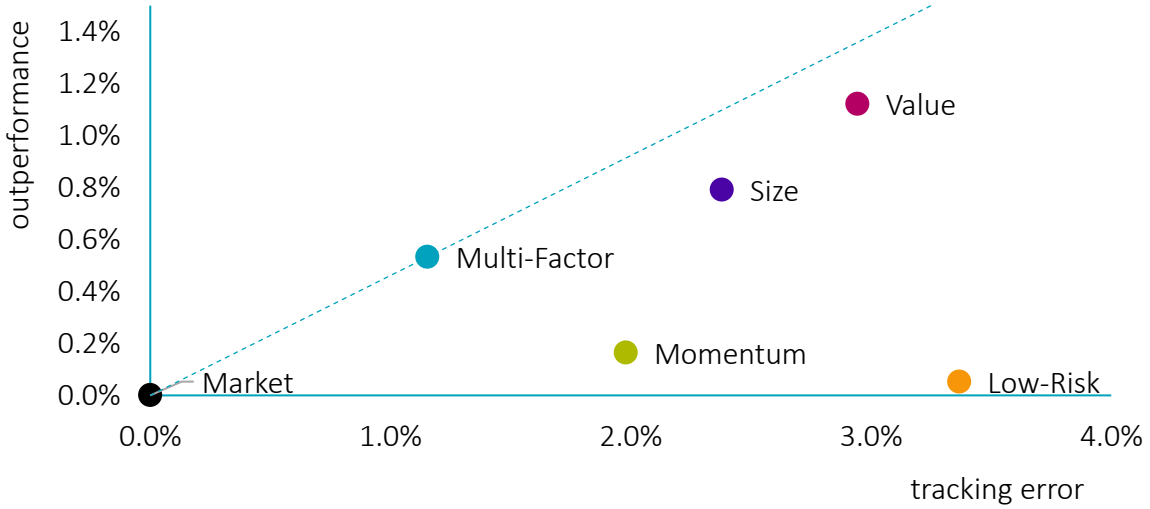
## Advantages of multi-factor portfolio compared to single-factor portfolios

- Factors tend to generate higher returns than the market
- Value typically delivers highest credit return, Low-Risk has highest Sharpe ratio
- Multi-factor portfolio tends to generate highest information ratio (outperformance / tracking error)

### Risk-return generic factors
(USD Investment Grade Jan94-Dec20)




### Relative risk-return
(USD Investment Grade Jan94-Dec20)



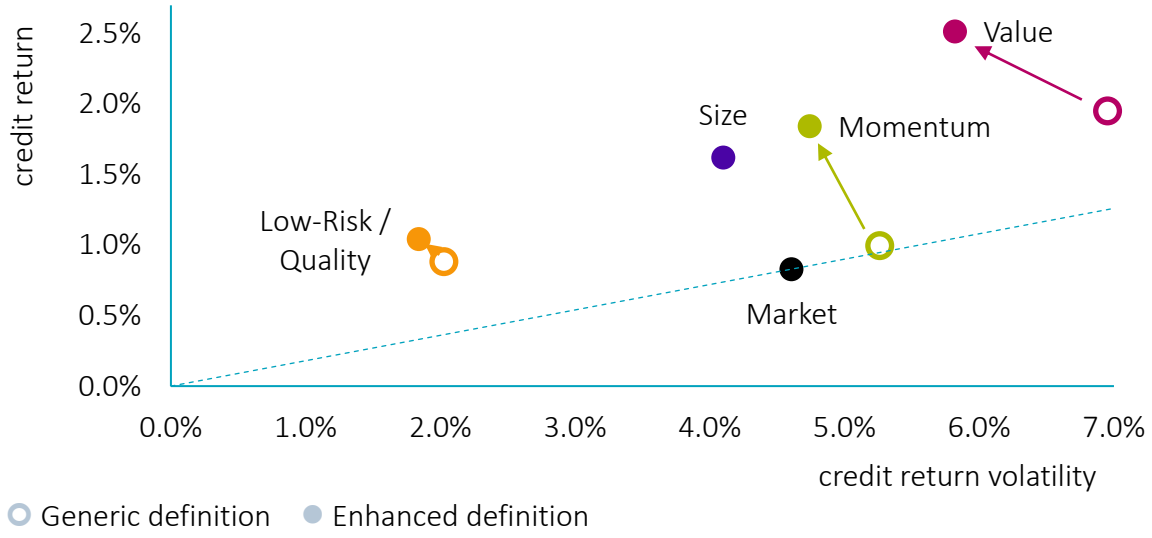

Sources: Robeco, Bloomberg. Factor definitions as in Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in *Financial Analysts Journal* in 2017.
Extended sample period until December 2020. Credit returns measured over duration-matched government bonds.
Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Risk-return of Robeco factors versus generic factors

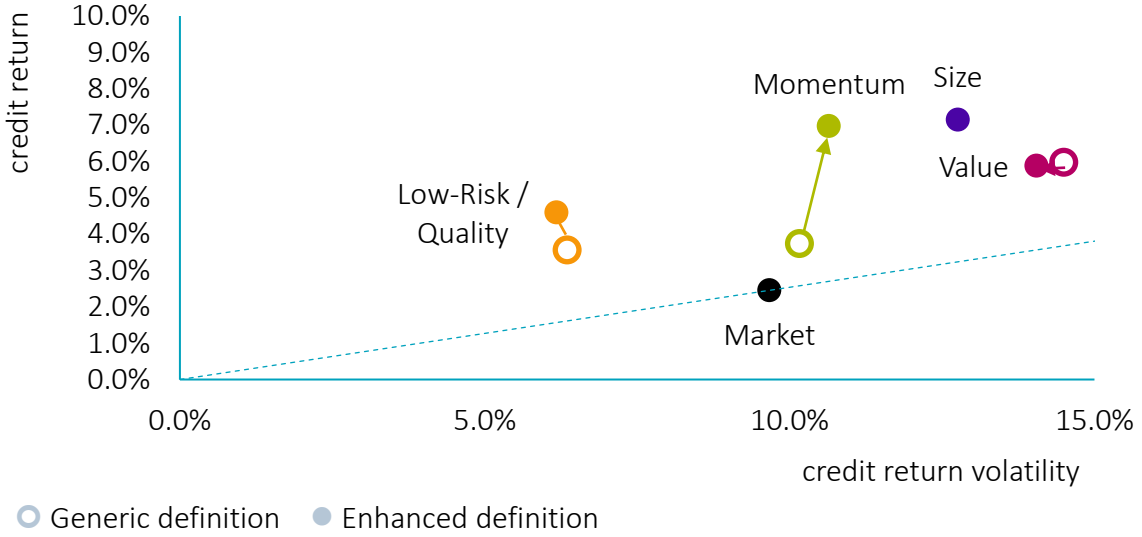
## Our factor definitions aim to remove unrewarded risks and include equity and accounting information

- Volatility is typically reduced
- Returns increase for all factors
- For Size we do not have a smarter definition, but a smarter implementation

### Risk-return generic and enhanced factors
(USD Investment Grade Jan94-Dec20)




### Risk-return generic and enhanced factors
(USD High Yield ex Financials Jan94-Dec20)




Sources: Robeco, Bloomberg. Generic factor definitions as in Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in *Financial Analysts Journal* in 2017.
Extended sample period until December 2020. Credit returns measured over duration-matched government bonds
Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Backtest: Realistic illiquidity modelling & portfolio construction

> Academic research ignores liquidity differences and creates a concentrated high-turnover portfolio

> Robeco approach realistically models liquidity and constructs a well-diversified multi-factor portfolio with limited turnover

| | Academic | Robeco |
|---|---|---|
| Liquidity modelling | > Assume all bonds can always be traded<br>> Ignore transaction costs | > Bond-specific trade probabilities*<br>> Bond-specific transaction cost estimates** |
| Portfolio construction | > Buy top 10% per factor and hold for fixed period<br>> Ignore other factors<br>> Allow large concentrations in portfolios | > Apply buy and sell rules → bond-specific holding period lowers turnover<br>> Use multi-factor scores to get exposure to all factors<br>> Impose risk constraints, e.g. on sectors, ratings & regions |

* Calibrated on historical corporate bond trading volume data from the TRACE database
** Based on Barclays Liquidity Cost Score. Source: Barclays, 2009, "Liquidity Cost Scores for US Credit Bonds"

# Global Multi-Factor Credits: Backtest

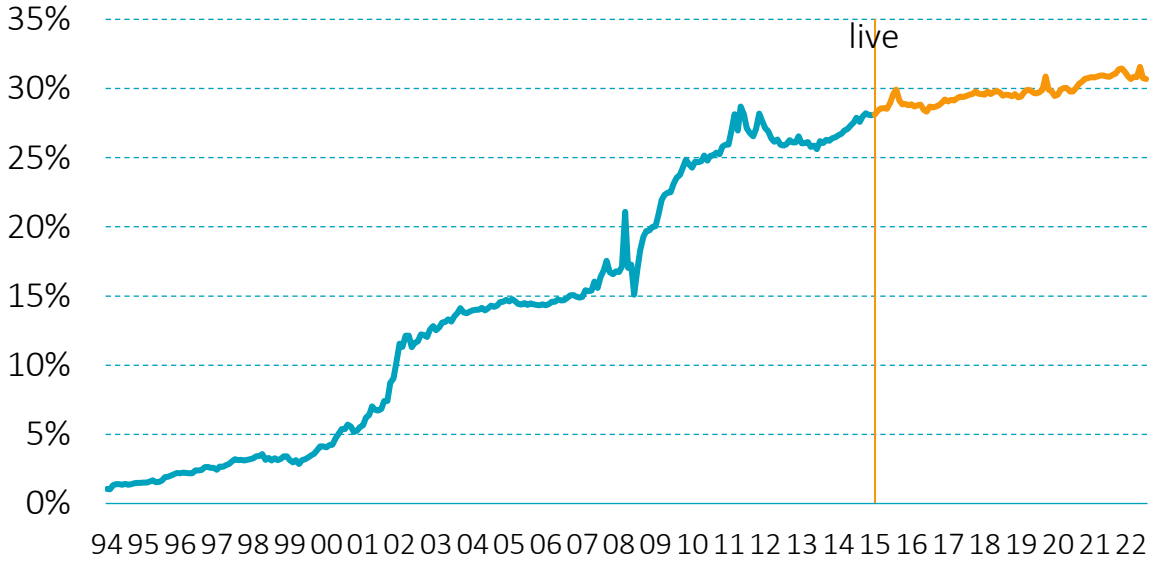
## Higher Sharpe ratio than the Investment Grade market

> Higher return with market-like volatility

> Higher Sharpe ratio and attractive information ratio

| | Strategy | Index |
|---|---|---|
| Average total return | 7.00% | 5.77% |
| Total return volatility | 4.57% | 4.53% |
| Sharpe ratio | 0.82 | 0.58 |
| Average credit return | 1.31% | 0.30% |
| Credit return volatility | 3.43% | 3.45% |
| Sharpe ratio | 0.38 | 0.09 |
| Outperformance | 1.01% | |
| Tracking error | 1.50% | |
| Information ratio | 0.67 | |
| Average DTS beta | 0.99 | |
| Turnover (single-count) | 66% | 31% |

Cumulative performance vs. index




Source: Robeco. Table shows backtest for Jan94-Jun15. Chart shows performance difference between strategy and index; simulated for Jan94-Jun15 (blue): live track-record from Jul15 onwards (orange). Index = Bloomberg US Corporates for Jan94-Dec00, Bloomberg Global Aggregate Corporates from Jan01 onwards. Multi-Factor Credits strategy: USD for Jan94-Dec00, Global from Jan01 onwards. Investment universe: Investment Grade + BB. Strategy returns are net of transaction costs, but gross of fees. In reality costs (such as management fees, transaction- and other costs) are charged. These have a negative effect on the returns shown. Total returns are hedged to USD. Credit returns are in terms of excess returns of corporate bonds vs. duration-matched government bonds. Turnover is annualized and single-counted.

The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Investment process

# Disciplined investment process to manage the Global Multi-Factor Credits strategy

| | |
|---|---|
| 1) **Global universe of corporate bonds*** | |
| > Main currencies: USD, EUR and GBP; local currencies: AUD, CAD, CHF, JPY | 12,000 bonds |
| > Excluded issuers: based on Robeco and client-supplied exclusion lists | 1,800 issuers |
| 2) **Enhancing the universe** | |
| > Add bonds that (almost) meet the index criteria but are not in the index | |
| > Add Agencies | |
| > Add BB-rated bonds | 15,000 bonds |
| > Exclude longest ≈10% maturities | 2,500 issuers |
| 3) **Ranking using quant multi-factor model** | |
| > Low-Risk/Quality, Value & Momentum | |
| 4) **Human oversight** | |
| > Checking for distorting events and risks beyond the scope of the model | |
| 5) **Portfolio construction algorithm** | |
| > Takes Size factor, risk & sustainability constraints, liquidity, transaction costs into account | |
| 6) **Diversified portfolio with duration-hedge and FX-hedge**** | ≥150 issuers |

* Based on Bloomberg Global Aggregate Corporate + Government-Related + High Yield indices, as of December 31st, 2018; rounded numbers
** Number of issuers is a target and depends on portfolio size

# Multi-factor ranking model, buy & sell rules

## Ranking methodology

> Each bond gets a score on each factor and bonds are ranked on their total model score

> The model ranks separately for financials/non-financials and companies with/without public equity and DM/EM companies

| ISIN | Ticker | Name | Sector | Rating | Maturity | Model | Momentum | Value | Quality/Low-Risk |
|---|---|---|---|---|---|---|---|---|---|
| USU7963ZAE98 | SAMSNG | SAMSUNG ELECTRONICS CO LTD | TECHNOLOGY | A | 10-Apr-17 | 6.60 | 0.73 | 3.00 | 2.88 |
| US023135AP19 | AMZN | AMAZON.COM INC | CONSUMER_CYCLICAL | BBB | 05-Dec-34 | 5.80 | 2.33 | 1.56 | 1.91 |
| XS1077881743 | ETISLT | EMIRATES TELECOM CORP | OWNED_NO_GUARANT | AA | 18-Jun-19 | 5.70 | 1.32 | 3.00 | 1.38 |
| US87425EAL74 | TLMCN | TALISMAN ENERGY | ENERGY | BBB | 01-Jun-19 | 5.68 | 1.65 | 3.00 | 1.03 |
| XS0164876517 | HSBC | HSBC BANK PLC | BANKING | A | 20-Mar-18 | 5.66 | 3.00 | 2.61 | 0.06 |
| US19416QDH02 | CL | COLGATE-PALMOLIVE CO | CONSUMER_NON_CYCI | AA | 07-Nov-16 | 5.59 | 0.06 | 3.00 | 2.52 |
| US61746BDB99 | MS | MORGAN STANLEY DEAN WITTER-G | BANKING | A | 18-Oct-16 | 5.57 | 1.93 | 3.00 | 0.64 |
| US057224AK30 | BHI | BAKER HUGHES | ENERGY | BBB | 15-Jan-29 | 5.55 | 0.33 | 2.21 | 3.00 |
| XS0969636371 | HSBC | HSBC HOLDING PLC | BANKING | A | 10-Jan-19 | 5.53 | 3.00 | 2.48 | 0.06 |
| US30251GAS66 | FMGAU | FMG FINANCE PTY LTD | BASIC_INDUSTRY | BB | 01-Mar-22 | 5.49 | 2.15 | 2.57 | 0.77 |

## Buy from the top of the ranking

> Construct a diversified portfolio of at least 150 companies

> Target 50 bps overweight per company to get exposure to the Size factor

> Take into account top-down risk constraints and bonds' liquidities and transaction costs

## Hold until

> Model ranking drops below sell threshold, or

> Credit rating drops below BB-, or

> Portfolio managers or analysts identify a strong downside risk that is not captured by the model

Sample model output. Source: Robeco. For illustration purpose only.

# Complementing the model with human oversight

## Portfolio managers and analysts oversee the investment process to handle exceptions

### Credit analysts may recommend overruling the quantitative model

> Material events that distort the use of current balance sheet data, e.g. M&A, split-up, spin-off, Covid

> Risks beyond the scope of the model, e.g. ESG, climate, litigation, fraud, activist shareholder

### Portfolio managers keep an eye on market developments

> Recent news that is priced in just before buying a bond

> New risks that emerged after purchase

### Examples of fundamental overrules

Pacific Gas and Electric Company®

GameStop POWER TO THE PLAYERS

wirecard

Royal Caribbean Cruises Ltd.

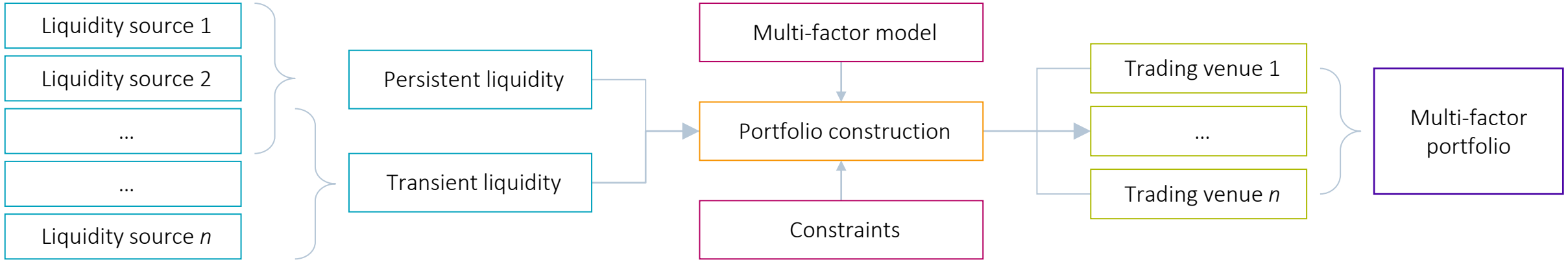
Source: Robeco, TechCrunch, Royal Caribbean Cruises Ltd, Wirecard AG, ISHN.com, Gamestop.

This is not a buy, sell or hold recommendation for any particular security. The information shown is only available for one-on-one presentations and for illustrative purposes only. No representation is made that these examples are past or current recommendations, that they should be bought or sold, nor whether they were successful or not.

# Portfolio construction with embedded liquidity management

**Our portfolio construction algorithm combines multi-factor model rankings, risk, sustainability and transaction costs constraints and real-time liquidity data**

- We measure two types of bond-specific liquidity in real-time
  - **Persistent liquidity:** regular two-way flow, e.g. inferred from traded volumes and number of active brokers
  - **Transient liquidity:** dealer positioning & counterparty matching, inferred from multiple inventory platforms
- The combination of both liquidity types implies a tradeable amount in each specific bond
- Our approach reduces transaction costs and generates maximum factor exposures given market liquidity




See Whirdy, Houweling, Muskens & van Zundert, 2016, "Implementing factor strategies in the corporate bond market", Robeco white paper

# Integrating sustainability in the investment process

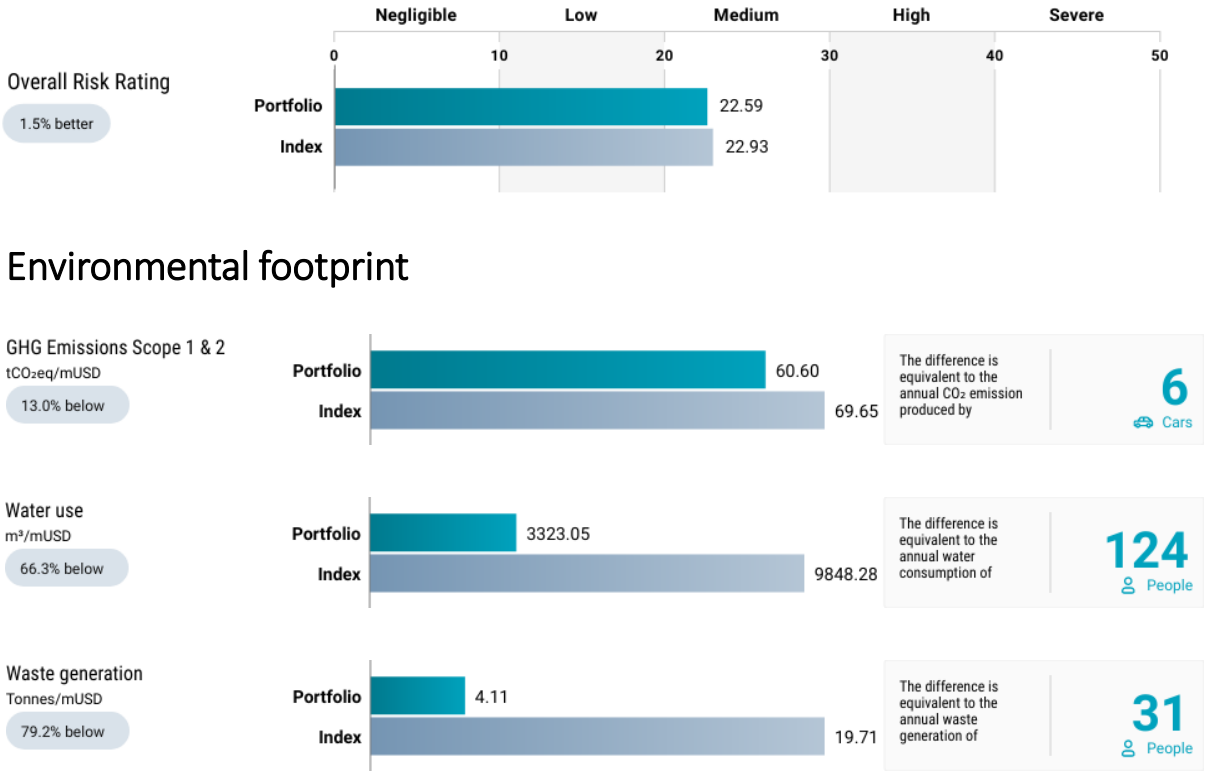
## Sustainability integration, exclusions and engagement

- Fundamental analysts check for ESG risks that may have material impact for bond holders
- Avoid investing in controversial behavior, controversial weapons, palm oil, tobacco and fossil fuel using Robeco's Exclusion List
- Active engagement with companies aiming to influence their corporate behavior

## Sustainability targets in place

- Portfolio's Sustainalytics ESG Risk Rating should be better (lower) than the index
- Environmental footprints should be smaller than the index (carbon, water and waste)

## ESG Risk Rating




Source: Robeco, Sustainalytics, Trucost. Certain underlying data is sourced from third parties (such as e.g. CDP Europe Services GmbH). ESG Risk Rating is based on Sustainalytics data. GHG emissions Scope 1 & 2, water use and waste generation is based on S&P Trucost data. S&P Trucost Limited © Trucost 2022. All rights in the Trucost data and reports vest in Trucost and/or its licensors. Neither Trucost, nor its affiliates, nor its licensors accept any liability for any errors, omissions or interruptions in the Trucost data and/or reports. No further distribution of the Data and/or Reports is permitted without Trucost's express written consent.
ESG Risk Rating and environmental footprint figures for Robeco QI Global Multi-Factor Credits and Bloomberg Global Aggregate Corporate Index. Data end of December 2022.
For illustration purposes only. Portfolio characteristics may vary from time to time from what is shown.

