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BlackRock Systematic

September 2022

BlackRock®

Sustainable Alpha

CDAR Risk Seminar


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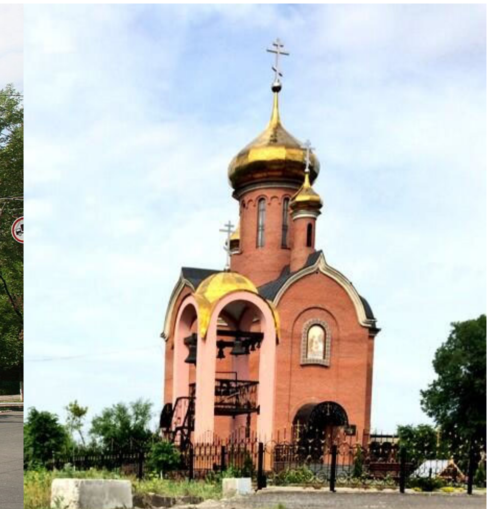


ESG Investing

01 Align

02 Uplift

03 Alpha

BlackRock, 2022. The environmental, social and governance ("ESG") considerations discussed herein may affect an investment team's decision to invest in certain companies or industries from time to time. Results may differ from portfolios that do not apply similar ESG considerations to their investment process.

References

Ang, Kilburn, Schwaiger, Snow, and Wendt, 2021 Active Paris Aligned Equity Investing, to appear in Jurczenko, ed., "Climate Investing"

Chan, Hogan, Schwaiger, and Ang, 2020, ESG in Factors, Journal of Portfolio Management

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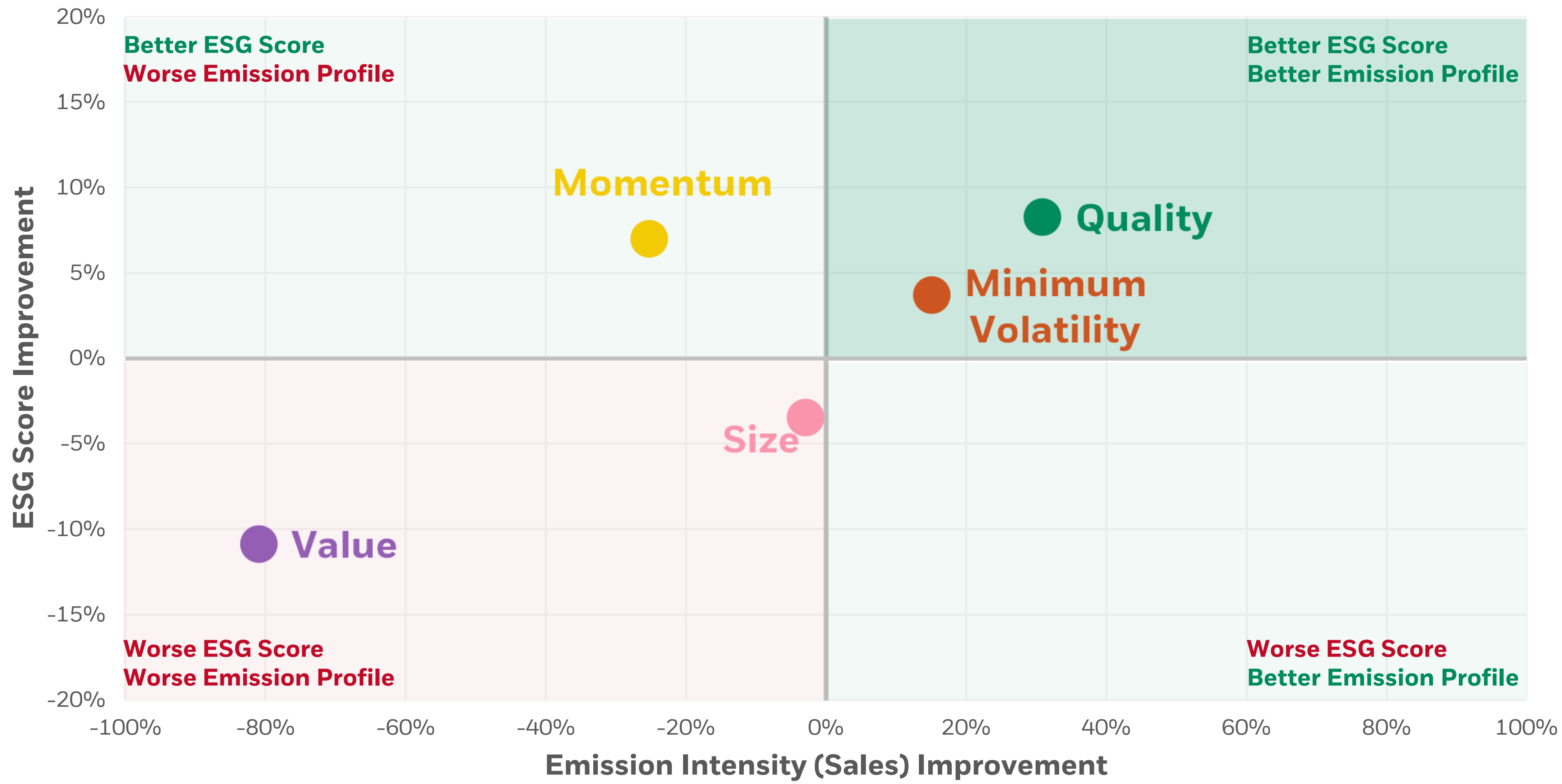
Hodges, Ren, Schwaiger, and Ang, 2022, Net-Zero Investing for Multi-Asset Portfolios Seeking to Satisfy Paris-Aligned Benchmark Requirements with Climate Alpha Signals, Journal of Portfolio Management

Schwaiger, Si, and Kilburn, 2022, Addressing Climate Change in Sovereign Bond Portfolios, BlackRock and ClimateTRACE

Uplift