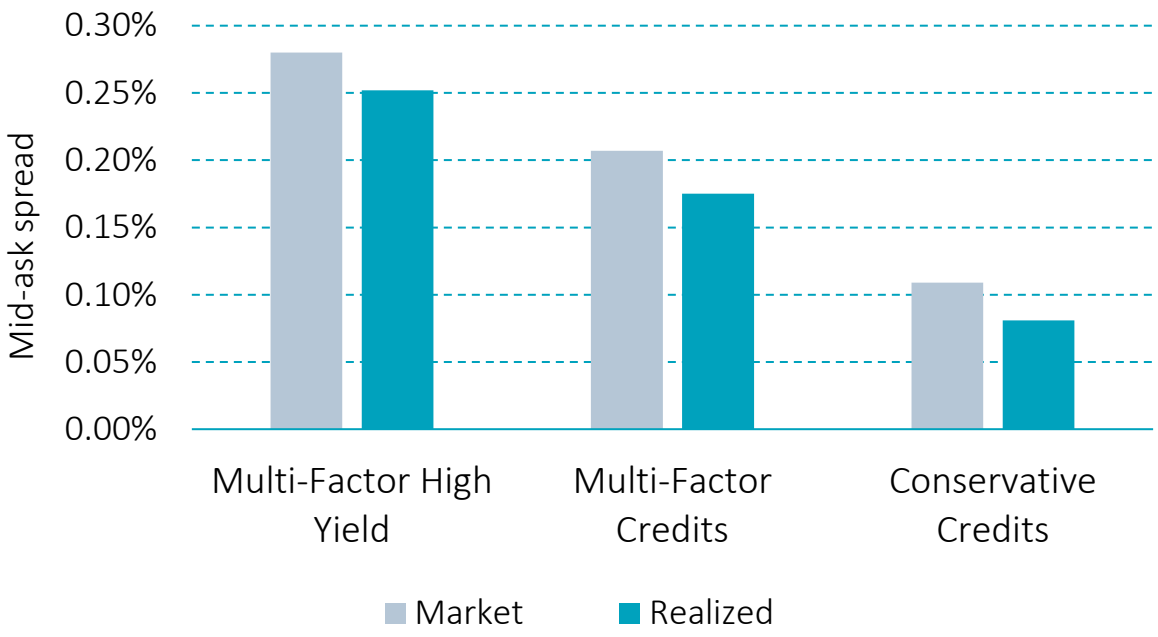
# Realized transaction costs are below externally benchmarked costs

> Robeco designed its own proprietary TCA tool to analyze all trade activity

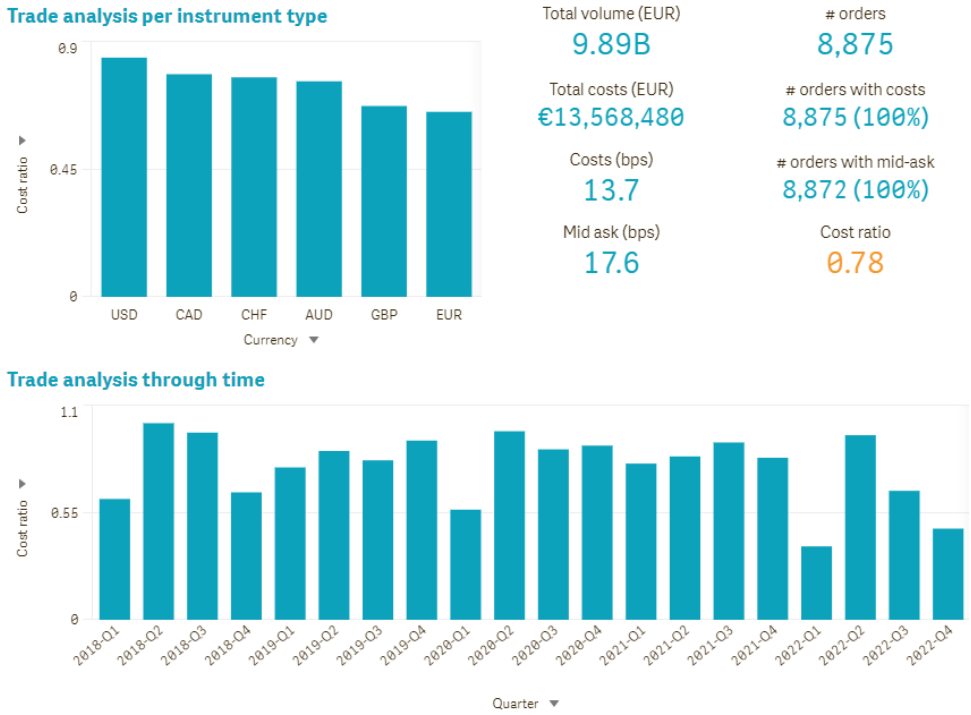
> Realized transaction costs were approximately 22% below market mid-ask spreads over 2018-2022

> Transactions costs have been much lower than assumptions used in historical backtest

## Transaction costs composites




## Robeco's proprietary Transaction Cost Analysis system




Source: Robeco's proprietary TCA, costs calculated over 2018-2022 for Robeco QI Global Multi-Factor Credits, Robeco QI Global Multi-Factor High Yield and a representative Euro Conservative Credits account.

# Risk Management: Key part of our Investment Process

| Type of risk | | Portfolio Implementation* |
|---|---|---|
| **Credit Risk** | DTS methodology used for beta calculation | Beta approximately 1 vs. index |
| | Diversified investment approach | Target 50 bps overweight for at least 150 issuers |
| | Constraints | Sector: max 25% per sector**<br>Rating: max 10% BB<br>Currency-denomination: max 10% deviation vs. index<br>Seniority: max 10% overweight subordinated bonds vs. index<br>Region: max 5% overweight Emerging Markets issuers vs. index |
| **Market Risk** | Maximum volatility | Max 30% above index volatility |
| **Liquidity Risk** | Portfolio holdings | Integrated liquidity management in investment process |
| | Maximum exposure single issuer | No more than 10% of outstanding debt of an issuer |
| | Trading costs related to fund inflows | Partial swing pricing applied at inflows, no outflow swing |
| **Counterparty Risk** | Interest rate swaps | Central clearing |
| | Credit default swaps & FX forwards | Central clearing where possible and otherwise traded with approved counterparty list (rated A or higher) and covered by ISDAs and CSAs (daily exchange of cash collateral) |
| **Operational Risk** | Monitoring by Group Risk Management | Independent supervision |
| | Compliance | Automated pre- and post-trade guideline compliance in Charles River Trading System |
| **Currency Risk** | Currency hedged | EUR, USD, CHF and JPY hedged share classes (or other at request) |
| **Interest Rate Risk** | Interest rate risk hedged | Interest rate risk hedged towards index |

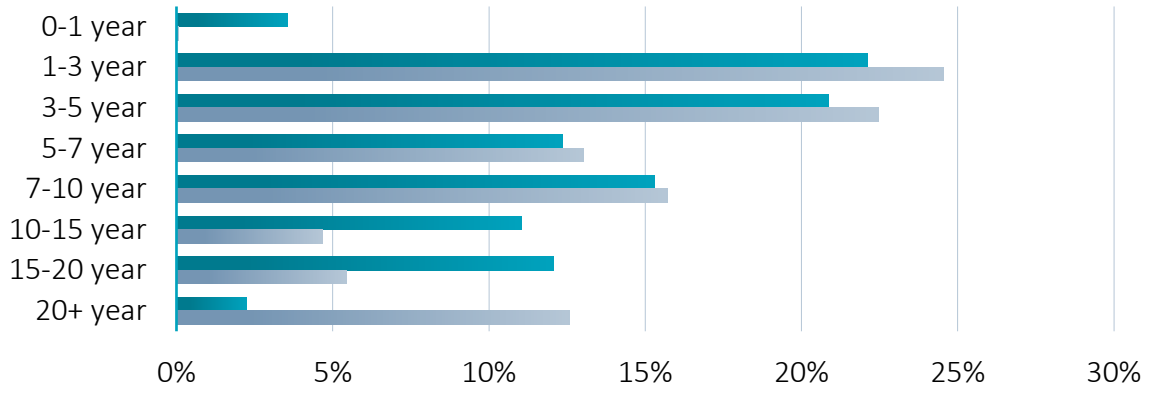
* These internal guidelines determined by Robeco are subject to change without prior notice. The restriction in the prospectus are at all times leading. The prospectus is available on request and free of charge from www.robeco.com
** Bloomberg' class 3 sectors are being used in the sector constraint, except that all Financials subsectors are grouped into one sector

# Portfolio positioning & performance

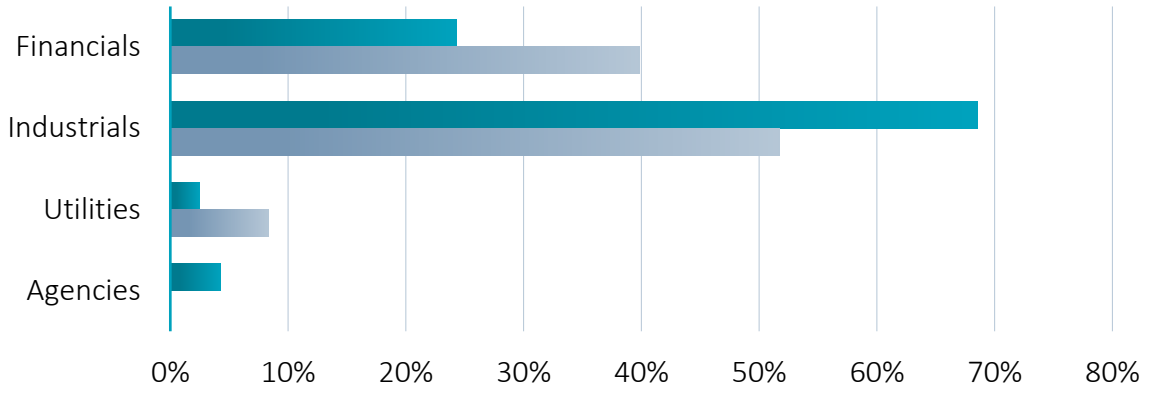
# Positioning

## Underweight longest-dated bonds, overweight EUR and GBP bonds, off-benchmark positions in Agencies and BB

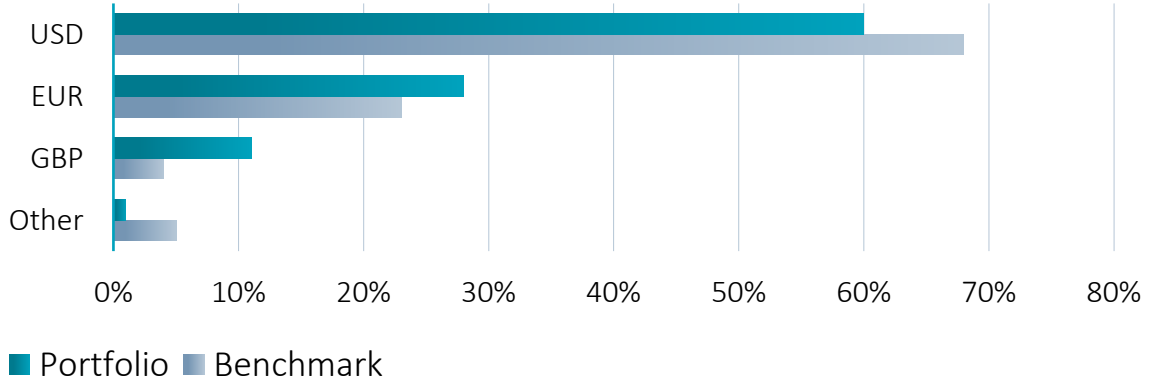
### Maturities



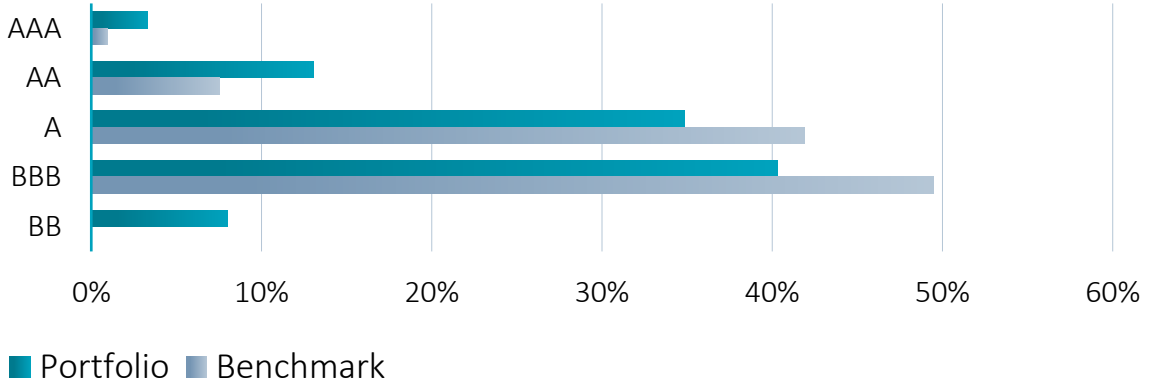

### Sector Class 2




### Currency denominations



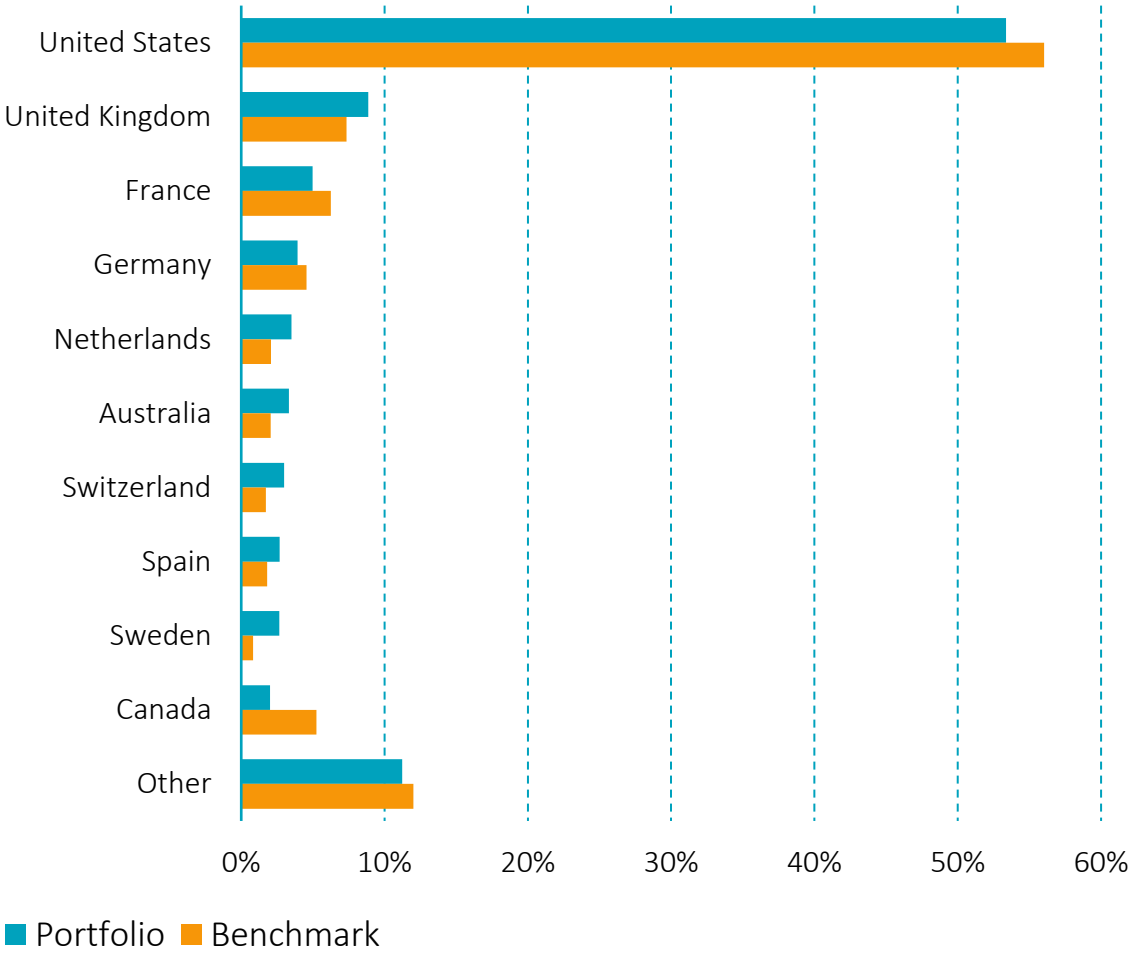

### Ratings



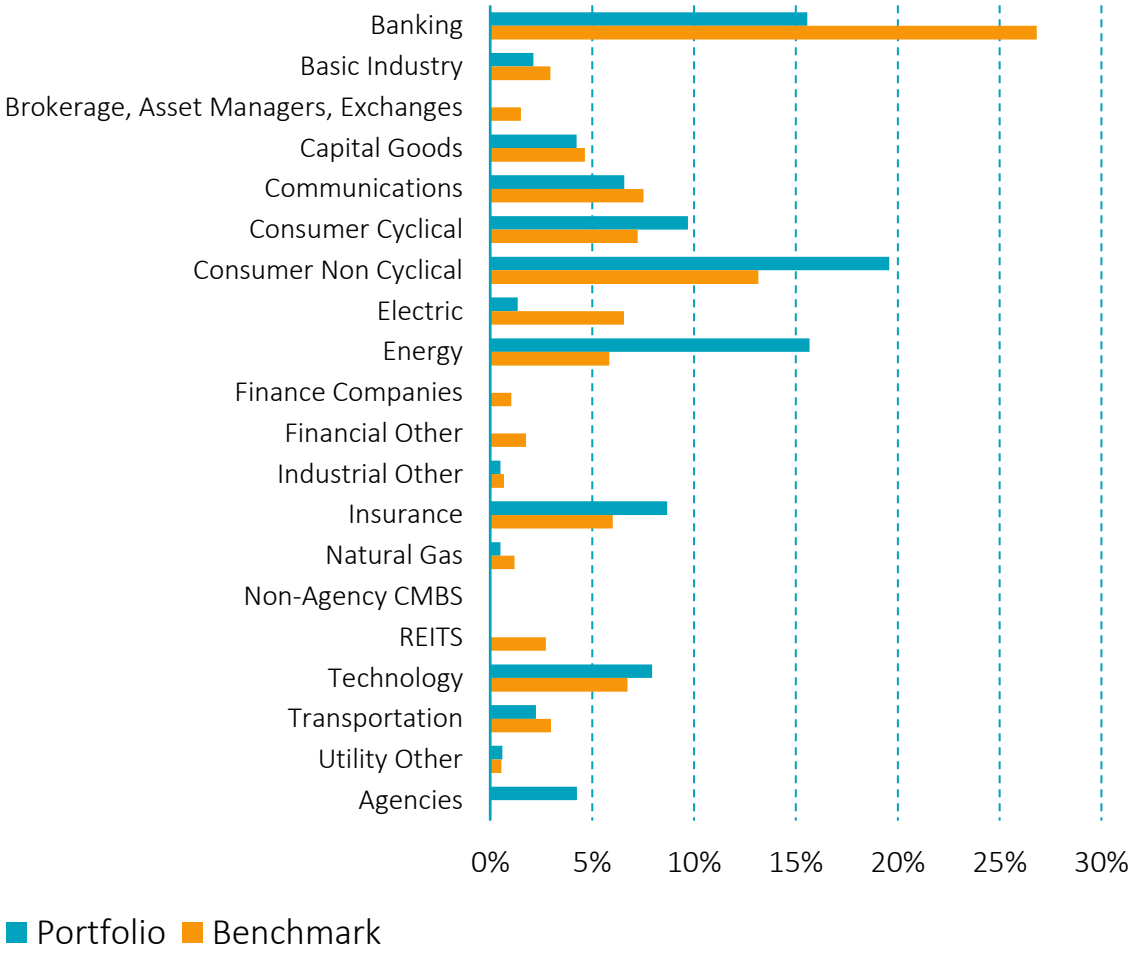

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor Credits. Benchmark: Bloomberg Global Aggregate - Corporates. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Portfolio positioning: Global Multi-Factor Credits

## Country




## Sector class 3




Source: Robeco. Portfolio: Robeco QI Global Multi-Factor Credits. Benchmark: Bloomberg Global Aggregate - Corporates. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Positioning: Characteristics

## Portfolio interest rate duration in line with index and beta close to 1

| Characteristics | Portfolio | Benchmark |
|---|---|---|
| Interest rate duration (OAD in years) | 6.2 | 6.1 |
| Spread duration (OASD in years) | 5.8 | 6.3 |
| Yield to Worst (Hedged to EUR) | 3.5% | 3.3% |
| Yield to Worst (Hedged to USD) | 6.1% | 5.9% |
| Yield to Worst (Hedged to GBP) | 5.2% | 5.0% |
| Credit spread (OAS in bps) | 164 | 147 |
| Coupon | 3.5% | 3.2% |
| DTS beta | 1.00 | 1.00 |
| Numbers of issuers | 193 | 2,101 |
| Average rating | A3/BAA1 | A3/BAA1 |

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor Credits. Benchmark: Bloomberg Global Aggregate - Corporates. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Performance

## Robeco QI Global Multi-Factor Credits

| Annualized performance (Hedged into EUR) | YTD | 1 Year | 3 Years | 5 Years | 7 Years | Since Jul-15 |
|---|---|---|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | -16.20% | -16.20% | -3.87% | -1.29% | 0.30% | 0.39% |
| Benchmark | -16.31% | -16.31% | -4.24% | -1.59% | 0.01% | 0.04% |
| Relative Performance | 0.11% | 0.11% | 0.37% | 0.30% | 0.28% | 0.35% |

| Performance statistics since inception (Jul-15) | Return | Volatility | Return/Risk |
|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | 0.39% | 5.51% | 0.13 |
| Benchmark | 0.04% | 5.83% | 0.06 |
| Relative Performance | 0.35% | 0.69% | 0.51 |
| Alpha | 0.36% | | |
| Beta | 0.94 | | |

| Calendar year performance (Hedged into EUR) | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | -16.20% | -0.80% | 6.84% | 9.25% | -3.41% | 4.56% |
| Benchmark | -16.31% | -1.69% | 6.73% | 9.24% | -3.76% | 3.66% |
| Relative Performance | 0.11% | 0.89% | 0.12% | 0.01% | 0.35% | 0.90% |

The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. Periods shorter than one year are not annualized. The value of your investments may fluctuate. Past performance is no guarantee of future results. Returns gross of fees, based on gross asset value. In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown.

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor Credits IH-EUR Share Class. Benchmark: Bloomberg Global Aggregate - Corporates. All figures in EUR. Data end of December 2022.

# Performance

## Robeco QI Global Multi-Factor Credits

| Annualized performance (Hedged into USD) | YTD | 1 Year | 3 Years | 5 Years | 7 Years | Since Jul-15 |
|---|---|---|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | -14.19% | -14.19% | -2.35% | 0.77% | 2.28% | 2.29% |
| Benchmark | -14.11% | -14.11% | -2.65% | 0.55% | 2.06% | 1.99% |
| Relative Performance | -0.08% | -0.08% | 0.30% | 0.23% | 0.21% | 0.29% |

| Performance statistics since inception (Jul-15) | Return | Volatility | Return/Risk |
|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | 2.29% | 5.47% | 0.20 |
| Benchmark | 1.99% | 5.80% | 0.13 |
| Relative Performance | 0.29% | 0.72% | 0.41 |
| Alpha | 0.33% | | |
| Beta | 0.94 | | |

| Calendar year performance (Hedged into USD) | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|---|
| Robeco QI Global Multi-Factor Credits | -14.19% | 0.02% | 8.48% | 12.46% | -0.76% | 6.59% |
| Benchmark | -14.11% | -0.79% | 8.26% | 12.51% | -1.00% | 5.70% |
| Relative Performance | -0.08% | 0.81% | 0.22% | -0.05% | 0.24% | 0.89% |

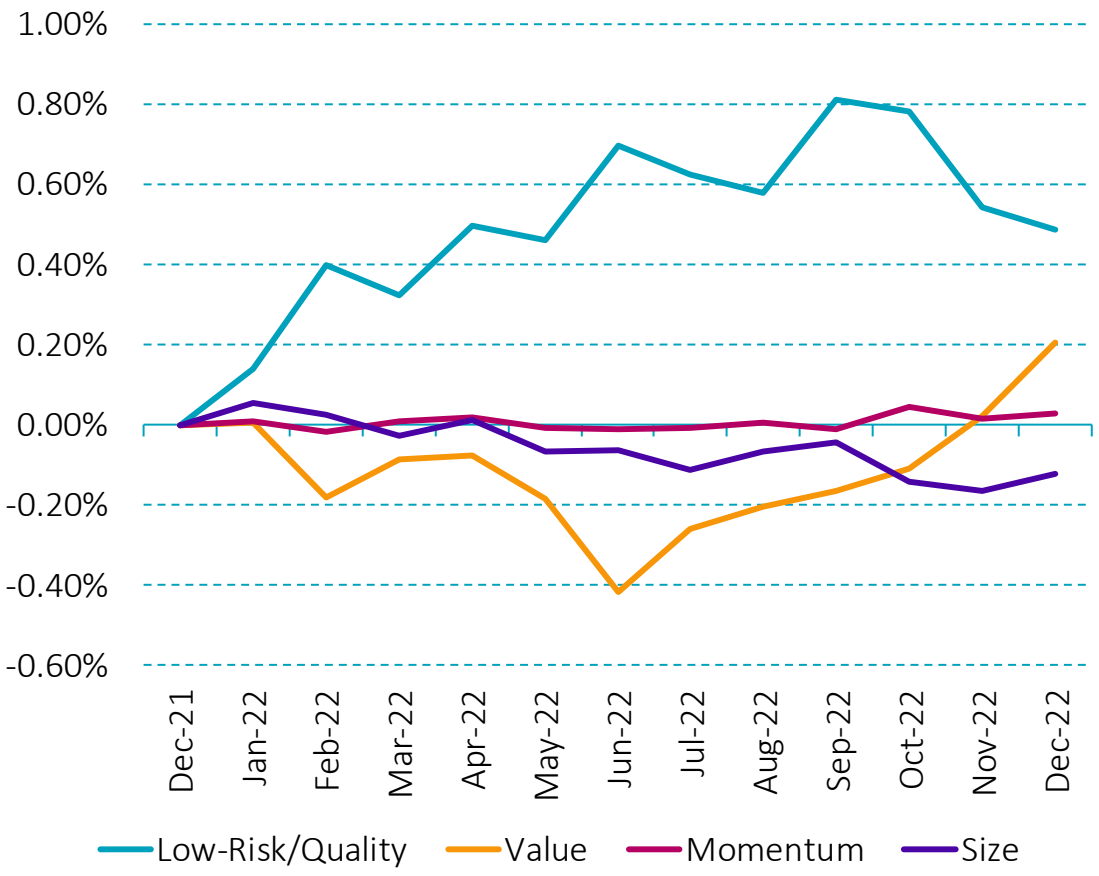
The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. Periods shorter than one year are not annualized. The value of your investments may fluctuate. Past performance is no guarantee of future results. Returns gross of fees, based on gross asset value. In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown.

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor Credits IH-USD Share Class. Benchmark: Bloomberg Global Aggregate - Corporates. All figures in USD. Data end of December 2022.

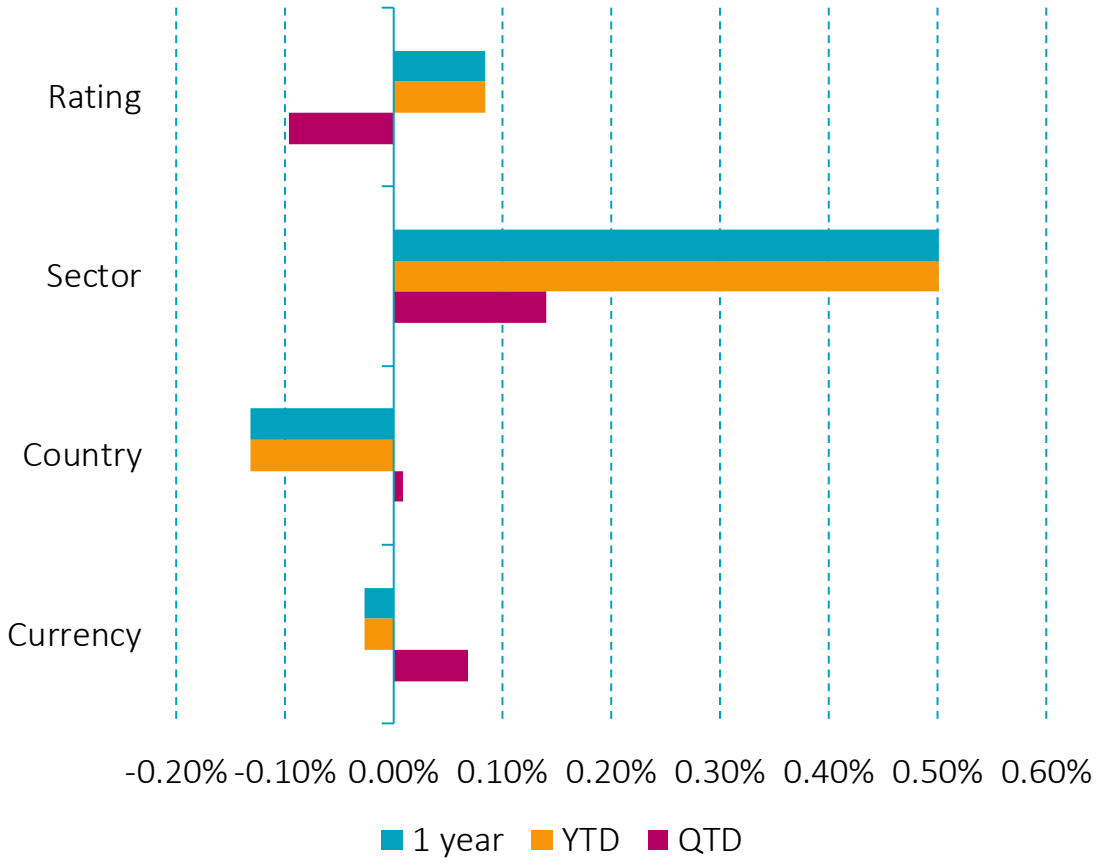
# Performance attributions

## Contributions to outperformance

### Attributions of allocating to factors (cumulative)




### Attributions of allocating to traditional segments




Robeco QI Global Multi-Factor Credits, IH EUR share class. Gross of fees. Based on gross asset value. All figures in EUR. Data end of December 2022.
In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown. Periods shorter than one year are not annualized.
Sources: Robeco, Bloomberg. The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Reasons to invest

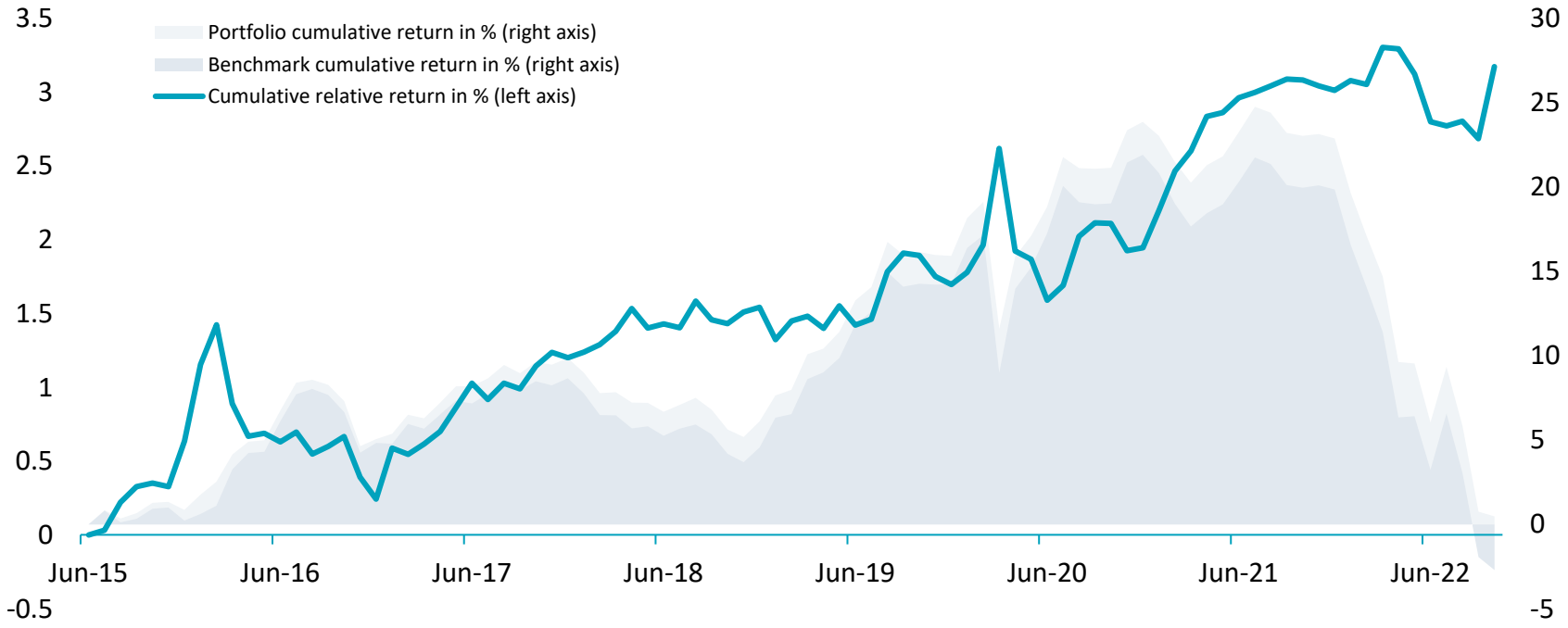
# Attractive and stable performance delivery

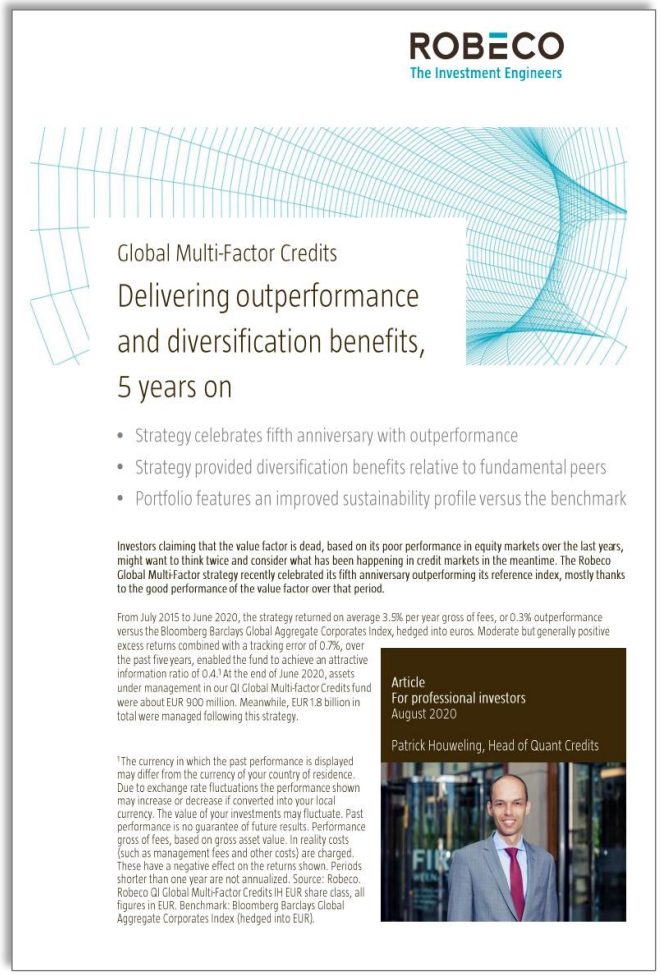
> Attractive relative returns since inception

> Low variation in relative return (0.66% ex post TE since inception)

> Outperformance in five of the six calendar years since inception in 2015

## Cumulative return



ROBECO
The Investment Engineers

Global Multi-Factor Credits

Delivering outperformance and diversification benefits, 5 years on

- Strategy celebrates fifth anniversary with outperformance
- Strategy provided diversification benefits relative to fundamental peers
- Portfolio features an improved sustainability profile versus the benchmark

**Investors claiming that the value factor is dead, based on its poor performance in equity markets over the last years, might want to think twice and consider what has been happening in credit markets in the meantime. The Robeco Global Multi-Factor strategy recently celebrated its fifth anniversary outperforming its reference index, mostly thanks to the good performance of the value factor over that period.**

From July 2015 to June 2020, the strategy returned on average 3.5% per year gross of fees, or 0.3% outperformance versus the Bloomberg Barclays Global Aggregate Corporates Index, hedged into euros. Moderate but generally positive excess returns combined with a tracking error of 0.7%, over the past five years, enabled the fund to achieve an attractive information ratio of 0.4.[1] At the end of June 2020, assets under management in our QI Global Multi-Factor Credits fund were about EUR 900 million. Meanwhile, EUR 1.8 billion in total were managed following this strategy.

Article
For professional investors
August 2020

Patrick Houweling, Head of Quant Credits

[1] The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. The value of your investments may fluctuate. Past performance is no guarantee of future results. Performance gross of fees, based on gross asset value. In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown. Periods shorter than one year are not annualized. Source: Robeco. Robeco QI Global Multi-Factor Credits IH EUR share class, all figures in EUR. Benchmark: Bloomberg Barclays Global Aggregate Corporates Index (hedged into EUR).

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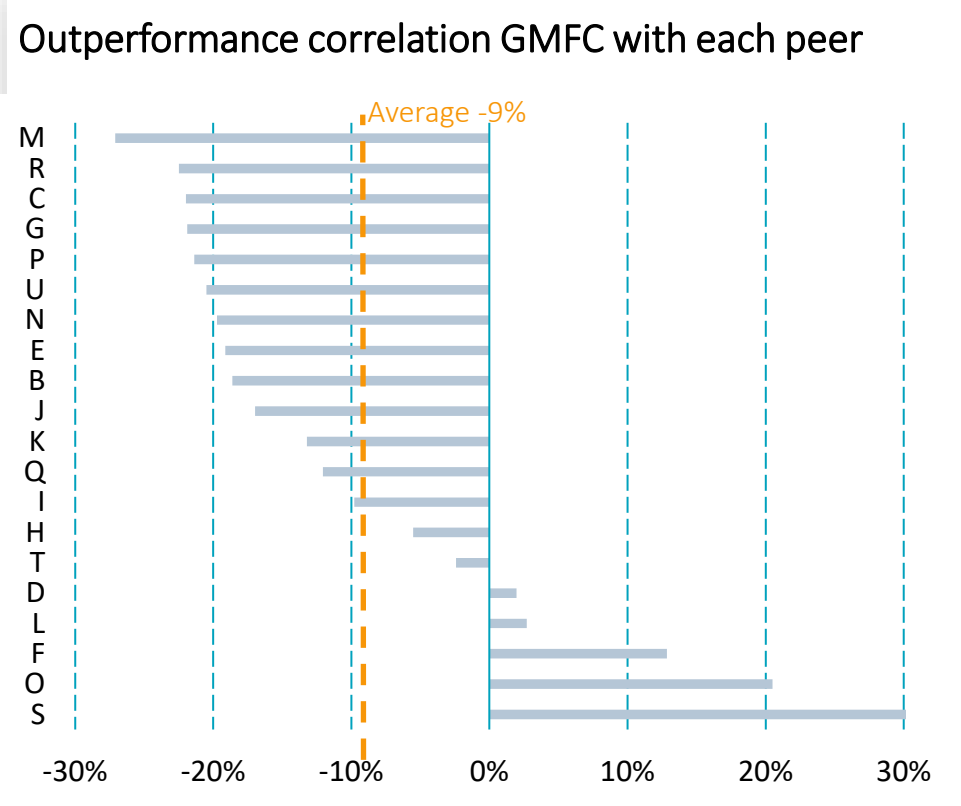
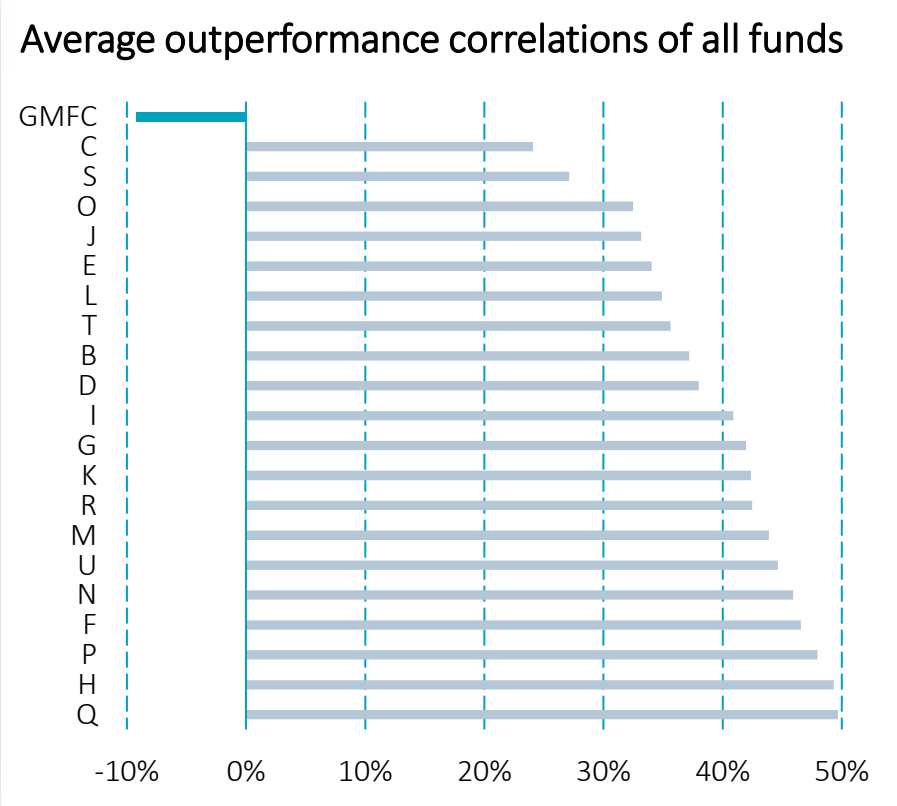
Source: Robeco. Robeco QI Global Multi-Factor Credits IH-EUR share class, based on gross asset value, all figures in EUR. Performance statistics until end October 2022.

# Style diversification with traditional active credit managers

> Robeco's Global Multi-Factor Credits fund shows a -9% performance correlation with its global credit peers[1]

> Style diversification is larger in times of market stress, e.g. around outbreak of Covid-19 pandemic in March 2020



Source: Morningstar Direct, Bloomberg, Robeco. Period: July 2015-August 2022. GMFC = Robeco QI Global Multi-Factor Credits (euro hedged) live track-record. B to U are 20 anonymized global credit funds (all euro hedged). Outperformance is calculated vs. Bloomberg Global Aggregate Corporates (euro hedged). The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. The value of your investments may fluctuate. Past performance is no guarantee of future results. Performance gross of fees, based on gross asset value. In reality, costs (such as management fees and other costs) are charged.

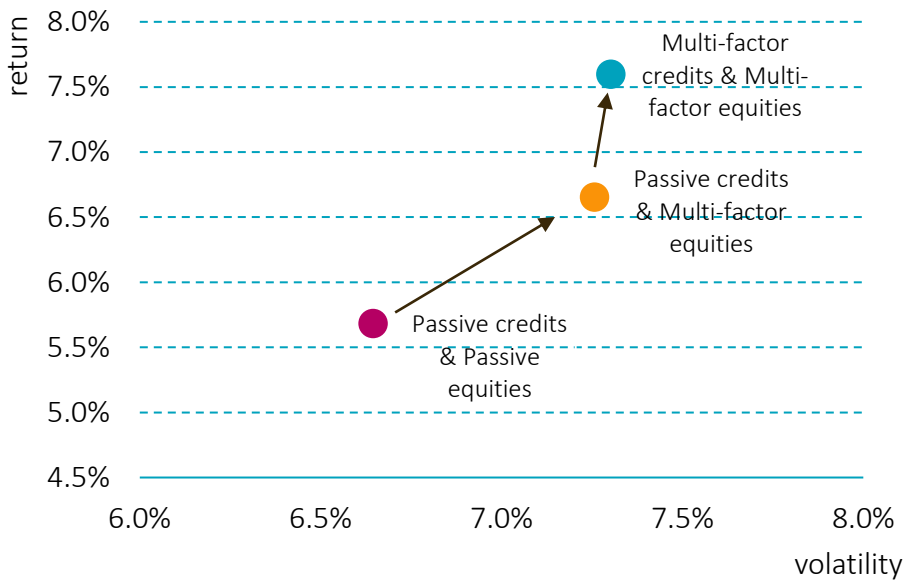
# Added value beyond factor investing in equities

## Multi-asset portfolios benefit from factor investing

> Applying factor investing in both markets improves Sharpe ratio beyond single-market application

> Compared to equity-only application: 1% additional alpha at similar risk

### Risk-return passive and multi-factor portfolios




### Correlations between credit and equity factor alphas:

| | Investment Grade | High Yield |
|---|---|---|
| Low-Risk | 16% | 21% |
| Value | 45% | 52% |
| Momentum | 10% | 24% |
| Size | 4% | 28% |

Research

Factor Investing in the Corporate Bond Market

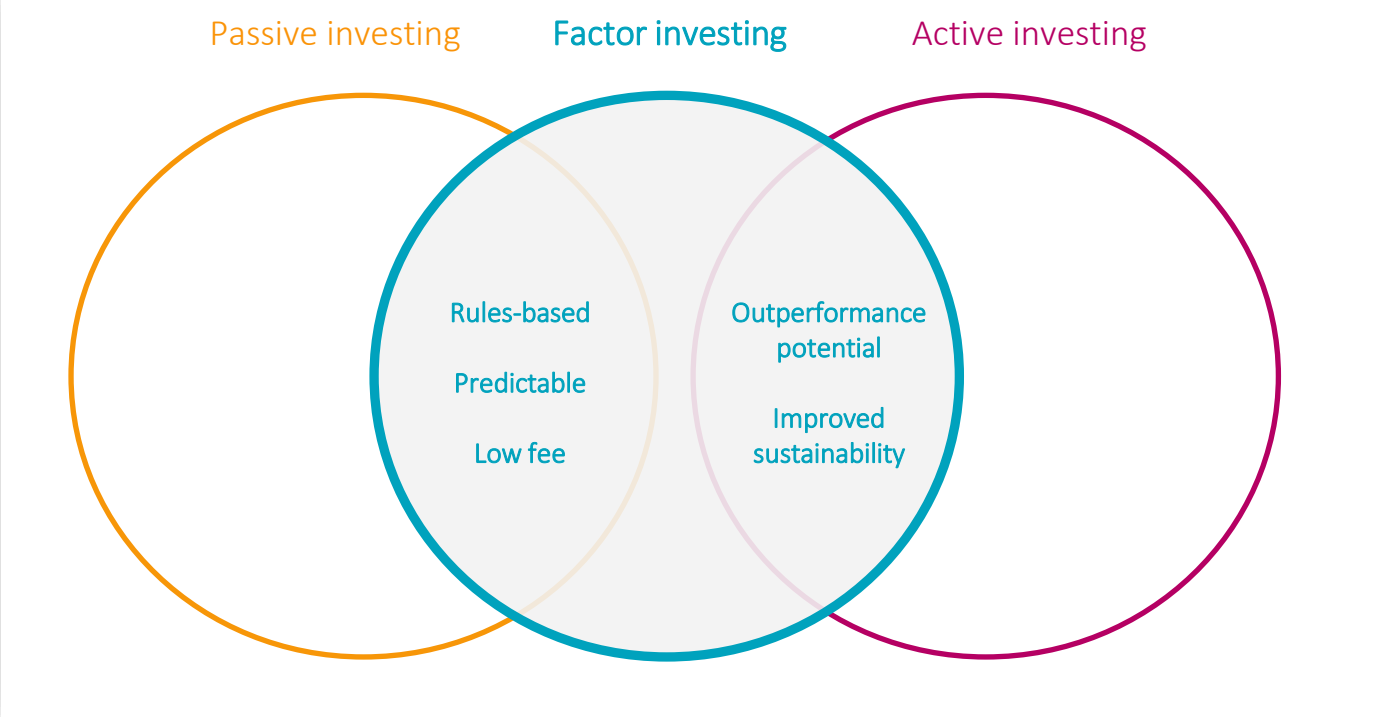
Patrick Houweling and Jeroen van Zundert, CFA

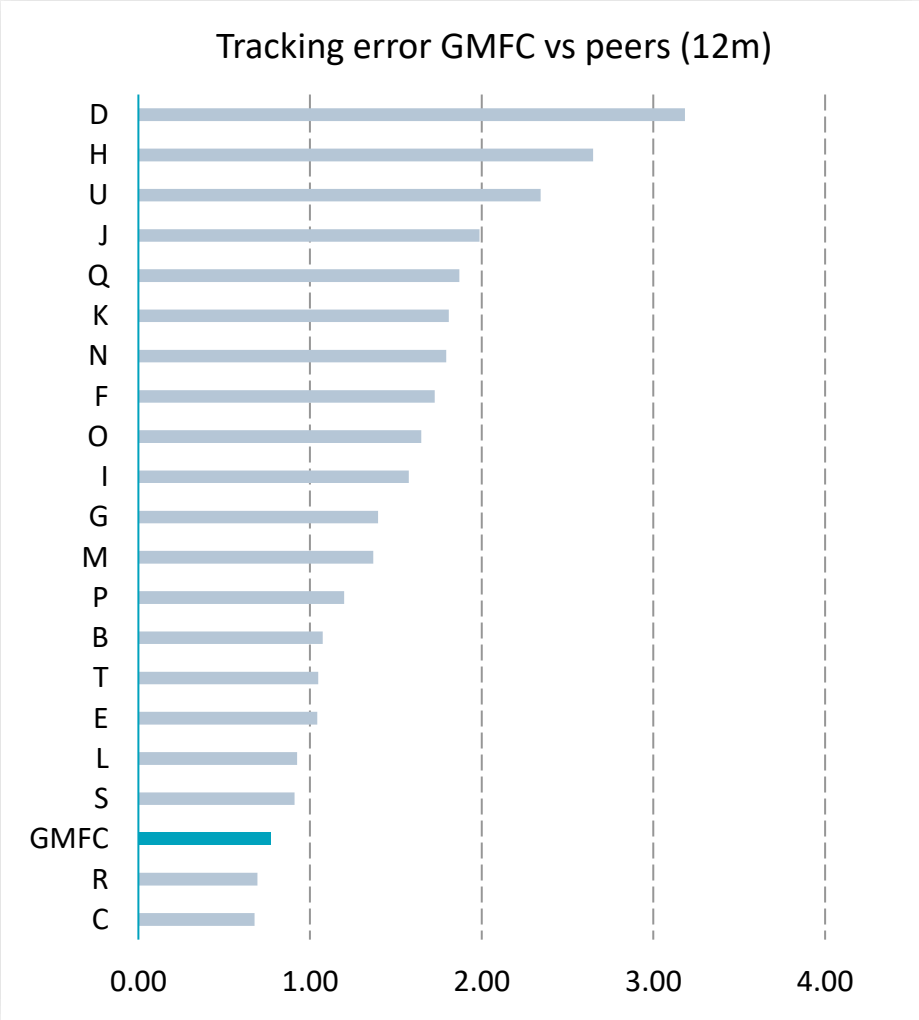
Source: Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in Financial Analysts Journal in 2017. Left chart: extended sample period until December 2020. Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy. Research setup left chart: Asset classes: 25% allocations to Treasuries, Investment Grade, High Yield, Equities. Either invest in passive market index or multi-factor portfolio. Excess returns over risk-free rate.

# Combining the best of passive and active

> Like passive: rules-based, predictable risk/return, low fee

> Like active: outperformance potential, improved sustainability




Left image: Source: "Foundations of Factor Investing", MSCI Research Insight, December 2013. Right chart: Source: Morningstar Direct, Bloomberg, Robeco. Period: July 2015-August 2022. GMFC = Robeco QI Global Multi-Factor Credits (euro hedged) live track-record. B to U are 20 anonymized global credit funds (all euro hedged). Tracking error is calculated vs. Bloomberg Global Aggregate Corporates (euro hedged).

# Appendix

# Characteristics

## Robeco QI Global Multi-Factor Credits

| Characteristics | Description |
|---|---|
| Name | Robeco QI Global Multi-Factor Credits |
| Portfolio Manager | Patrick Houweling, Mark Whirdy, Johan Duyvesteyn |
| Inception | April 2014 |
| Asset under Management | USD 158 million / EUR 148 million |
| Benchmark | Bloomberg Global Aggregate - Corporates |
| Morningstar rating | 5 |
| Ex-ante tracking error | No ex-ante tracking error limit |
| Currency risk | Fully hedged to share class currency |
| Liquidity | Daily liquidity |
| Legal status | Investment company with variable capital incorporated under Luxembourg law |
| UCITS IV | Yes |

Source: Robeco. Data end of December 2022.
These internal guidelines determined by Robeco are subject to change without prior notice. The restriction in the prospectus are at all times leading. The prospectus is available on request and free of charge from www.robeco.com.

# Factor investing can be an alternative versus costly index trackers

**Why index tracking is more difficult for credits than for stocks:**

1) Credit indices have high turnover due to redemptions, calls, coupons, upgrades, downgrades, defaults, etc.
   - > IG index: 62%
   - > HY index: 110%

(annualized, double-counted*)

2) Transaction costs are uncompensated in the index, as
   - > bonds enter the index at the bid price
   - > cash is 'reinvested' by scaling up index constituents

**This leads to structural underperformance of ETFs****

> IG ETFs: -38 bps

> HY ETFs: -337 bps

(relative performance vs. own benchmark, before fees)

## On the Performance of Fixed-Income Exchange-Traded Funds

PATRICK HOUWELING

PATRICK HOUWELING is a vice president at Robeco Quantitative Strategies in Rotterdam, The Netherlands.
p.houweling@robeco.com

We evaluate the performance of fixed-income exchange-traded funds (ETFs). ETFs are very similar to open-ended mutual funds but are listed and traded like a single stock on stock exchanges. More and more investors are putting their money in fixed-income ETFs to receive exposure to Treasury bonds, investment-grade corporate bonds, or high-yield corporate bonds. Since the introduction of the first fixed-income ETF in 2000, fixed-income ETFs have exploded in both number and in assets under management (see BlackRock [2010b]).

Because ETFs are specifically designed to track their benchmarks, the foremost measure of an ETF's quality is its ability to replicate benchmark returns. We find that Treasury ETFs have indeed, on average, been able to track their benchmarks. Investment-grade corporate bond ETFs and, especially, high-yield corporate bond ETFs have lagged their benchmarks, however: Their average underperformances are larger than their average costs.

We find that the transaction costs of the underlying bonds are a key determinant of an ETF's underperformance. Because of the mechanics of the creation/redemption process, trading costs find their way into ETF performance. We extract several determinants of transaction costs from the academic literature, such as credit rating, maturity, and size, and create groups of ETFs based on these determinants. We find that ETF underperformance indeed increases with transaction costs, as hypothesized. Therefore, we conclude that an ETF's ability to replicate its benchmark depends on the transaction costs of that benchmark's constituents.

Our results have several implications. First, when forming an expectation about the expected underperformance of an ETF relative to its benchmark, investors should take into account not only stated expense ratios but also the transaction costs of the securities in that benchmark. Especially for high yield, and to a lesser extent for investment grade, investors should expect ETFs to underperform by more than their costs. Consequently, investors should lower their return expectations on corporate bonds in asset allocation decisions when using ETFs in the implementation. Second, our results contribute to the debate on the added value of active management (see, e.g., Derwall and Huij [2008] and Lipton and Kish [2010]). Given that passive corporate bond ETFs cannot replicate benchmark returns, it seems that those benchmark returns are not a fair yardstick for evaluating the performance of active funds either. Instead, by comparing active funds' returns to those of passive funds such as ETFs, investors may more fairly measure these funds' added value.

Our study is similar to Rompotis [2008], Blitz and Huij [2011], and Blitz, Huij, and Swinkels [2012] on equity ETFs and to Drevonak,

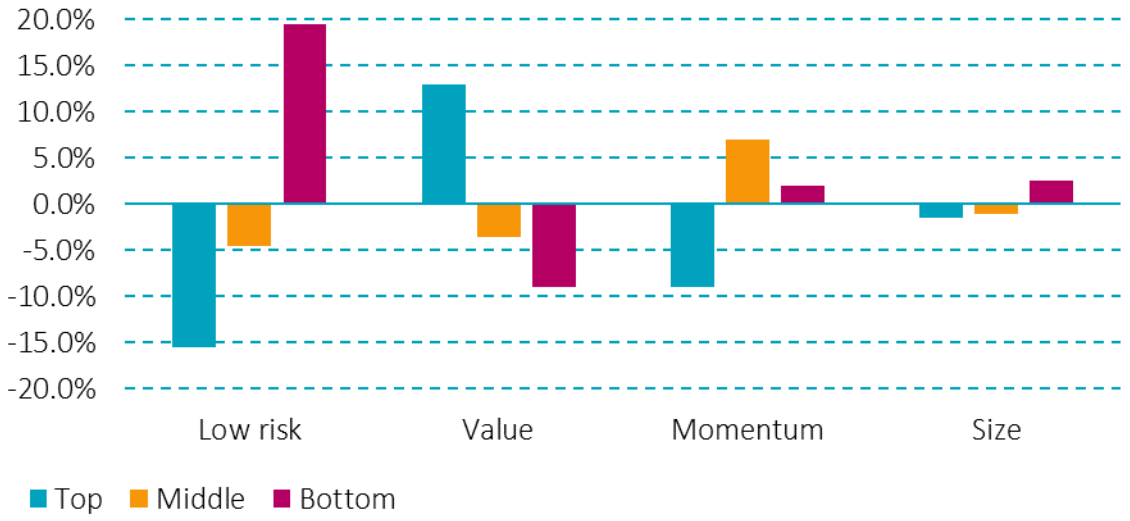
SUMMER 2012 THE JOURNAL OF INDEX INVESTING 39

* Houweling & van Zundert, 2017, "Factor Investing in the Corporate Bond Market, Financial Analysts Journal
** Houweling, 2012, "On the Performance of Fixed Income Exchange Traded Funds", Journal of Index Investing

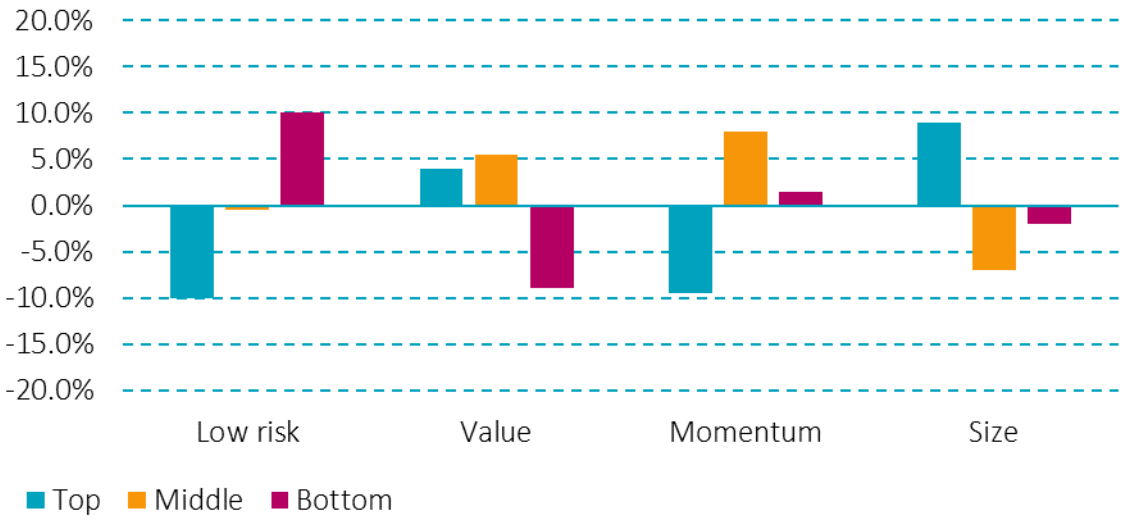
# Robeco Factor Scan Tool: Measure factor exposures of current portfolio

- As a starting point, it is important to measure the factor exposures of the current portfolio
- Methodology to measure factor exposure
  - Sort benchmark constituents on a factor and create 3 groups (Top/Middle/Bottom) with equal market cap
  - Calculate portfolio weight in each group, as defined by benchmark's cutoff points
  - Factor exposure per group = portfolio weight – benchmark weight

## Factor exposures sample portfolio 1




## Factor exposures sample portfolio 2




Source: Robeco Factor Scan Tool, sample portfolios

# Excerpt from SFDR-related disclosures (not exhaustive)

## Robeco QI Global Multi-Factor Credits

### SFDR Classification

**Article 8:** The fund promotes environmental and/or social characteristics.

### Sustainability Risk Profile

Corporate sustainability risk (overall) profile: medium
Government sustainability risk (overall) profile: not applicable

### Taxonomy alignment

The fund does not intend to make Taxonomy-aligned investments. It cannot be excluded that among the fund's holdings certain investments are Taxonomy aligned.

### Fund specific disclosures including PAIs considered

Please refer to prospectus and SFDR disclosures publicly available via Robeco's website

### Binding elements to attain the environmental and/or social characteristics promoted by the fund

The fund has the following binding elements:

1. The fund's portfolio complies with Robeco's Exclusion Policy (https://www.robeco.com/docm/docu-exclusion-policy.pdf), that is based on exclusion criteria with regards to products and business practices that Robeco believes are detrimental to society and incompatible with sustainable investment strategies. This means that the fund has 0% exposure to excluded securities, taking into account a grace period. Information with regards to the effects of the exclusions on the fund's universe can be found at https://www.robeco.com/docm/docu-exclusion-list.pdf
2. The fund's carbon, water and waste footprint score is better than that of the general market index.
3. The fund scrutinizes investment in companies that are in breach of the ILO standards, UNGPs, UNGC or OECD Guidelines for Multinational Enterprises. If a company in the portfolio breaches one of the international guidelines during the investment period, the company will become part of the Enhanced Engagement program. When engagement is deemed highly unlikely to succeed, the company might be excluded directly.
4. The fund's weighted average ESG score is better than that of the general market index.

For more information, refer to the sustainability-related disclosure on Robeco's website.

### Sustainability policies and methodologies

**All SFDR-related policies and methodologies:** https://www.robeco.com/en/key-strengths/sustainable-investing/sustainability-reports-policies.html

**Good governance:** https://www.robeco.com/docm/docu-robeco-good-governance-policy.pdf

**Principal Adverse Impact Statement:** https://www.robeco.com/docm/docu-robeco-principal-adverse-impact-statement.pdf

### Asset allocation

At least 90% of the investments are aligned with the E/S characteristics of the fund. The fund plans to make a minimum of 50% sustainable investments, measured by positive scores via Robeco's SDG Framework. The investments in the category Other, estimated between 0-10%, are mostly in cash and cash equivalents. The planned asset allocation is monitored and evaluated on a yearly basis.

### Dedicated reference benchmark for E/S characteristics

There is no reference benchmark designated for the purpose of attaining the environmental or social characteristics promoted by the fund.

Source: Robeco.
Sustainability disclosures based on October 2022 prospectus. The disclosures in the prospectus are at all times leading. The prospectus is available on request and free of charge from www.robeco.com

# Enhancements to our Quant Credit selection strategies

## Aiming for continued efficient factor exposure and attractive risk-adjusted returns

### Examples of implemented enhancements

- 2015: Systematized the integration of liquidity information in the investment process
- 2016: Ex-ante Transaction Cost Model and ex-post Transaction Cost Analysis application
- 2016: Indirect momentum measure for private companies
- 2016: Integration of RobecoSAM ESG-scores in the investment process
- 2017: Beta-neutralization of momentum factor
- 2018: Integration of solvency capital requirements for insurance companies
- 2019: Increased sell threshold for bottom ranked companies
- 2020: Implementation of constraint on portfolio's carbon footprint
- 2020: Adding data provider for private companies
- 2021: Extended investment universe with Emerging Markets issuers
- 2021: Implementation of constraint on portfolio's water & waste footprint
- 2021: Adding downside risk prediction to help reduce risk, mostly relevant for High Yield

### Tested and rejected

- 2015: implied equity volatility
- 2016: carry factor
- 2017: supply-chain momentum
- 2018: covenant quality
- 2019: dividends and share buy-backs
- 2021: shared analyst coverage
- 2021: post-earnings announcement drift

### Examples of current research and upcoming enhancements

- 2022: Automating process to benefit from new issues
- 2022: Reduced tracking error contribution of Size factor

Source: Robeco

# Performance attributions with and without risk-adjustments

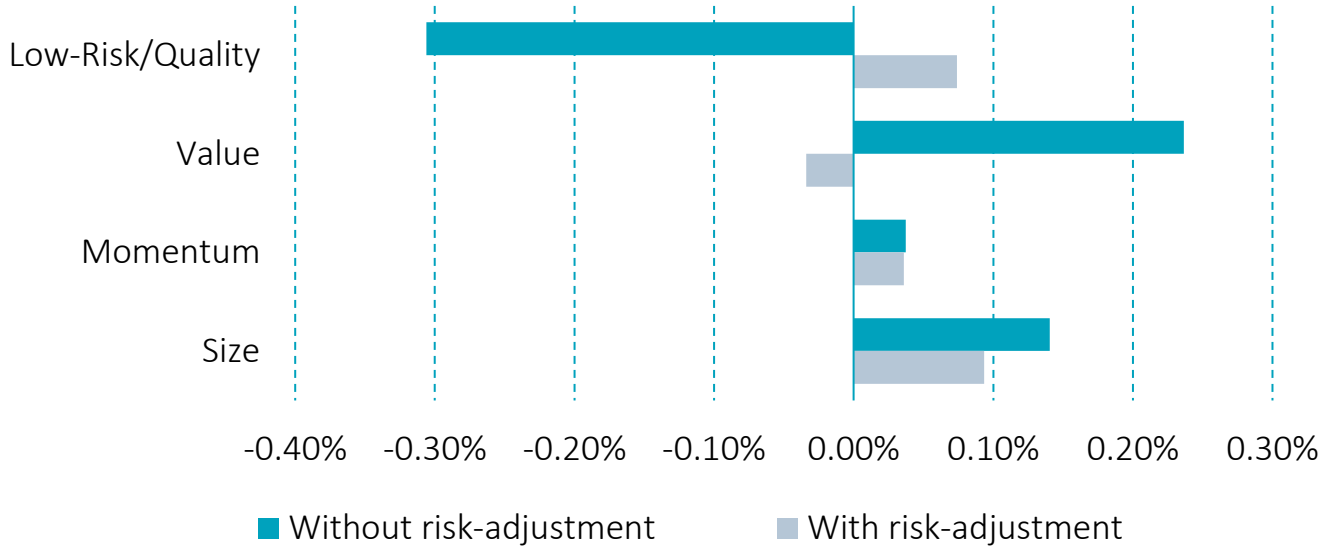
## Our performance attribution methodology has the following benefits

> Multivariate instead of univariate, so that attributed effects are additive

> Attributions can be conducted with or without adjusting for risk (DTS)

> The residual can be quantified and further analyzed

## Factor attribution Robeco QI Global Multi-Factor Credits



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A multivariate approach

Improved performance attribution for quant credit strategies

- Natural progression of traditional univariate approach
- Multivariate framework allows addition of attributed factor returns
- Insights into factor performance with and without risk adjustment

In our factor-based quantitative credit strategies, the attractiveness of a bond is determined by its factor scores. Factor scores drive the decision to buy or sell a corporate bond. As a result, the performance of a factor-based portfolio is driven by how much factor exposures it has, and the ability of the factors to successfully distinguish outperforming from underperforming bonds. To evaluate portfolio performance and to gauge factor effectiveness, we attribute a portfolio's realized outperformance to the factors. Until recently, we have relied on a univariate performance attribution technique, which provides useful insights for attributions towards one dimension at a time, such as sectors, countries, or a single factor. However, our strategies use a multi-factor model that combines various factors for optimal diversification. Therefore, we switch to a newly developed multivariate performance attribution methodology that deals with all factors simultaneously.

The advantages of the new method are threefold: it takes correlations between factors into account, it allows addition of the attributed factor effects, and it quantifies which part of the performance cannot be explained by factor exposures.

In this note we first show how we measure a portfolio's factor exposures, then we describe the previous and new performance attribution methodologies, and finally we demonstrate that the new approach is a natural progression from the previous approach, while offering several advantages.

Article
For professional investors
April 2020

Joris Blonk, CFA, Quant Researcher
Patrick Houweling, PhD, Head Quant Credit

Source: Robeco. Robeco QI Global Multi-Factor Credits, data as of June 2020.

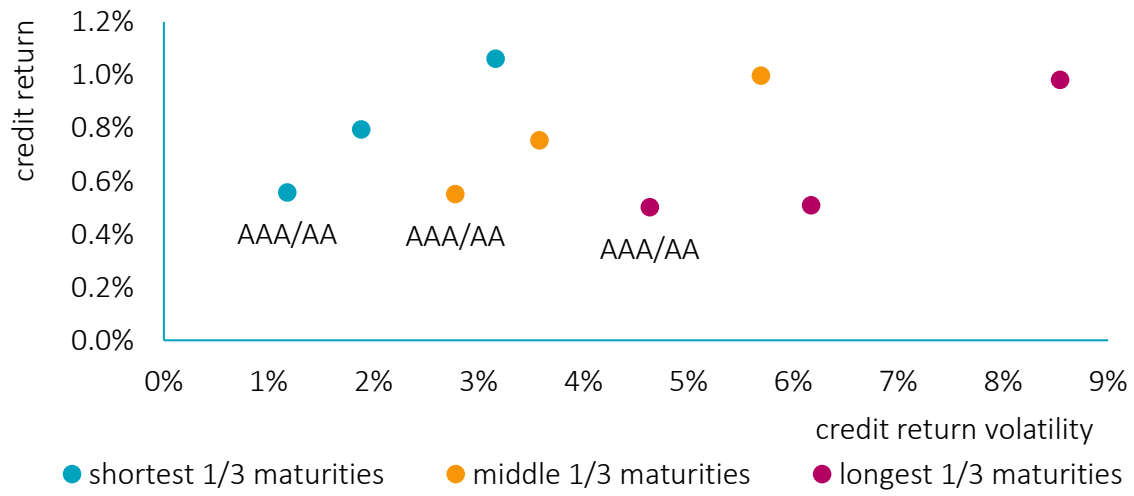
# Low-Risk factor: Buy low-risk/high-quality bonds, avoid high-risk/low-quality bonds

> **Intuition:** investors are overpaying for high-risk bonds, risk has not been sufficiently rewarded

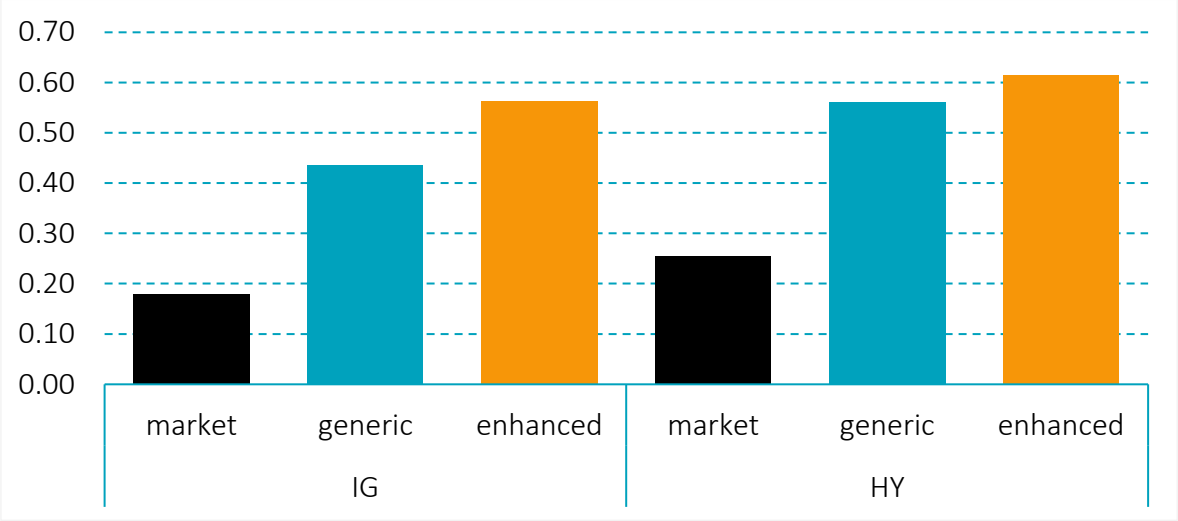
> **Generic Low Risk:** use rating and maturity as risk measures; disadvantage: ratings adjust slowly to new information

> **Enhanced Low Risk:** use additional risk measures to further reduce risk or preserve return, e.g. distance-to-default and leverage

**Maturity x rating***
(USD Investment Grade Corporates, 1994-2020)




**Sharpe ratios Low Risk and Quality factors****
(USD 1994-2020)



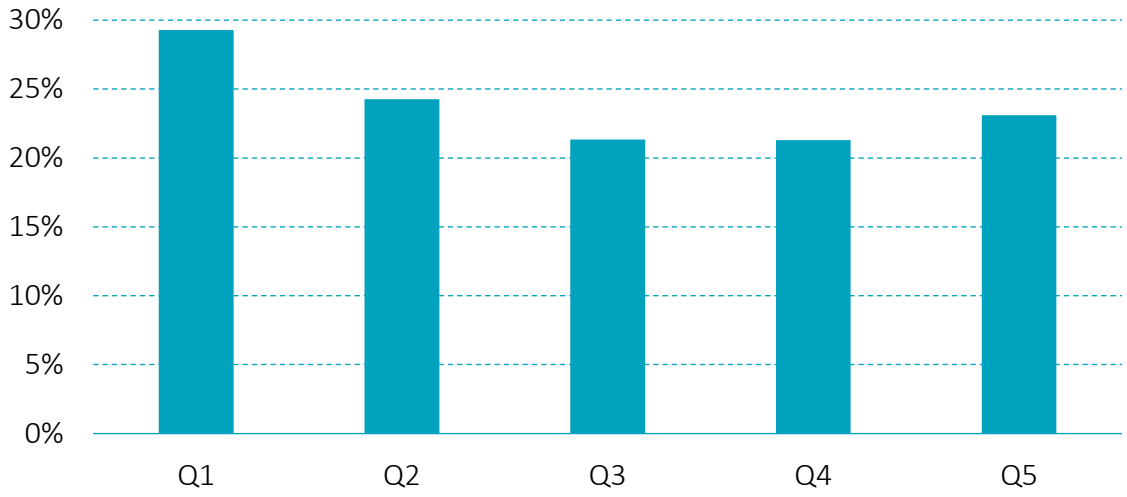

* Source: Houweling, Van Vliet, Wang & Beekhuizen, 2015, "The Low-Risk Effect in Corporate Bonds". Extended sample period until December 2020.
** Source: Houweling & Van Zundert, 2017, "Factor Investing in the Corporate Bond Market", *Financial Analysts Journal*. Extended sample period until December 2020 + enhanced definitions.
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Quality factor: Quantitatively and qualitatively similar to Low-Risk factor

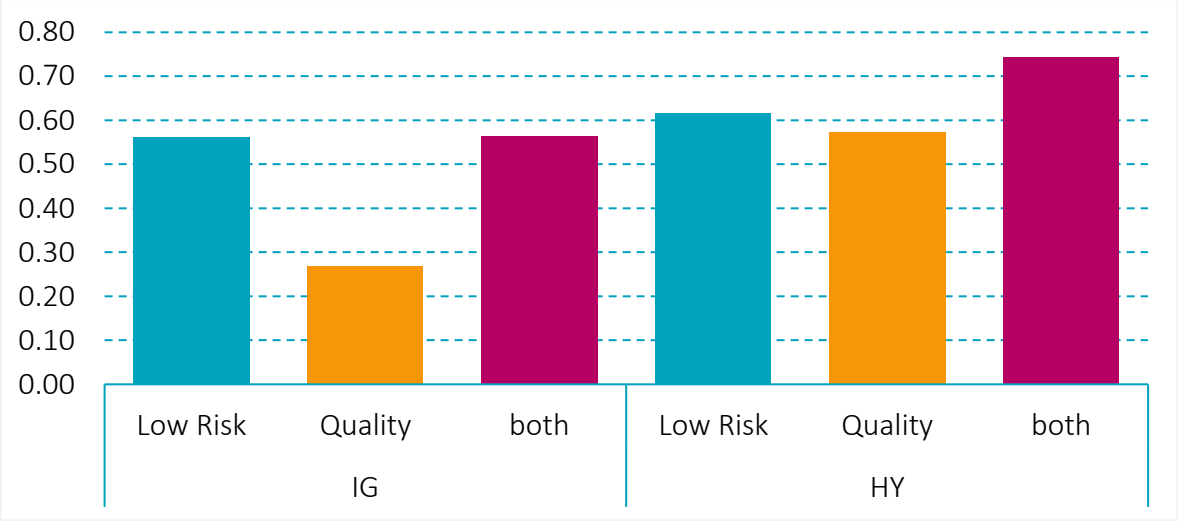
- **Intuition:** investors are underpaying for high-quality securities, because they are focused on the 'wrong' indicators, such as earnings
- **Generic Quality:** profitability, growth, safety, and payout
- **Enhanced Quality:** profitability, earnings quality, and conservative management

Quality is quantitatively and qualitatively similar to Low Risk* → we combine Quality and Low Risk

**Profitability of Low Risk quintile portfolios***
(USD Investment Grade, 1994-2020)




**Sharpe ratios Low Risk and Quality factors****
(USD 1994-2020)

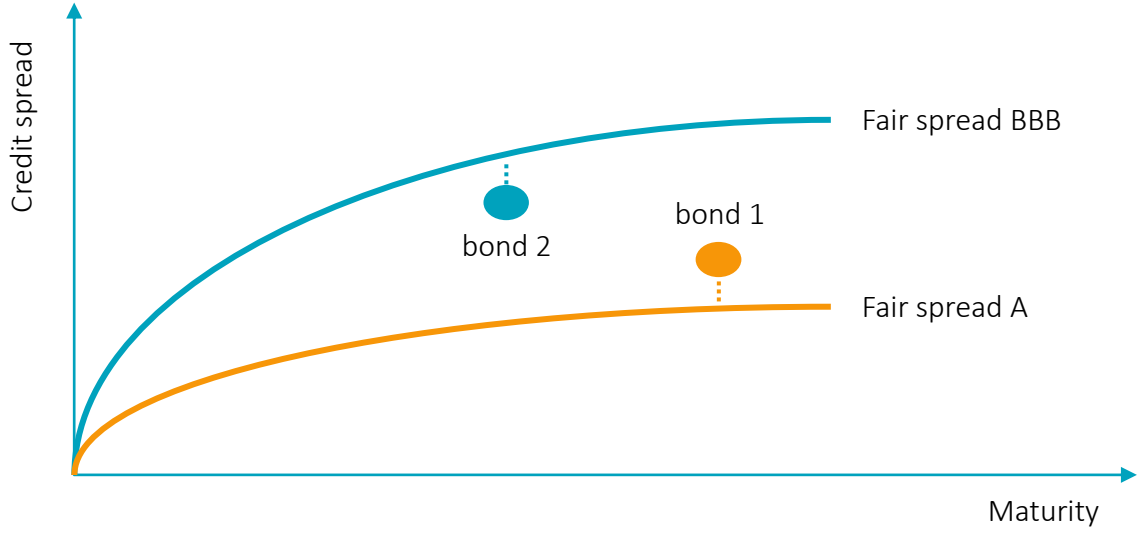



* Source: Houweling, van Zundert, Muskens, Whirdy, 2016, "The Quality of Low-Risk Credits". Extended sample period until December 2020.
** Source: Houweling & Van Zundert, 2017, "Factor Investing in the Corporate Bond Market", *Financial Analysts Journal*. Extended sample period until December 2020 + enhanced definitions.
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# Value factor: Buy bonds that are undervalued vs. risk, avoid overvalued bonds

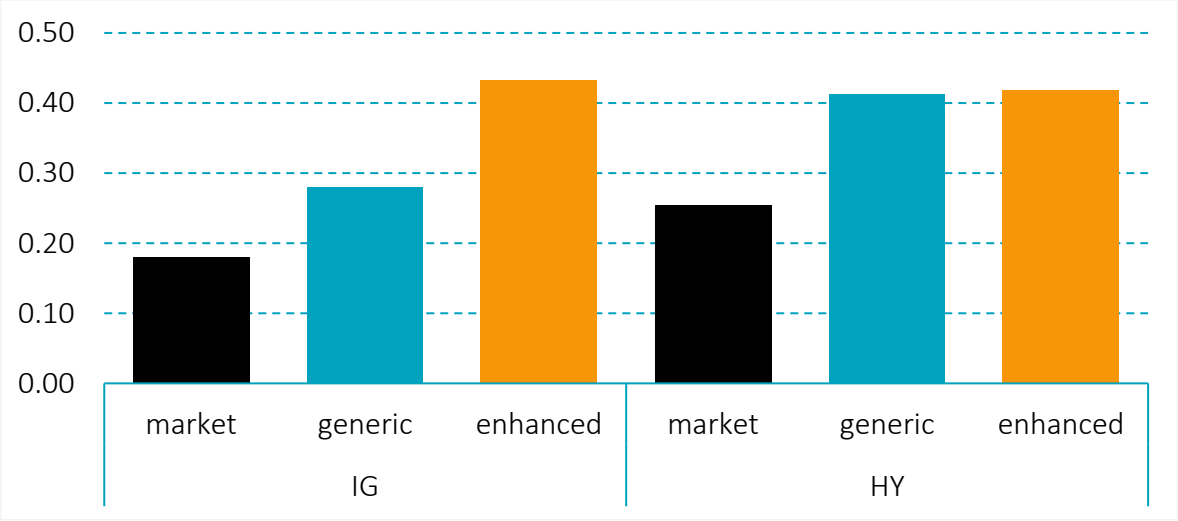
- **Intuition**: overreaction to news creates mispricings, which subsequently mean-revert to fair values
- **Generic Value**: use rating and maturity as risk measures in a linear regression; disadvantages: prone to select bonds that are cheap for a reason (value-trap) and actual curves are non-linear
- **Enhanced Value**: use more risk measures and allow for non-linearity

## Illustration generic Value*




## Sharpe ratios Value factor**

(USD 1994-2020)

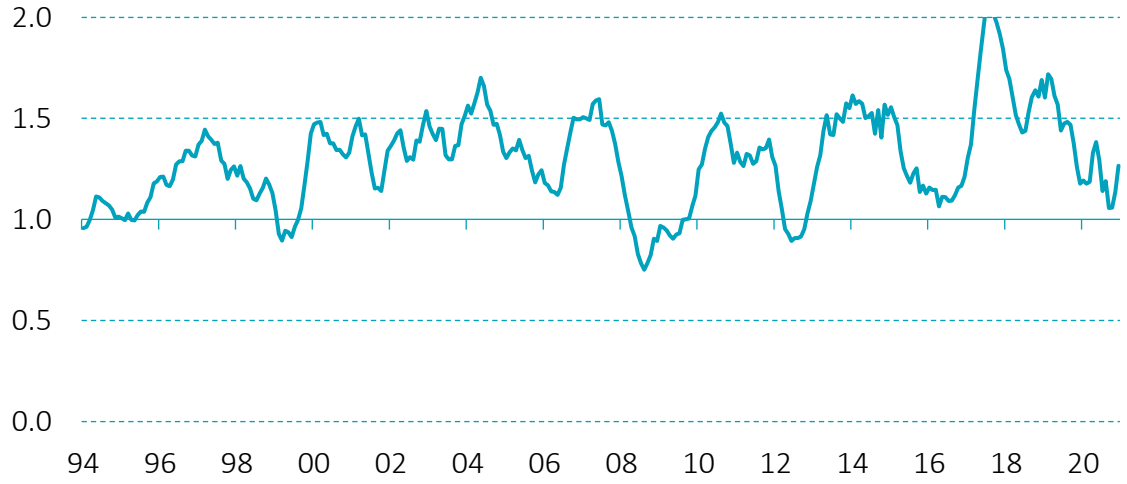



* Source: Houweling, Beekhuizen, Kyosev & van Zundert, 2015, "Smart Credit Investing: the Value Premium", Robeco white paper.
** Source: Houweling & Van Zundert, 2017, "Factor Investing in the Corporate Bond Market", *Financial Analysts Journal*. Extended sample period until December 2020 + enhanced definitions.
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

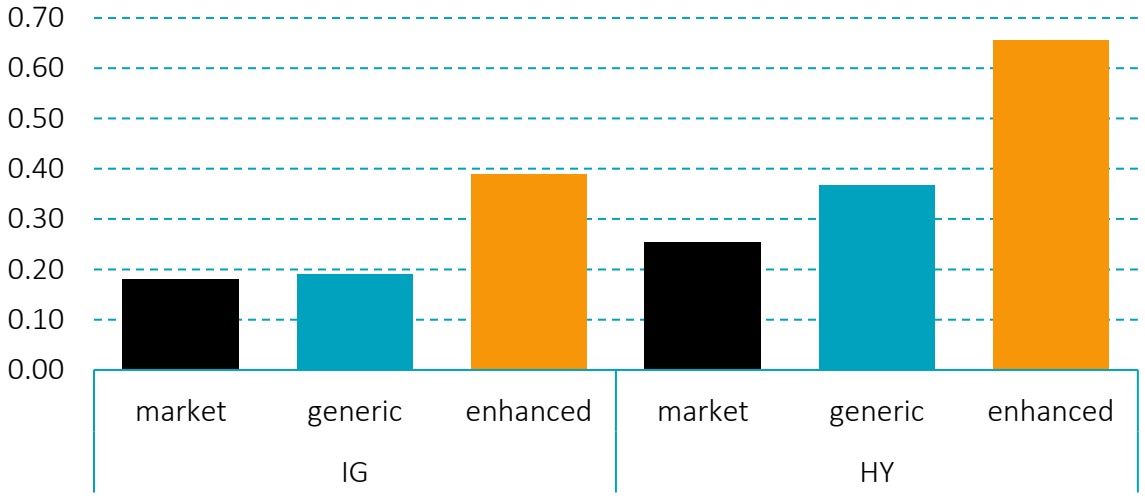
# Momentum factor: Buy recent winners, avoid recent losers

- **Intuition:** news is slowly incorporated in security prices, causing persistence in performance
- **Generic Momentum:** use credit return to measure past performance; disadvantages: works poorly in Investment Grade and has time-varying risk profile
- **Enhanced Momentum:** use momentum spillover from the equity market to the credit market and correct for time-variation in risk by Residual Momentum technique

**Beta Generic Momentum***
(USD HY, 1994-2020)




**Sharpe ratios Momentum factor****
(USD 1994-2020)




* Source: Haesen, Houweling, van Zundert, 2017, "Momentum Spillover from Stocks to Corporate Bonds", *Journal of Banking and Finance.* Extended sample period until December 2020.
** Source: Houweling & Van Zundert, 2017, "Factor Investing in the Corporate Bond Market", *Financial Analysts Journal*. Extended sample period until December 2020 + enhanced definitions.
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

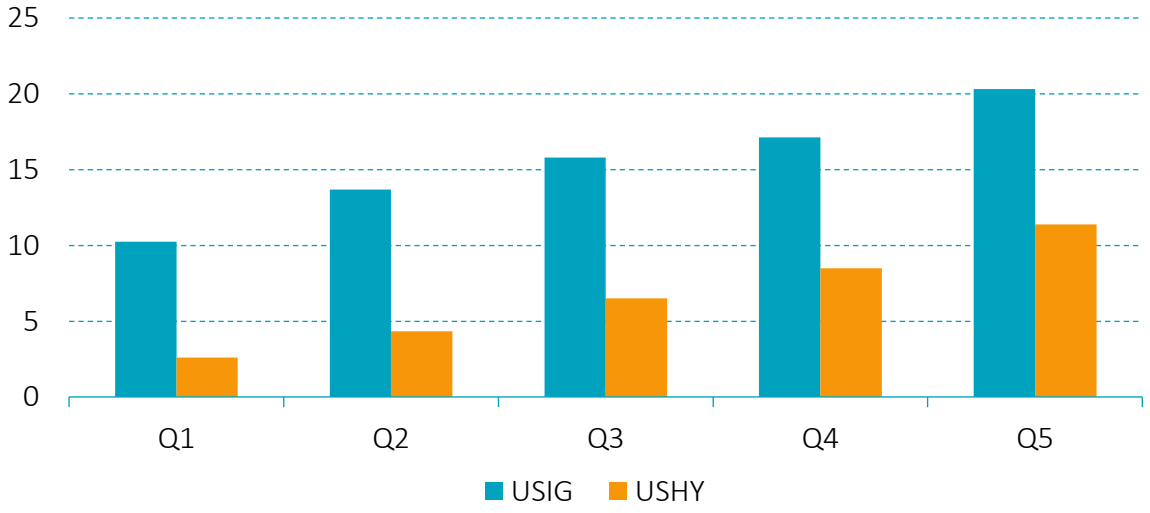
# Size factor: Buy bonds of small firms, avoid bonds of large firms

> **Intuition:** small firms are neglected by investors and small bonds carry an illiquidity premium

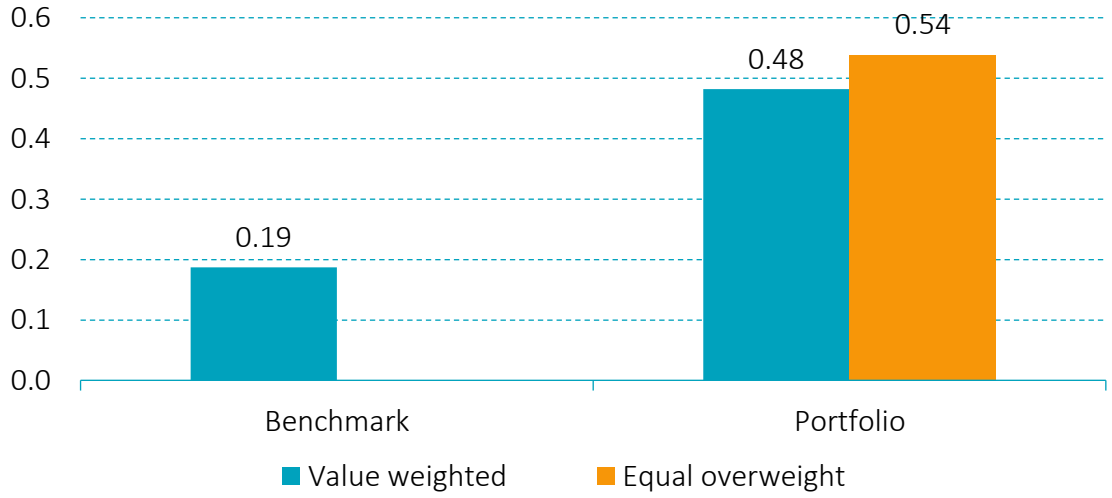
> **Generic Size:** construct portfolio of small issuers; disadvantage: small bonds can be relatively illiquid

> **Enhanced Size:** construct portfolio with equal overweights to capture the size premium in a very effective manner

**Average number of equity sell-side analysts***
(USD, 1994-2020)




**Market value weighting vs. equal overweights****
(Global Multi-Factor Credits, 1994-2020)




* Source: Houweling & van Zundert, 2013, "Smart Credit Investing: the Size Premium", Robeco white paper. Extended sample until December 2020.
** Source: Robeco
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# No place for the Carry factor in the credit factor zoo

ARTICLE
For professional investors
May 2017

ROBECO
The Investment Engineers

Does Carry add value to existing credit factors?

Vania Valerie
Researcher

Patrick Houweling
Researcher and Portfolio Manager

Jeroen van Zundert
Researcher

- Carry is one of the latest candidates to join the 'factor zoo'
- A critical look reveals that Carry offers higher return due to higher risk
- De-risked Carry is too similar to Value to add value to existing factors

**Since the birth of the Capital Asset Pricing Model (CAPM), academics and practitioners have continuously expanded this model with a range of factors, leading John Cochrane[1] to coin the term 'factor zoo'. In this article, we analyze the Carry factor as yet another potential addition to the corporate bond factor zoo.**

As in the equity market, the number of factors is also growing in the corporate bond market. To date, the most common factors in the credit marketare size, value, momentum, and low risk, as documentedin our article.[2] Since this study, wehave also analyzed the Quality factor andcame to the conclusion that, in the corporate bond market, the Quality factor is a natural extension of the Low-Risk factor: part of Quality's alpha is subsumed by Low-Risk, but Quality still adds value to the factor mix.[3]

'Carry earns its higher return by taking more risk'

[1] See "Presidential Address: Discount Rates" (Cochrane, 2011). Among others, Harvey, Liu, and Zhu (2016) pose a challenge to factor investors by concluding that only a handful of over 300 factors are statistically significant. They suggest that the crowding out of the existing factors is to be taken into account prior to extending the factor list.
[2] See "Factor Investing in the Corporate Bond Market" (Houweling & Van Zundert, 2017) or our white paper "Smart credit investing: harvesting factor premiums" (2016).
[3] See our white paper "The Quality of Low-Risk Credits" (2016).

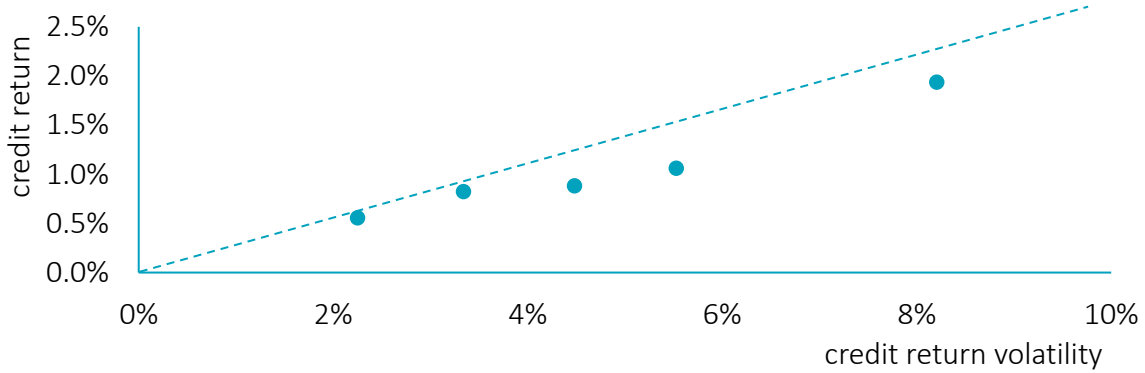
## Defining Carry

- Expected return on a corporate bond when spread curve stays constant
- Carry = pick-up + roll-down
- Estimating issuer-specific curves is non-trivial as many issuers have only a few bonds

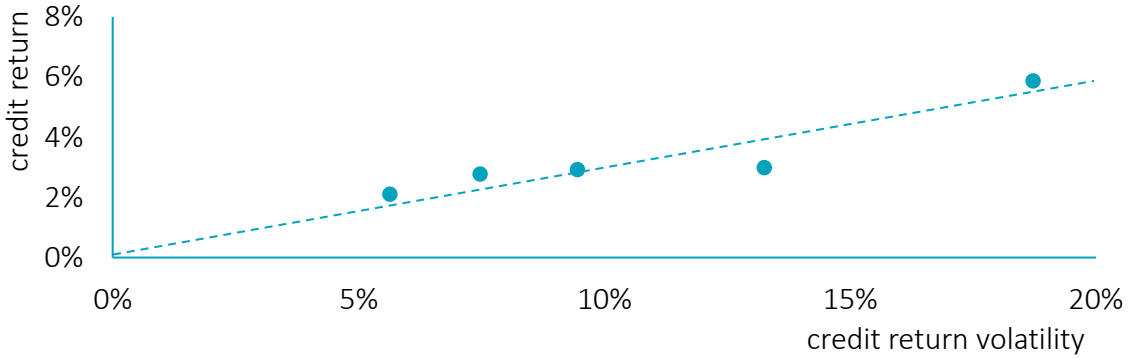
## No alpha from Carry

- High-Carry bonds generate higher returns than low-Carry bonds…
- … but also are more risky in terms of volatility, spread-duration, rating, beta, distance-to-default, etc.
- The risk-adjusted outperformance of Carry is not statistically significant

### Risk-return of Carry quintile portfolios
(USD IG Jan94-Dec20)




### Risk-return of Carry quintile portfolios
(USD HY Jan94-Dec20)

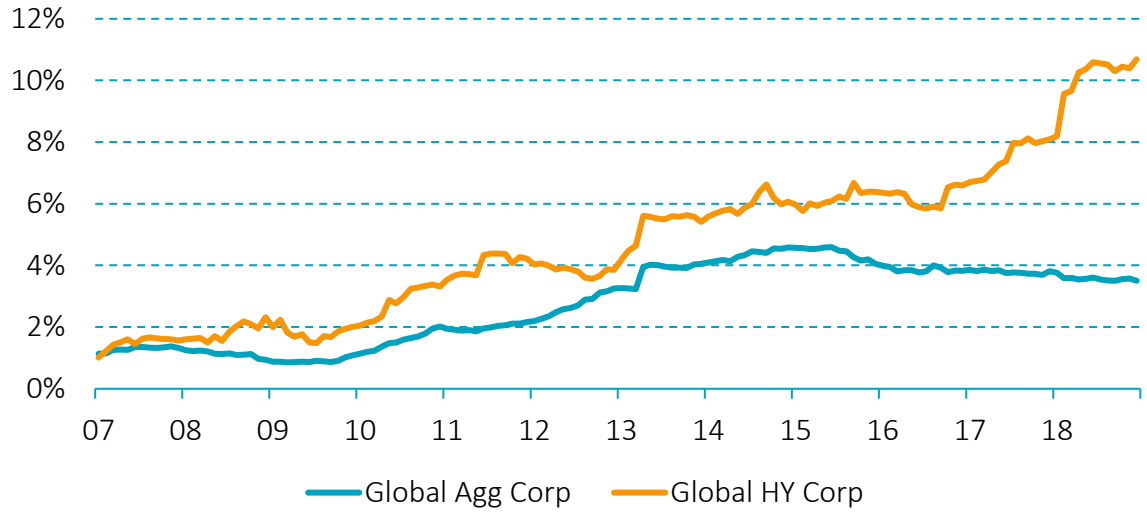



Source: "Does carry add value to existing credit factors?", Robeco white paper. Extended sample period until December 2020.
Above charts are for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

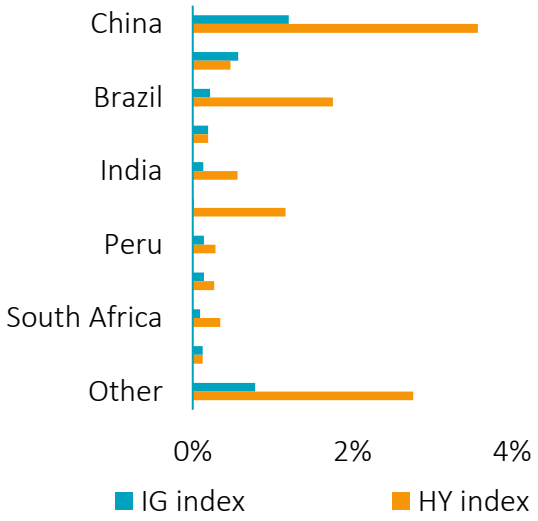
# The growing importance of emerging markets in credits

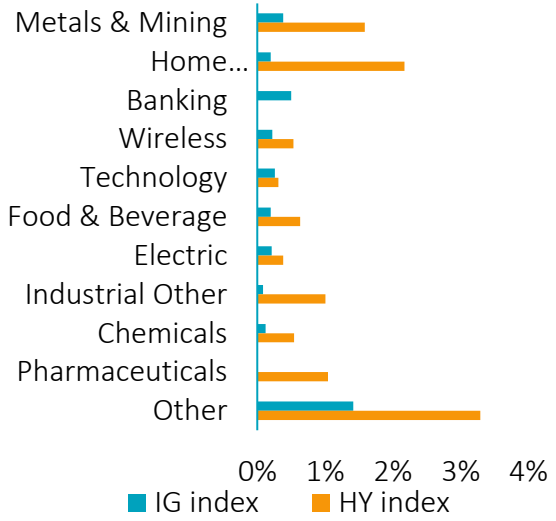
- Emerging market credits have become increasingly important over recent decades, also for global credit investors
- Today, EM corporates have issued a total of USD 700 billion; another USD 630 billion is issued by agencies
- Most issuers are from China, Mexico and Brazil, and are active in Metals & Mining and Home Construction

## Weight of EM issuers in investment grade and high yield index




## Country and sector distribution of EM issuers



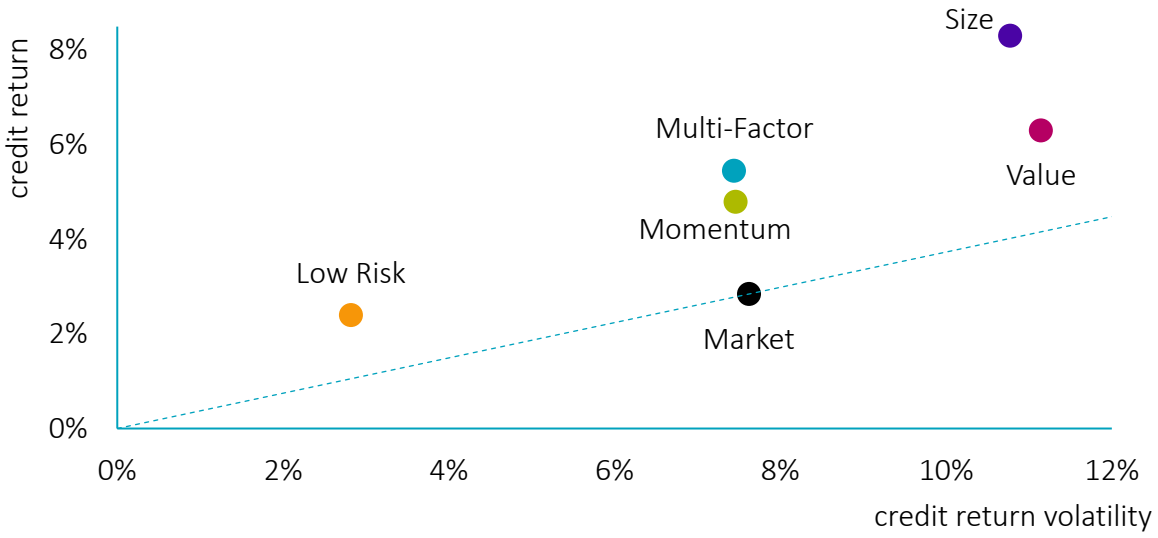




Source: Bloomberg.
Country and sector distributions as of 31 December 2020.

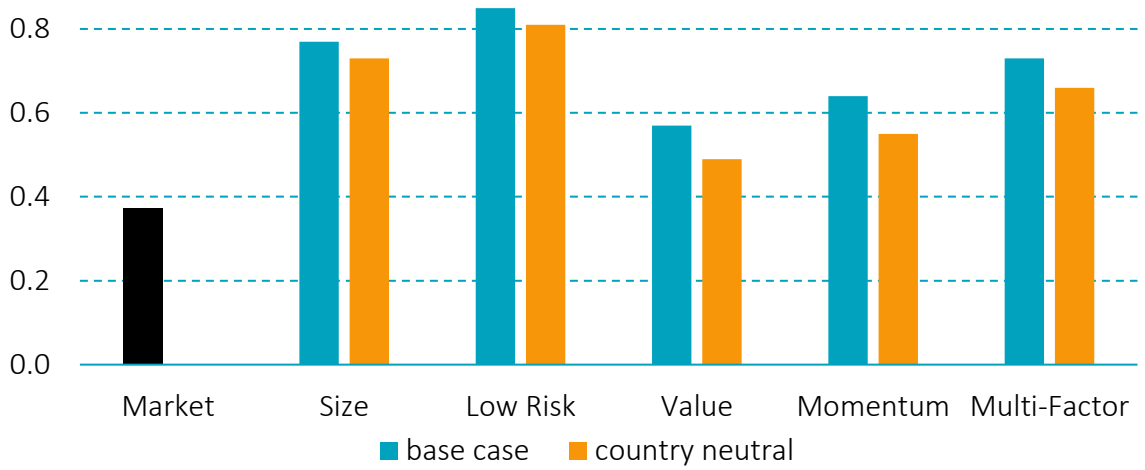
# Research on credit factors in emerging markets

- Low-risk, Value, Momentum and Size factors show superior risk-adjusted returns
- Multi-Factor shows highest information ratio
- Neutralizing country risk confirms that superior risk-adjusted returns are indeed mostly driven by issuer selection

## Risk-return characteristics of generic factors in Emerging Markets




## Neutralizing country risk: impact on Sharpe ratios of generic factors




Sources: Robeco, Bloomberg. Generic factor definitions as in Houweling & van Zundert, 2014, "Factor Investing in the Corporate Bond Market", published in *Financial Analysts Journal* in 2017.
Sample period until December 2018. Credit returns measured over duration-matched government bonds.
Dekker, Houweling & Muskens, 2021, "Factor Investing in Emerging Market Credits", published in *The Journal of Index Investing* in 2021.
Above chart is for illustrative purposes and does not represent the performance of any specific Robeco investment strategy.

# From theory to practice: implementation

## Expanding the universe with emerging market credits

### Enhanced factor definitions

> Using proprietary credit risk and quality measures and adding information from other markets

### Human oversight

> Leverage on the experience of our fundamental credit analysts

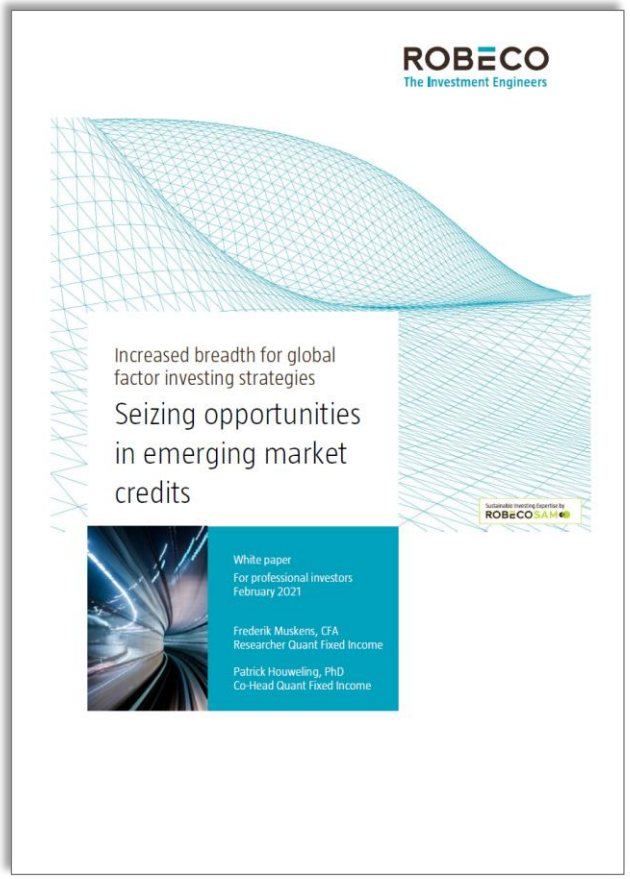
> Look beyond our models to get a full picture of issuer risks

### Liquidity management

> Using real-time liquidity information to ensure cost-efficient implementation

### Risk management

> Applying a maximum 5% overweight in bonds from EM issuers


ROBECO
The Investment Engineers

Increased breadth for global factor investing strategies

Seizing opportunities in emerging market credits

White paper
For professional investors
February 2021

Frederik Muskens, CFA
Researcher Quant Fixed Income

Patrick Houweling, PhD
Co-Head Quant Fixed Income

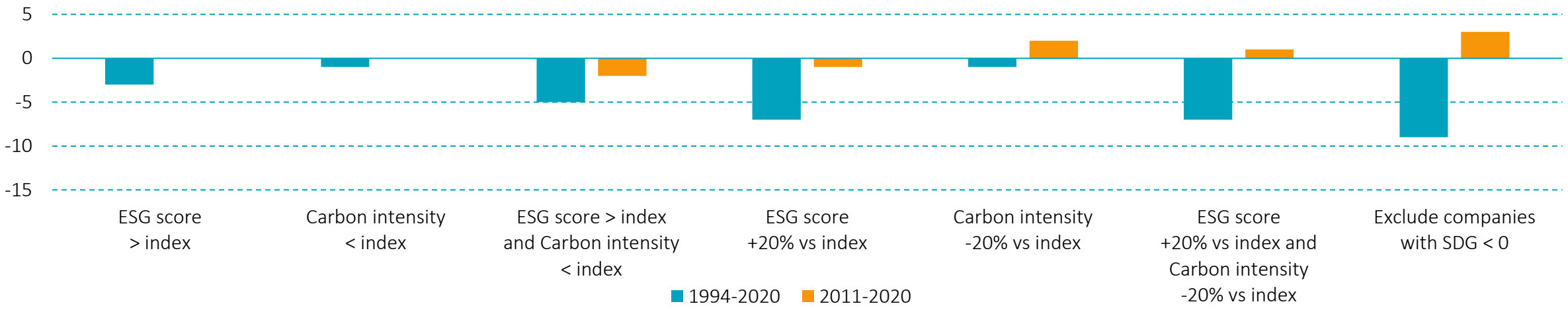
# Client-specific sustainability integration

## For segregated accounts

### Available sustainability targets:

- Client-specific exclusion lists
- Degree of ESG improvement versus index
- Degree of carbon intensity reduction versus index
- Exclusion of companies that contribute negatively to the SDGs

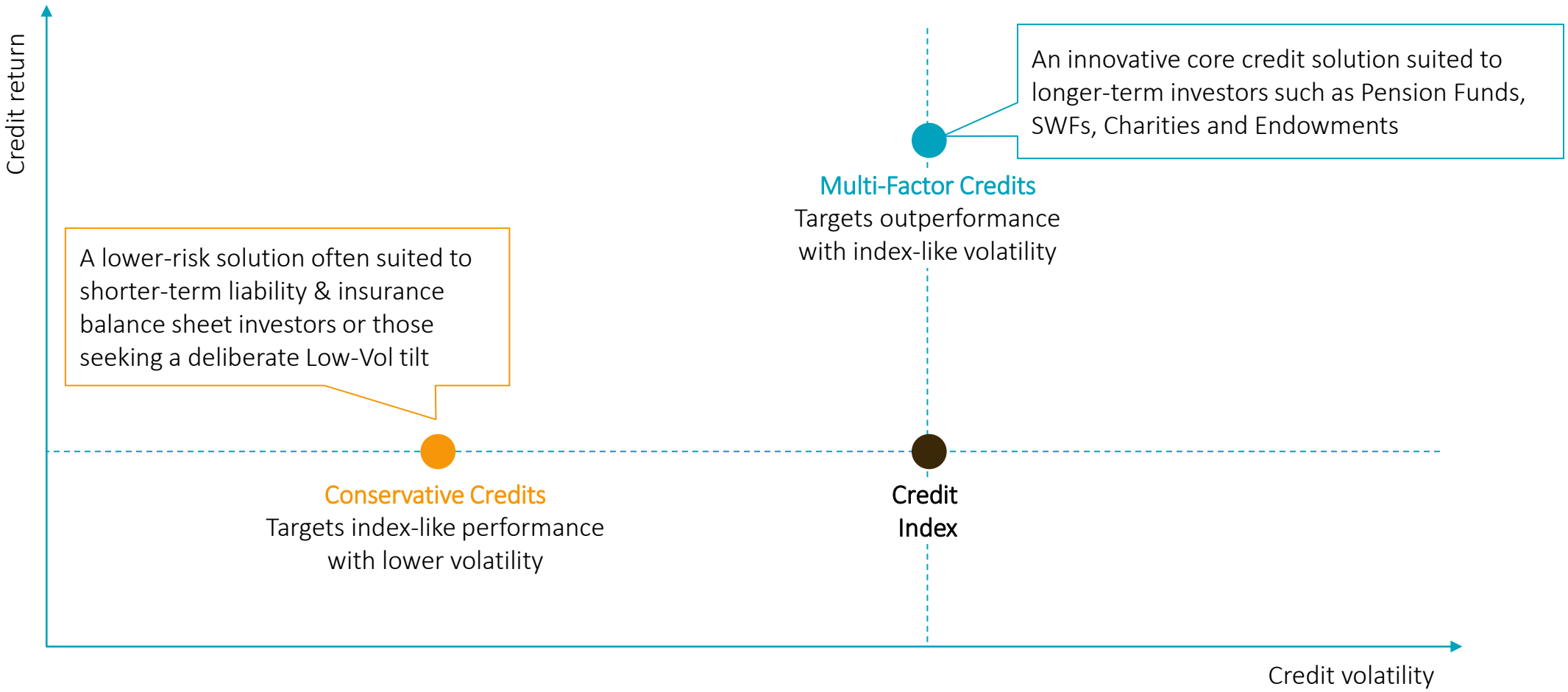
### Impact on simulated outperformance (bps)




Source: Robeco. This chart shows the impact in basis points per year on the simulated annual outperformance of Robeco QI Global Multi-Factor Credits for each sustainability restriction. Please note that the above numbers are averages as measured over several research periods (1994-2020; 2011-2020). Over shorter periods the performance impact may be larger.

The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Strategy propositions

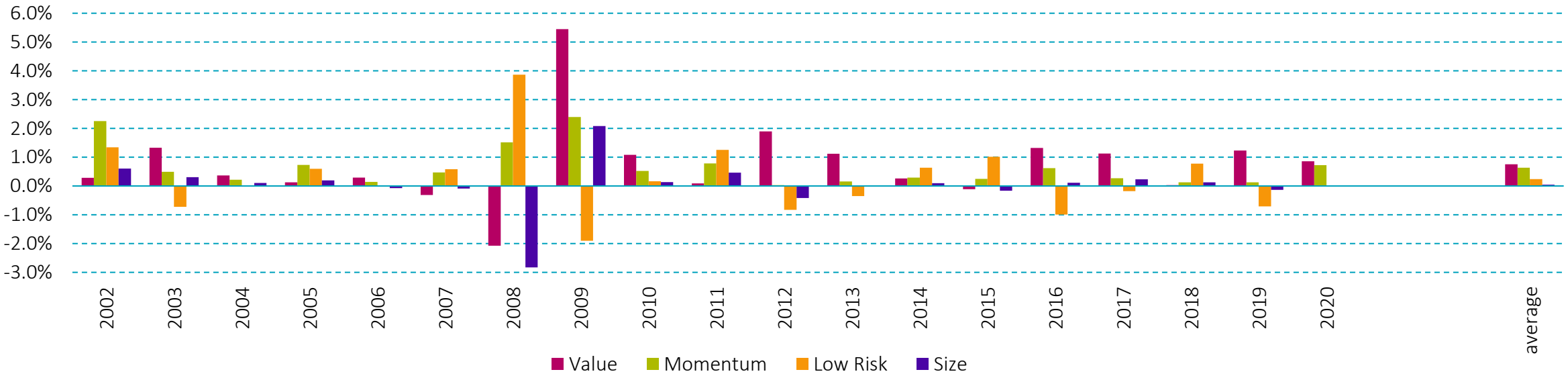



Source: Robeco, for illustrative purposes, credit returns and credit volatility represent excess returns over government bonds and its corresponding volatility

# Backtest: Univariate performance attribution to factor exposures

- We conduct univariate attributions of alpha = beta-adjusted outperformance of credit returns
- Value is the strongest source of performance, followed by Momentum and Size
- Low Risk does not contribute much to performance, but reduces risk
- Weak years for one factor are off-set by strong performance of other factors, e.g. 2008 and 2009

**Performance attribution Global Multi-Factor Credits vs. Bloomberg Global Aggregate Corporate***
(Global 2002-2020)



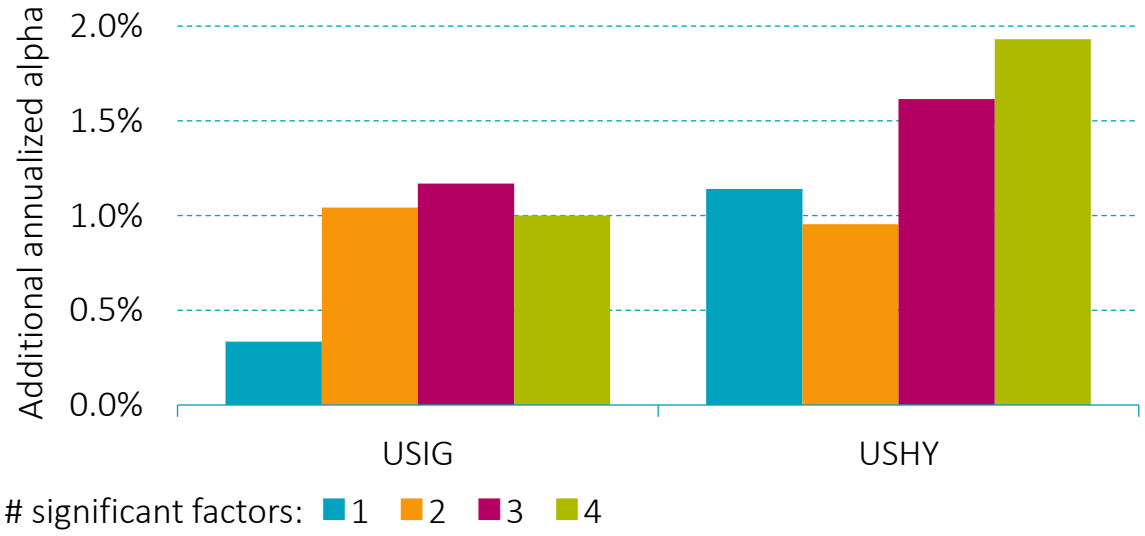

* Source: Robeco. January 2002 – December 2020. IG Index = Bloomberg Investment Grade index; Multi-Factor Credits = Investment Grade + BB universe
Returns are calculated on monthly data and subsequently annualized. Strategy returns are net of transaction costs, but gross of fees. Back-tested performance is for illustrative purposes only.
All returns are in terms of excess returns vs. duration-matched government bonds. The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Robeco Multi-Factor Credits is a style diversifier in its peer group

- Robeco Multi-Factor Credits offers persistent exposures to all factors
- Vast majority of existing credit funds show little exposure to factors*
- Funds that have more significant factor exposures generally have higher alphas

## Additional alpha vs. #significant factor exposures

(US mutual funds, 1994-2013)




## Percentage of funds per group

| # significant factors | USIG | USHY |
|---|---|---|
| 0 | 22% | 25% |
| 1 | 23% | 30% |
| 2 | 21% | 29% |
| 3 | 23% | 12% |
| 4 | 11% | 3% |

* Sources: Robeco, Morningstar, CRSP, Bloomberg. Study based on the performance of Investment Grade and High Yield mutual funds in the US

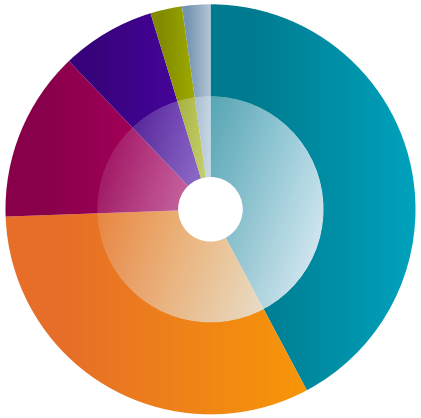
# Overview capabilities related to Quant Fixed Income

## Quantitative Investing* - EUR 69.1 billion

| | |
|---|---|
| Core Quant Equities (2002) | 33.5 billion |
| Factor Investing Equities (2012) | 17.8 billion |
| Conservative Equities (2006) | 12.5 billion |
| Quant Fixed Income (1998) | 6.7 billion |

*Excludes 1.3 billion from reinvesting

## Quant Fixed Income - EUR 6.7 billion



| | |
|---|---|
| Multi-Factor Credits (2015) | 2.8 billion |
| Dynamic Duration (1998) | 2.1 billion |
| Multi-Factor High Yield (2005) | 894 million |
| Conservative Credits (2012) | 493 million |
| Multi-Factor Bonds (2019) | 166 million |
| Dynamic High Yield (2014) | 148 million |

## Fixed Income - EUR 56 billion

| | |
|---|---|
| Credits - Investment Grade | 28.6 billion |
| Government | 15.8 billion |
| Credits - High Yield | 9.1 billion |
| Aggregate | 2.4 billion |

Source: Robeco. Quant and Quant Fixed Income data end of December 2022. Fixed Income data end of September 2022.
Quant and Quant Fixed Income figures based on preliminary data.

# Overview of quant fixed income strategies

## Successfully applying factor-based strategies to deliver superior risk-adjusted returns

| | Government bonds | Credits | Aggregate |
|---|---|---|---|
| **Allocation strategies** | > Global Dynamic Duration<br>> Long/Short Dynamic Duration | > Dynamic High Yield | |
| **Selection strategies** | > Multi-Factor Government Bonds* | > Multi-Factor Credits<br>> SDG & Climate Multi-Factor Credits<br>> Multi-Factor High Yield<br>> Conservative Credits*<br>> Sustainable Enhanced Index HY* | > Multi-Factor Bonds |

> Allocation strategies apply dynamic market timing based on factors

> Selection strategies use factors to select bonds with the most attractive risk-adjusted returns perspectives

Source: Robeco. *Segregated accounts only.

# Robeco Global Multi-Factor High Yield

## Harvesting factor premiums in the high yield market

# Global Multi-Factor High Yield: investment process

| | | |
|---|---|---|
| 1. | **Global universe of corporate bonds*** | |
| | > Main currencies: USD, EUR and GBP | |
| | > Sectors: Industrials and Utilities (no Financials) | 2,500 bonds<br>1,200 issuers |
| | > Exclude issuers based on Robeco and client-supplied exclusion lists | |
| 2. | **Enhancing the universe** | |
| | > Add bonds that (almost) meet the index criteria but are not in the index | 3,100 bonds<br>1,200 issuers |
| | > Exclude ratings CC and lower | |
| 3. | **Ranking using quantitative multi-factor model** | |
| | > Low-Risk/Quality, Value & Momentum | |
| 4. | **Fundamental checks** | |
| | > Data quality, bond characteristics and additional risks | |
| 5. | **Portfolio construction algorithm** | |
| | > Takes Size factor, risk & sustainability constraints, liquidity, transaction costs into account | |
| 6. | **Diversified portfolio with hedges for FX, duration and credit beta**** | ≥150 issuers |

* Based on Bloomberg Global High Yield Corporate ex Financials index, as of December 31st, 2018; rounded numbers
** Number of issuers is a target and depends on portfolio size

# Global Multi-Factor High Yield: Backtest

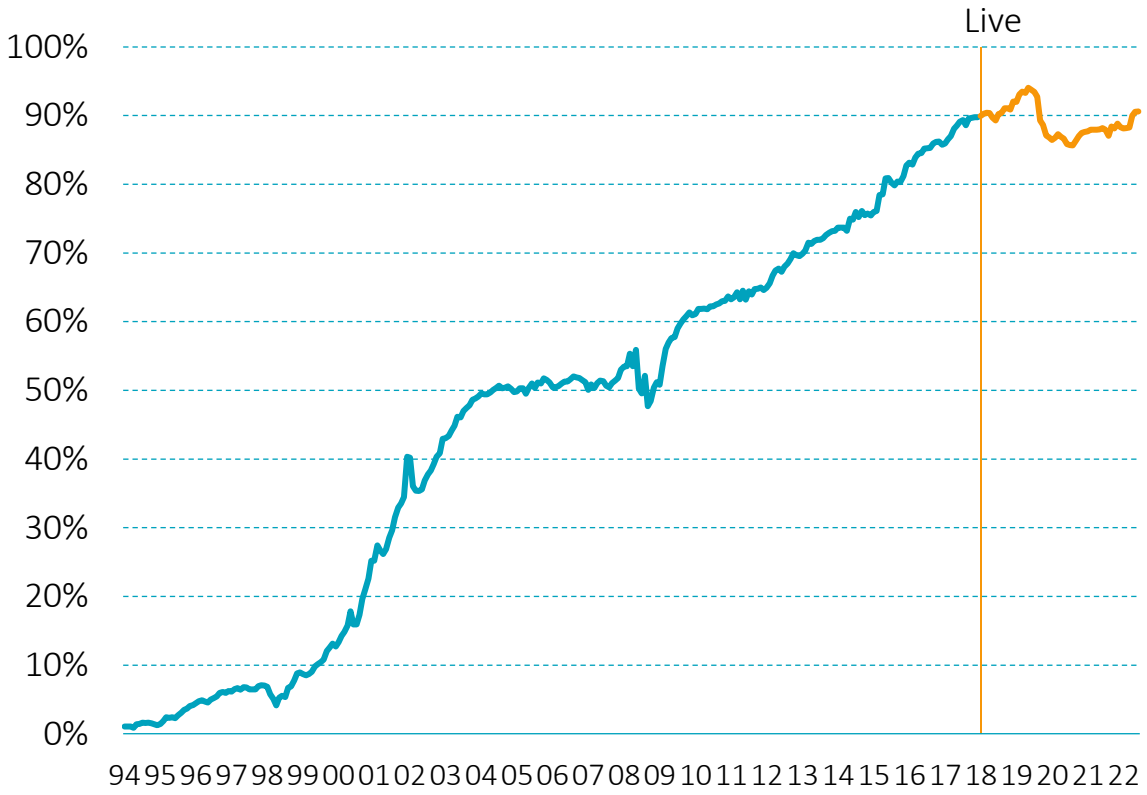
## Higher Sharpe ratio than the High Yield market

> Higher return with market-like volatility

> Higher Sharpe ratio and attractive information ratio

| | strategy | index |
|---|---|---|
| Average total return | 9.77% | 7.13% |
| Total return volatility | 8.20% | 8.24% |
| Sharpe ratio | 0.83 | 0.51 |
| Average credit return | 5.05% | 2.37% |
| Credit return volatility | 9.50% | 9.44% |
| Sharpe ratio | 0.53 | 0.25 |
| Outperformance | 2.66% | |
| Tracking error | 2.33% | |
| Information ratio | 1.14 | |
| Average DTS beta | 1.12 | |
| Turnover (single-count) | 86% | 45% |

## Cumulative performance vs. index



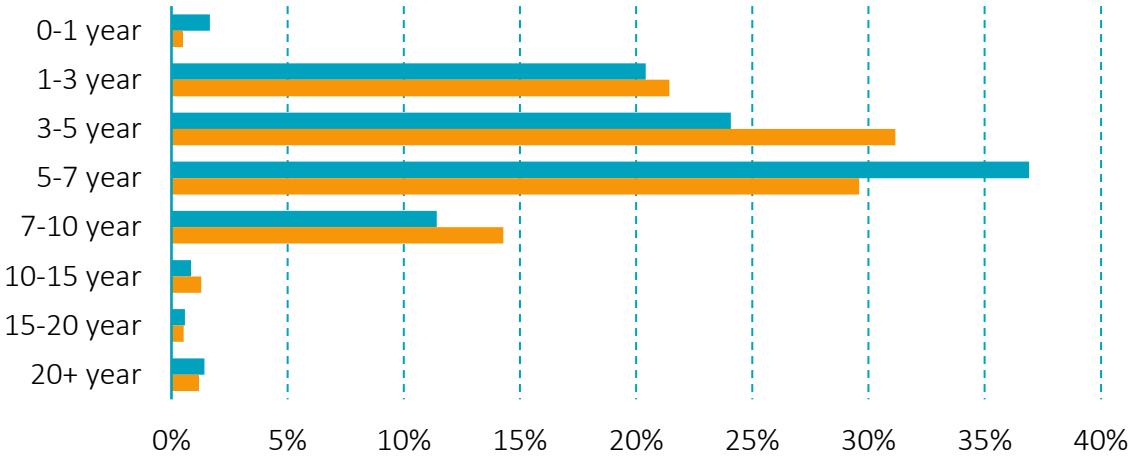

Source: Robeco. Table shows backtest for Jan94-Jun18. Chart shows performance difference between strategy and index; simulated for Jan94-Jun18 (blue): live track-record from Jul18 onwards (orange). Index = Bloomberg US High Yield ex Financials for Jan94-Dec00, Bloomberg Global High Yield Corporates ex Financials for Jan01-Dec17. Strategy: USD for Jan94-Dec00, Global for Jan01-Dec17. Multi-Factor High Yield strategy: USD for Jan94-Dec00, Global from Jan01 onwards. Investment universe: BB+B+CCC. Strategy returns are net of transaction costs, but gross of fees. In reality costs (such as management fees, transaction- and other costs) are charged. These have a negative effect on the returns shown. Total returns are hedged to USD. Credit returns are in terms of excess returns of corporate bonds vs. duration-matched government bonds. Turnover is annualized and single-counted.

The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

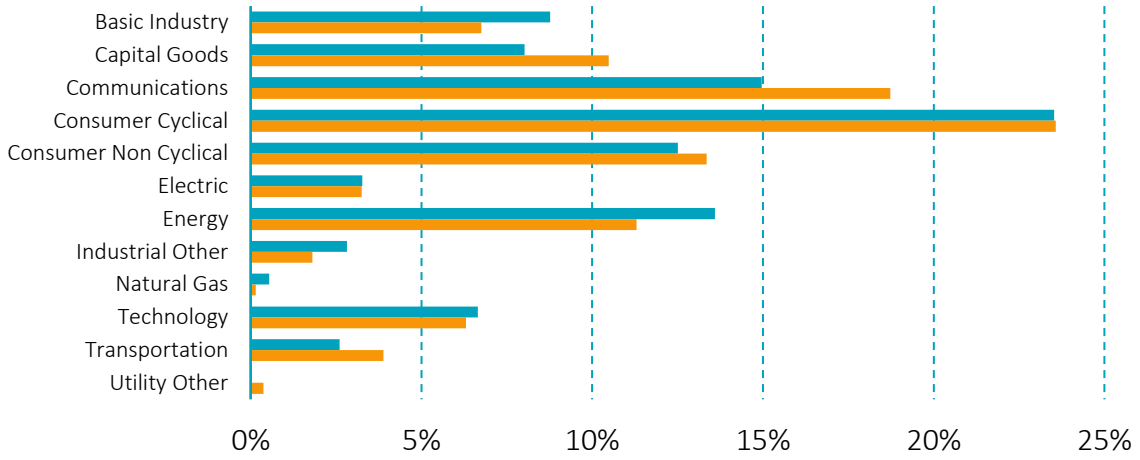
# Portfolio positioning: Global Multi-Factor High Yield

## Overweight EUR and GBP bonds, overweight BB's, no CC's

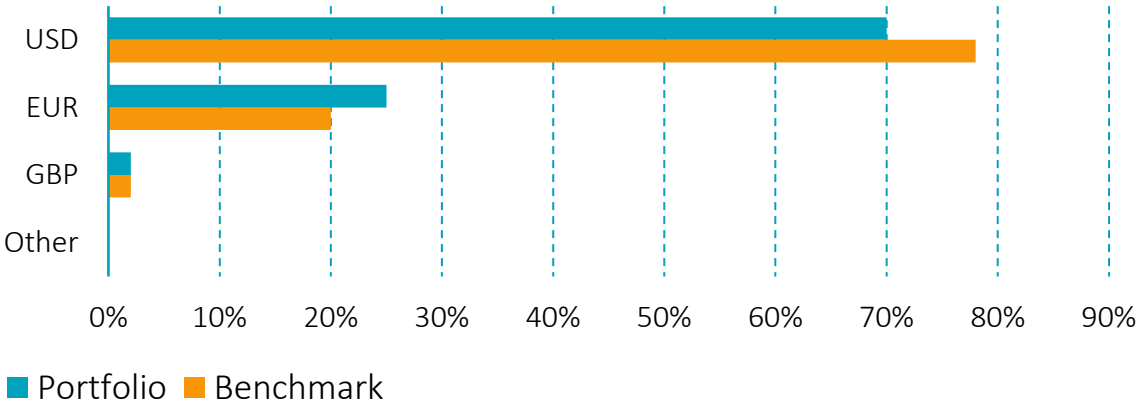
### Maturities



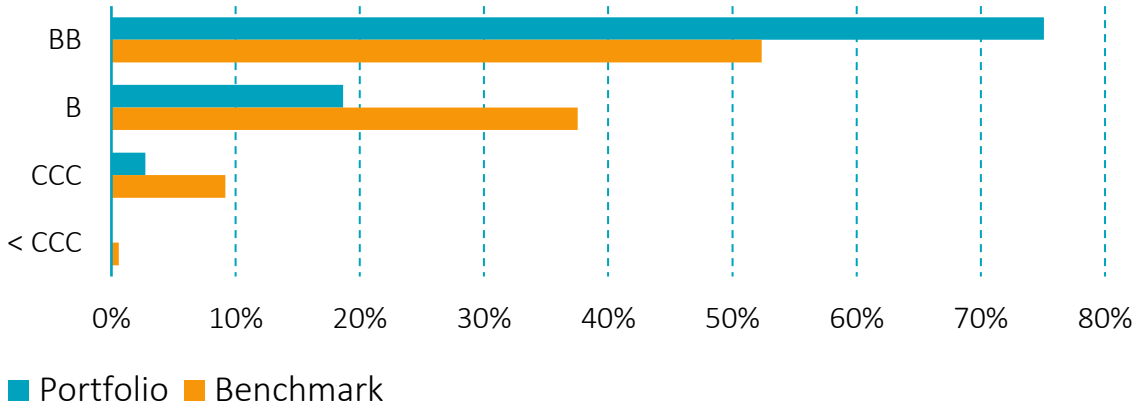

### Sector Class 3




### Currency denominations




### Ratings




Source: Robeco. Portfolio: Robeco QI Global Multi-Factor High Yield. Benchmark: Bloomberg Global High Yield Corporates ex Financials. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way

# Positioning: Characteristics

## Portfolio interest rate duration in line with index and beta close to 1

| Characteristics | Portfolio | Benchmark |
|---|---|---|
| Interest rate duration (OAD in years) | 3.7 | 3.8 |
| Spread duration (OASD in years) | 5.0 | 4.0 |
| Yield to Worst (Hedged to EUR) | 7.4% | 6.7% |
| Yield to Worst (Hedged to USD) | 10.0% | 9.3% |
| Yield to Worst (Hedged to GBP) | 9.2% | 8.4% |
| Credit spread (OAS in bps) | 484 | 483 |
| Coupon | 4.9% | 5.4% |
| DTS beta | 1.12 | 1.00 |
| Numbers of issuers | 174 | 1,184 |
| Average rating | BA2/BA3 | BA3/B1 |

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor High Yield. Benchmark: Bloomberg Global High Yield Corporates ex Financials. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Performance

## Robeco QI Global Multi-Factor High Yield

| Annualized performance (Hedged into EUR) | YTD | 1 Year | 3 Years | 4 Years | Since Jul-18 |
|---|---|---|---|---|---|
| Robeco QI Global Multi-Factor High Yield | -11.50% | -11.50% | -2.22% | 1.39% | 0.45% |
| Benchmark | -12.60% | -12.60% | -1.61% | 1.31% | 0.43% |
| Relative Performance | 1.10% | 1.10% | -0.62% | 0.08% | 0.02% |

| Performance statistics since inception (Jul-18) | Return | Volatility | Return/Risk |
|---|---|---|---|
| Robeco QI Global Multi-Factor High Yield | 0.45% | 10.31% | 0.08 |
| Benchmark | 0.43% | 9.64% | 0.08 |
| Relative Performance | 0.02% | 1.38% | 0.01 |
| Alpha | 0.02% | | |
| Beta | 1.06 | | |

| Calendar year performance (Hedged into EUR) | 2022 | 2021 | 2020 | 2019 |
|---|---|---|---|---|
| Robeco QI Global Multi-Factor High Yield | -11.50% | 5.26% | 0.34% | 13.04% |
| Benchmark | -12.60% | 3.85% | 4.94% | 10.57% |
| Relative Performance | 1.10% | 1.41% | -4.60% | 2.47% |

The currency in which the past performance is displayed may differ from the currency of your country of residence. Due to exchange rate fluctuations the performance shown may increase or decrease if converted into your local currency. Periods shorter than one year are not annualized. The value of your investments may fluctuate. Past performance is no guarantee of future results. Returns gross of fees, based on gross asset value. In reality costs (such as management fees and other costs) are charged. These have a negative effect on the returns shown.

Source: Robeco, Bloomberg. Portfolio: Robeco QI Global Multi-Factor High Yield IH-EUR Share Class. Benchmark: Bloomberg Global High Yield Corporates ex Financials. All figures in EUR. Data end of December 2022.

# Multi-Factor High Yield live performance
## (Jan09 – Dec19)

- We managed a Multi-Factor High Yield strategy as a sub-portfolio with in our High Yield Bond Fund from 2005 until 2019
- The universe of this sub-portfolio consisted of public small- and mid-caps
- The size of the sub-portfolio was EUR 400 million by end December 2019

- We tracked the performance of this sub-portfolio from 2009 until 2019:

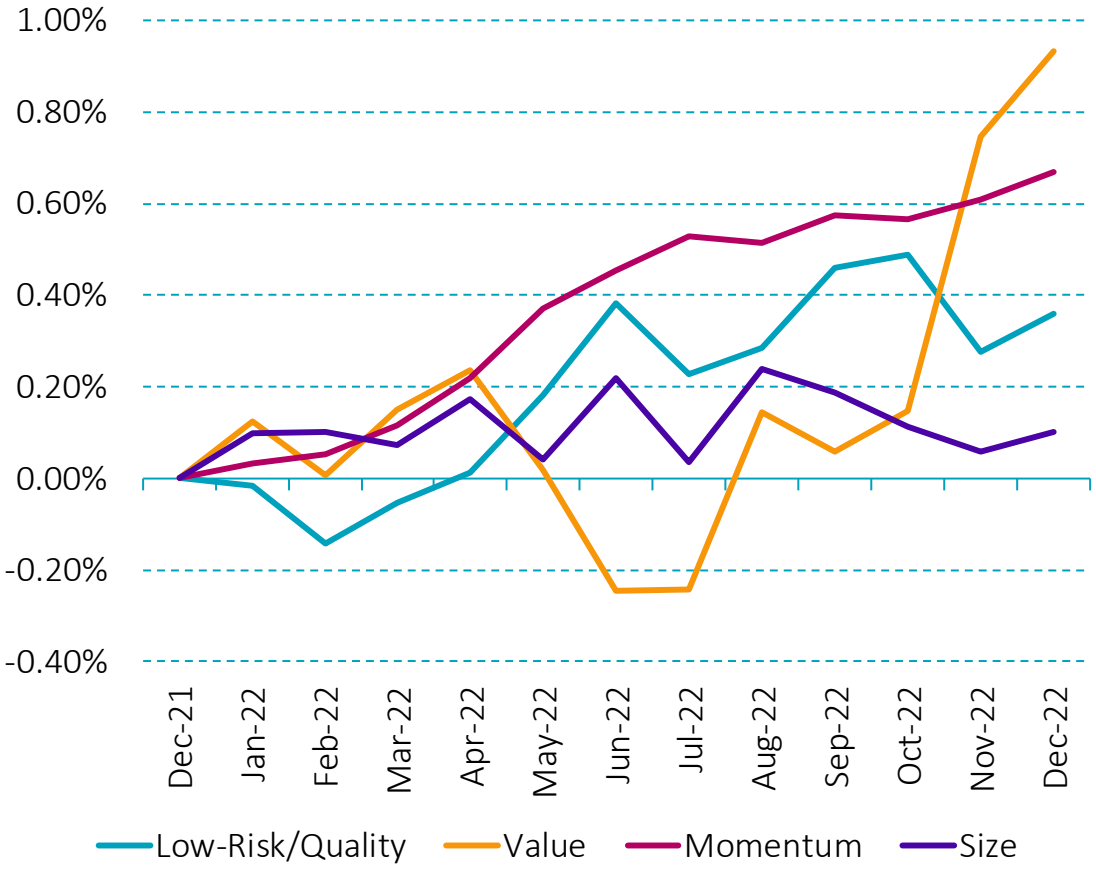
| | Global Multi-Factor High Yield sub-portfolio |
|---|---|
| Outperformance | 0.93% |
| Tracking error | 1.68% |
| Information ratio | 0.55 |

Source: Robeco Investment Research. The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

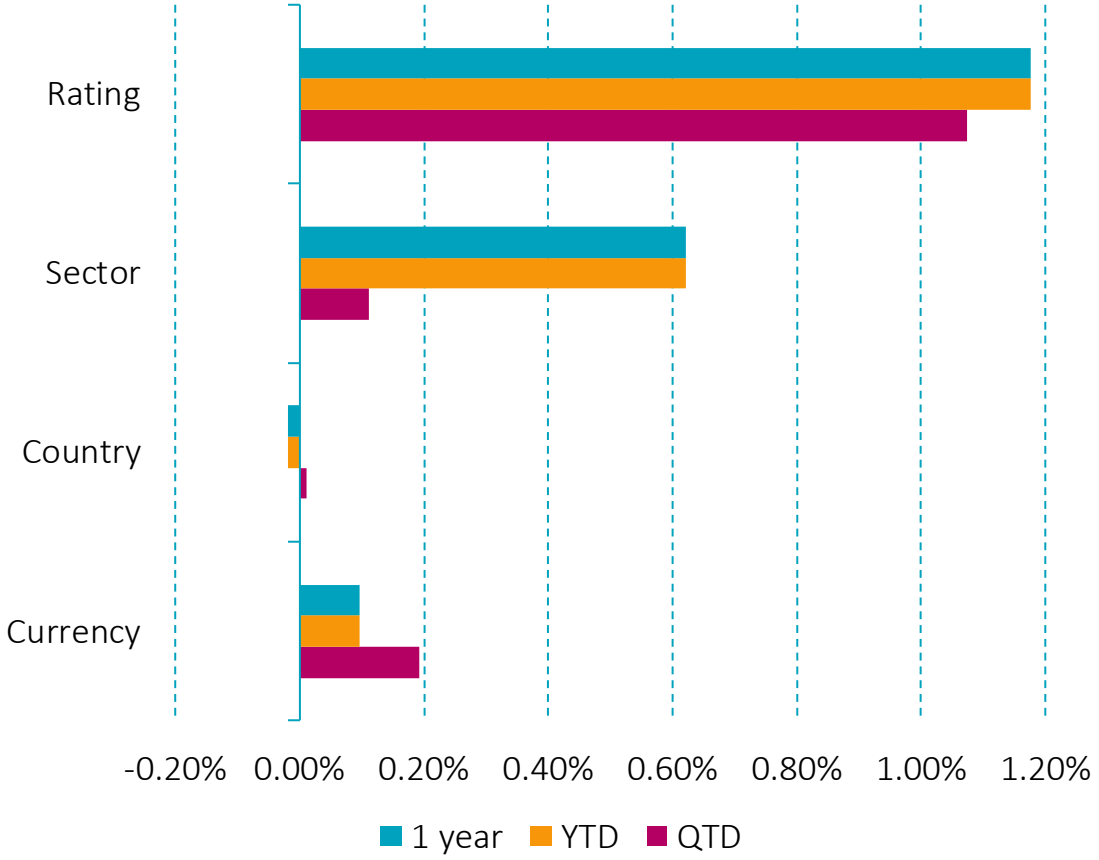
# Performance attributions

## Contributions to outperformance

### Attributions of allocating to factors (cumulative)




### Attributions of allocating to traditional segments



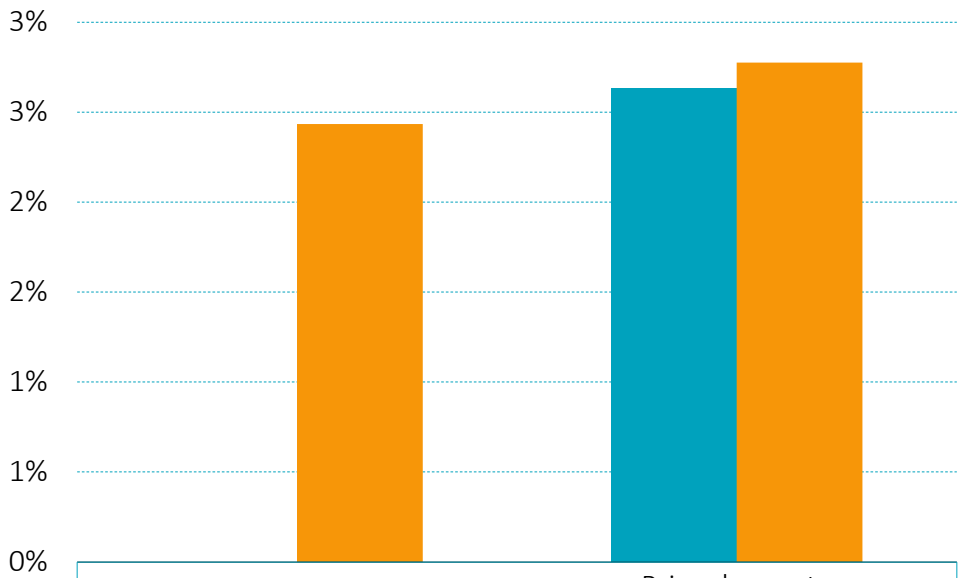

Robeco QI Global Multi-Factor High Yield, IH EUR share class. Gross of fees. Based on gross asset value. All figures in EUR. Data end of December 2022.
In reality costs (such as management fees, transaction- and other costs) are charged. These have a negative effect on the returns shown. Periods shorter than one year are not annualized.
Sources: Robeco, Bloomberg. The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Portfolio Losses: No defaults since inception

## Reasons for low default rate

1. Quality bias driven by Low-risk and Quality factors
   - > Preference for low risk, higher quality issuers
   - > Exclusion of distressed issuers (rated CC and below)
   - > Typical overweight BB and underweight CCC and below
2. Human oversight
   - > Model-selected issuers can be overruled by credit analysts in case of risk beyond the scope of the model
3. Typical preference for shorter-dated bonds
   - > Value factor typically sees better relative value shorter on the credit curve
   - > Shorted-dated bonds have lower sensitivity to spread changes

## Default and price drop rates Robeco QI Global Multi-Factor High Yield vs benchmark (July 2018 – December 2021)




| | Default rate | Price drop rate (30 points, 1 month) |
|---|---|---|
| Portfolio | 0.00% | 2.63% |
| Benchmark | 2.43% | 2.78% |

Source: Robeco, Robeco QI Global Multi-Factor High Yield. Calculation method is based on notional percentage and par value. The price drop rate is based on a 30 point price drop in 1 month.
Benchmark: Bloomberg Global High Yield Corporates ex. Financials.

# Excerpt from SFDR-related disclosures (not exhaustive)

## Robeco QI Global Multi-Factor High Yield

### SFDR Classification

**Article 8:** The fund promotes environmental and/or social characteristics.

### Sustainability Risk Profile

Corporate sustainability risk (overall) profile: medium
Government sustainability risk (overall) profile: not applicable

### Taxonomy alignment

The fund does not intend to make Taxonomy-aligned investments. It cannot be excluded that among the fund's holdings certain investments are Taxonomy aligned.

### Fund specific disclosures including PAIs considered

Please refer to prospectus and SFDR disclosures publicly available via Robeco's website

### Binding elements to attain the environmental and/or social characteristics promoted by the fund

The fund has the following binding elements:

1. The fund's portfolio complies with Robeco's Exclusion Policy (https://www.robeco.com/docm/docu-exclusion-policy.pdf), that is based on exclusion criteria with regards to products and business practices that Robeco believes are detrimental to society and incompatible with sustainable investment strategies. This means that the fund has 0% exposure to excluded securities, taking into account a grace period. Information with regards to the effects of the exclusions on the fund's universe can be found at https://www.robeco.com/docm/docu-exclusion-list.pdf
2. The fund's carbon, water and waste footprint is better than the general market index.
3. The fund scrutinizes investment in companies that are in breach of the ILO standards, UNGPs, UNGC or OECD Guidelines for Multinational Enterprises. If a company in the portfolio breaches one of the international guidelines during the investment period, the company will become part of the Enhanced Engagement program. When engagement is deemed highly unlikely to succeed, the company might be excluded directly.
4. The fund's weighted average ESG score is better than that of the general market index.

For more information, refer to the sustainability-related disclosure on Robeco's website.

### Sustainability policies and methodologies

**All SFDR-related policies and methodologies:** https://www.robeco.com/en/key-strengths/sustainable-investing/sustainability-reports-policies.html

**Good governance:** https://www.robeco.com/docm/docu-robeco-good-governance-policy.pdf

**Principal Adverse Impact Statement:** https://www.robeco.com/docm/docu-robeco-principal-adverse-impact-statement.pdf

### Asset allocation

At least 90% of the investments are aligned with the E/S characteristics of the fund. The fund plans to make a minimum of 50% sustainable investments, measured by positive scores via Robeco's SDG Framework. The investments in the category Other, estimated between 0-10%, are mostly in cash and cash equivalents. The planned asset allocation is monitored and evaluated on a yearly basis.

### Dedicated reference benchmark for E/S characteristics

There is no reference benchmark designated for the purpose of attaining the environmental or social characteristics promoted by the fund.

Source: Robeco.
Sustainability disclosures based on October 2022 prospectus. The disclosures in the prospectus are at all times leading. The prospectus is available on request and free of charge from www.robeco.com

# Robeco Conservative Credits

## Credit returns with lower risk

# Disciplined investment process to manage the Conservative Credits strategies

| | Global Conservative* | Euro Conservative* |
|---|---|---|
| 1) **Universe of corporate bonds** | | |
| > Included sectors: Financials, Industrials, Utilities, Agencies | 15,000 bonds | 3,600 bonds |
| > Excluded issuers: based on Robeco and client-supplied exclusion lists | 2,500 issuers | 825 issuers |
| 2) **Filtering on low-risk bonds** | | |
| > Maturity: at most 6 years | | |
| > Rating: at least BB- | 9,000 bonds | 2,100 bonds |
| > Seniority: senior and lower-tier II | 2,100 issuers | 700 issuers |
| 3) **Ranking using quant multi-factor model** | | |
| > Low-Risk/Quality, Value & Momentum | | |
| 4) **Fundamental checks** | | |
| > Data quality, bond characteristics, and additional risks | | |
| 5) **Portfolio construction algorithm** | | |
| > Takes Size factor, risk & sustainability constraints, liquidity, transaction costs into account | | |
| 6) **Diversified portfolio with FX-hedge**** | ≥150 issuers | ≥125 issuers |

* Based on Bloomberg Global Aggregate Corporate + Government-Related + High Yield indices, as of December 31st, 2018; rounded numbers
** Number of issuers is a target and depends on portfolio size

# Portfolio construction

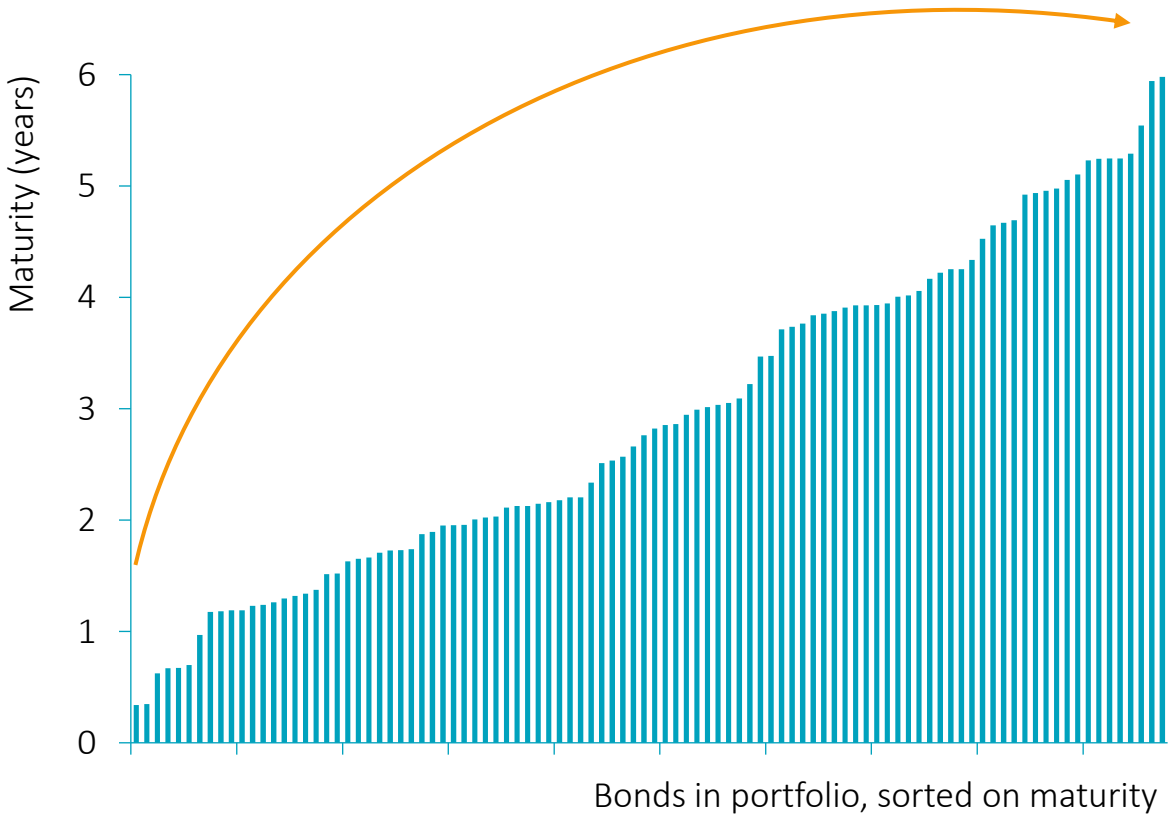
## Buying from the top of the ranking, respecting

- Bonds' liquidities and transaction costs
- Target weights: AAA/AA=100bps, A/BBB=67bps, BB=33bps
- Sector constraints:  maximum 25% per sector
- Uniform distribution across maturities within 0-6y segment

## Hold until maturity, unless

- Quantitative or analyst warning signal occurs
  - Low-Risk/Quality ranking drops to worst 20%, or
  - Rating drops below BB-, or
  - Analyst identifies strong downside risk
- Decide on sell taking remaining maturity and liquidity into account

## Sample maturity distribution




Source: Robeco

# Conservative Credits backtests show higher Sharpe ratio

## Higher return, lower risk, higher Sharpe ratio

> Net credit return improves by about 0.5%

> Risks are halved

> Sharpe ratio increases substantially

| | USD universe* | | EUR universe** | | Global universe*** | |
|---|---|---|---|---|---|---|
| | Conservative Credits | IG index | Conservative Credits | IG index | Conservative Credits | IG index |
| Average credit return | 1.57% | 0.83% | 1.32% | 0.93% | 1.47% | 0.72% |
| Credit return volatility | 2.59% | 4.61% | 2.25% | 3.54% | 2.35% | 3.77% |
| Sharpe ratio | 0.60 | 0.18 | 0.59 | 0.26 | 0.63 | 0.19 |
| Beta | 0.51 | 1 | 0.60 | 1 | 0.57 | 1 |
| Worst 5 drawdowns | -4.98% | -11.25% | -4.11% | -6.55% | -4.65% | -8.81% |

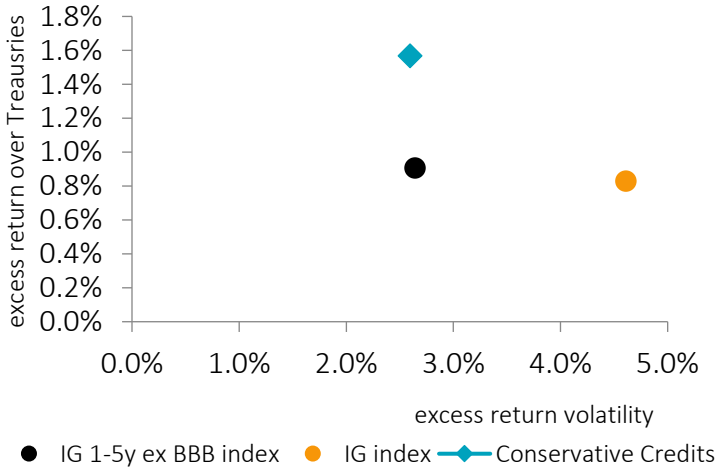
Source: Robeco
*January 1994 – Dec 2020
**January 2002 – Dec 2020
***January 2002 – Dec 2020
IG Index = Bloomberg Investment Grade index; Conservative Credits = Investment Grade + BB universe
Returns, volatilities and Sharpe ratios are calculated on monthly data and subsequently annualized.
The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.

# Backtest shows better risk-adjusted returns than generic credit products*

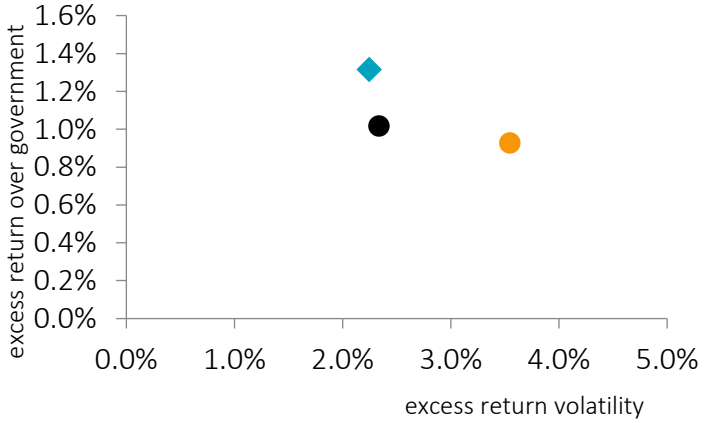
## Improved risk-return profile compared to generic credit products by

- Reducing risk at both the company and the bond level
- Using sophisticated Low-Risk & Quality measures
- Adding Value and Momentum factors

**Risk-return plot USD Conservative Credits***
(USD 1994-2020)




**Risk-return plot EUR Conservative Credits****
(EUR 2002-2020)




**Risk-return plot Global Conservative Credits*****
(Global, 2002-2020)

Note that tracking an investment grade index costs approx. 25 bps per annum****

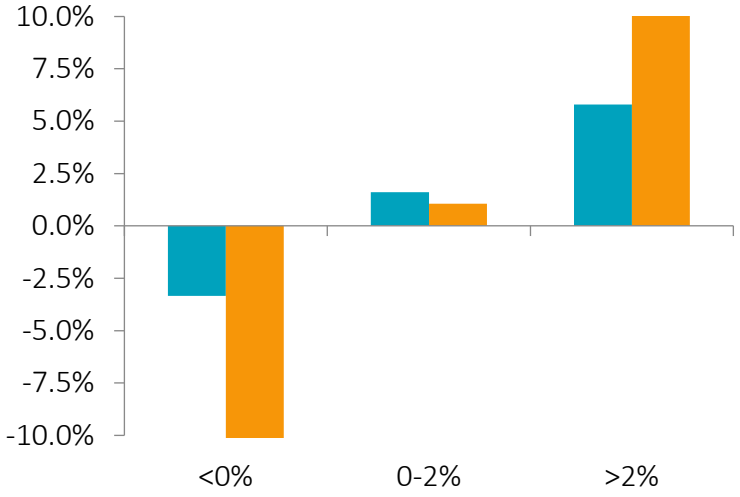
Source: Robeco.
*January 1994 – Dec 2020, USD Investment Grade + BB universe
**January 2002 – Dec 2020, Euro Investment Grade + BB universe
***January 2002 – Dec 2020, USD + Euro Investment Grade + BB universe
The value of your investments may fluctuate. Results obtained in the past are no guarantee for the future.
****Houweling, "On The Performance of Fixed Income ETFs", Journal of Index Investing (2012)

# Backtests show balanced return profile

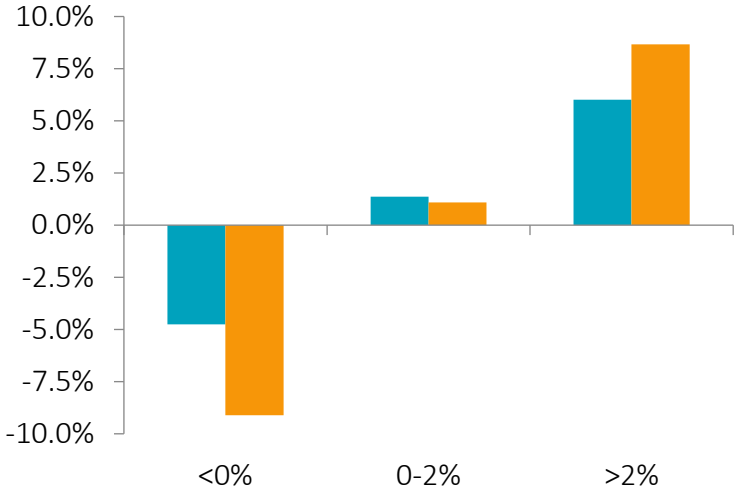
## Less downside and upside

- Bear markets: significant loss reduction
- Moderate bull markets: in-line performance
- Strong bull markets: lagging performance

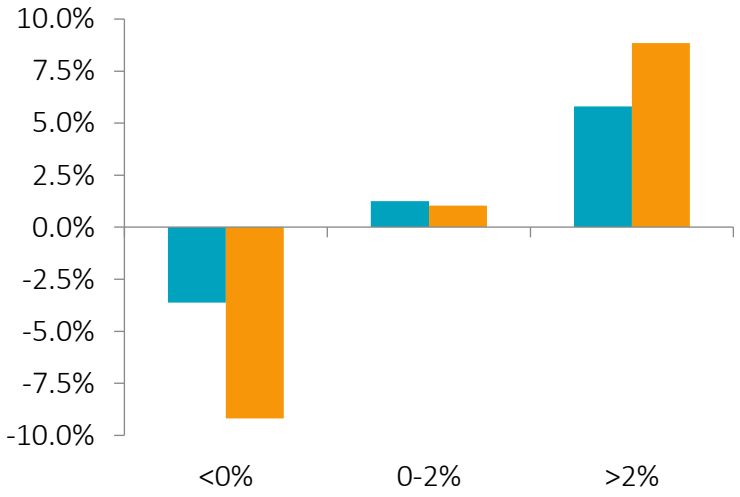
**Credit returns in 3 regimes***
(USD 1994-2020)




**Credit returns in 3 regimes****
(EUR 2002-2020)




**Credit returns in 3 regimes*****
(Global 2002-2020)




Conservative Credits IG index

Source: Robeco.
*January 1994 – Dec 2020, USD Investment Grade + BB universe
**January 2002 – Dec 2020, Euro Investment Grade + BB universe
*** January 2002 – Dec 2020, USD + Euro Investment Grade + BB universe
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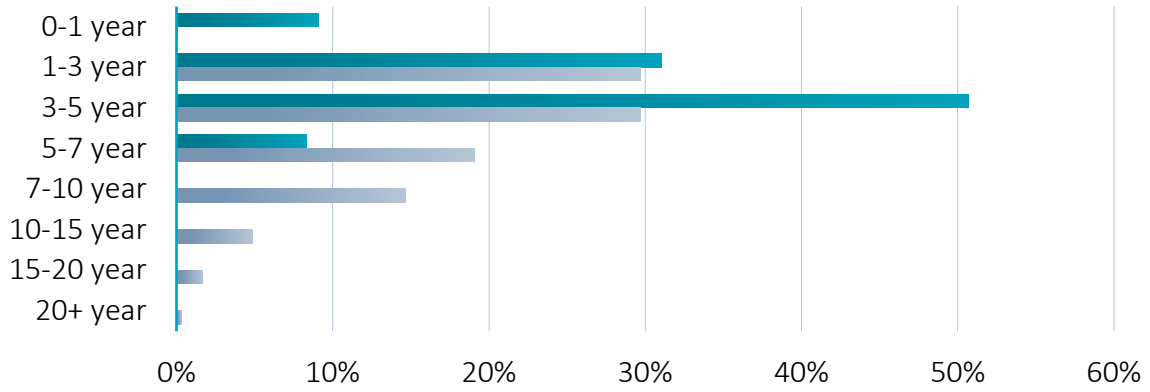
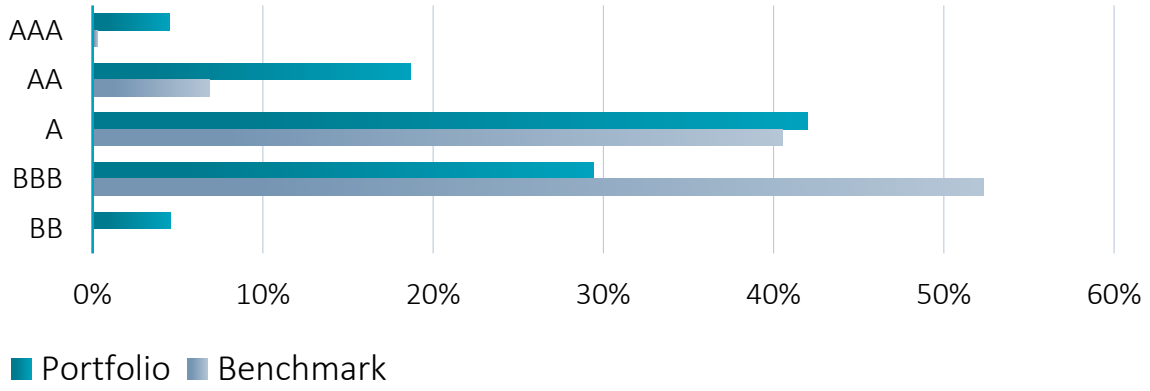
# Positioning: Maturity, Rating and Sector

## Portfolio is tilted towards shorter maturities and higher ratings and has less exposure to financials

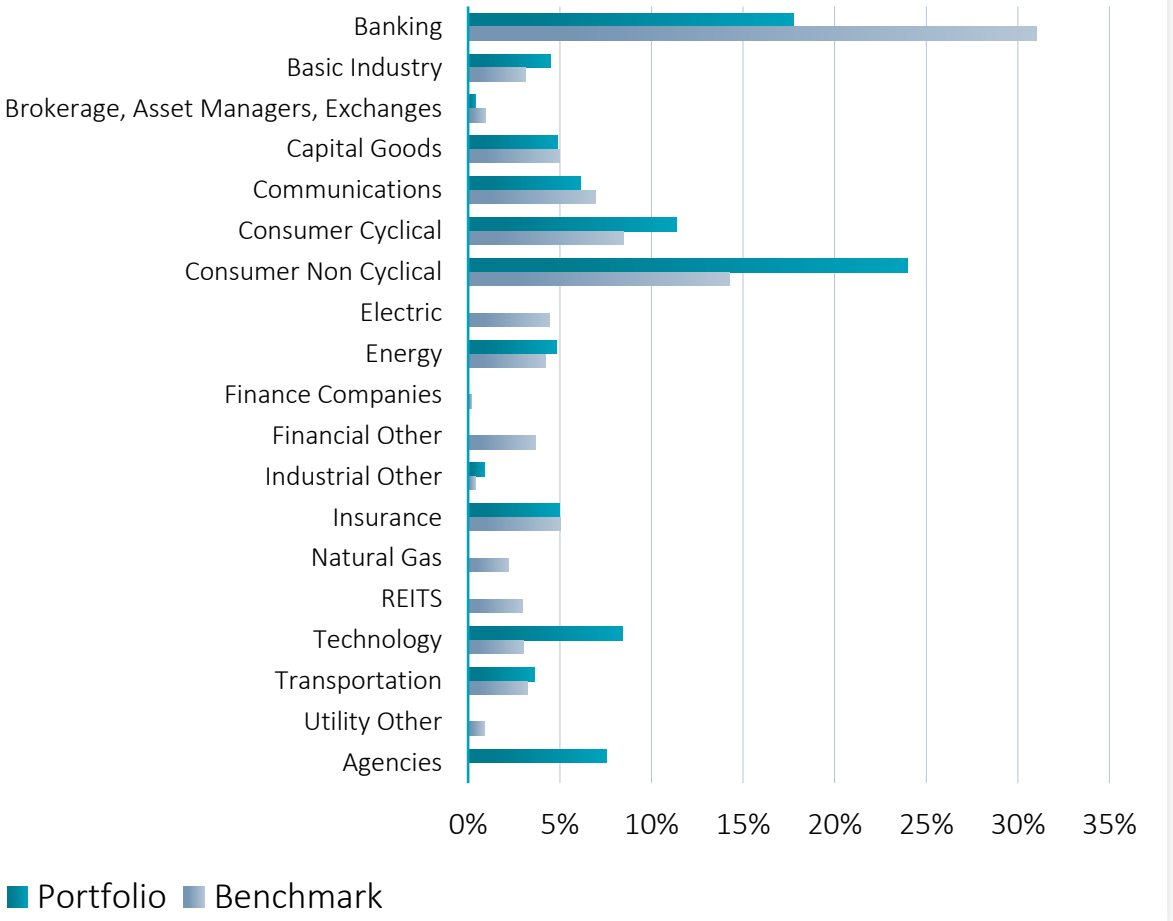
### Maturities




### Ratings




### Sector Class 3




Source: Robeco, Bloomberg. Portfolio: Euro Conservative Credits. Reference Index: Bloomberg Euro Aggregate Corporate. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Positioning: Characteristics

## Robeco Euro Conservative Credits Representative Mandate

| Characteristics | Portfolio |
|---|---|
| Interest rate duration (OAD in years) | 2.9 |
| Spread duration (OASD in years) | 2.9 |
| Yield to Worst (Hedged to EUR) | 3.7% |
| Yield to Worst (Hedged to USD) | 6.4% |
| Yield to Worst (Hedged to GBP) | 5.5% |
| Credit spread (OAS in bps) | 123 |
| Coupon | 1.4% |
| Numbers of issuers | 142 |
| Average rating | A2/A3 |

Source: Robeco. Portfolio: Robeco Euro Conservative Credits Representative Mandate. Data end of December 2022.
This example is for information purposes only and not intended to be an investment advice in any way.

# Performance

## Robeco Euro Conservative Credits Representative Mandate

| Annualized performance (Hedged into EUR) | YTD | 1 Year | 3 Years | 5 Years | 10 Years | Since Jul-12 |
|---|---|---|---|---|---|---|
| Robeco Euro Conservative Credits Representative Mandate | -7.21% | -7.21% | -2.22% | -0.94% | 0.33% | 0.66% |
| Benchmark | -7.83% | -7.83% | -2.70% | -1.40% | -0.17% | 0.16% |
| Relative Performance | 0.62% | 0.62% | 0.48% | 0.47% | 0.50% | 0.49% |

| Performance statistics since inception (Jul-12) | Return | Volatility | Return/Risk |
|---|---|---|---|
| Robeco Euro Conservative Credits Representative Mandate | 0.66% | 2.30% | 0.38 |
| Benchmark | 0.16% | 2.22% | 0.17 |
| Relative Performance | 0.49% | 0.28% | 1.77 |
| Alpha | 0.48% | | |
| Beta | 1.03 | | |

| Calendar year performance (Hedged into EUR) | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 |
|---|---|---|---|---|---|---|
| Robeco Euro Conservative Credits Representative Mandate | -7.21% | -0.32% | 1.06% | 2.29% | -0.21% | 0.66% |
| Benchmark | -7.83% | -0.60% | 0.54% | 1.89% | -0.72% | 0.12% |
| Relative Performance | 0.62% | 0.28% | 0.52% | 0.39% | 0.50% | 0.53% |

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Source: Robeco, Bloomberg. Portfolio: Robeco Euro Conservative Credits Representative Mandate. Benchmark: Beta adjusted conservative credits benchmark. All figures in EUR. Data end of December 2022.

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## Robeco Institutional Asset Management B.V.

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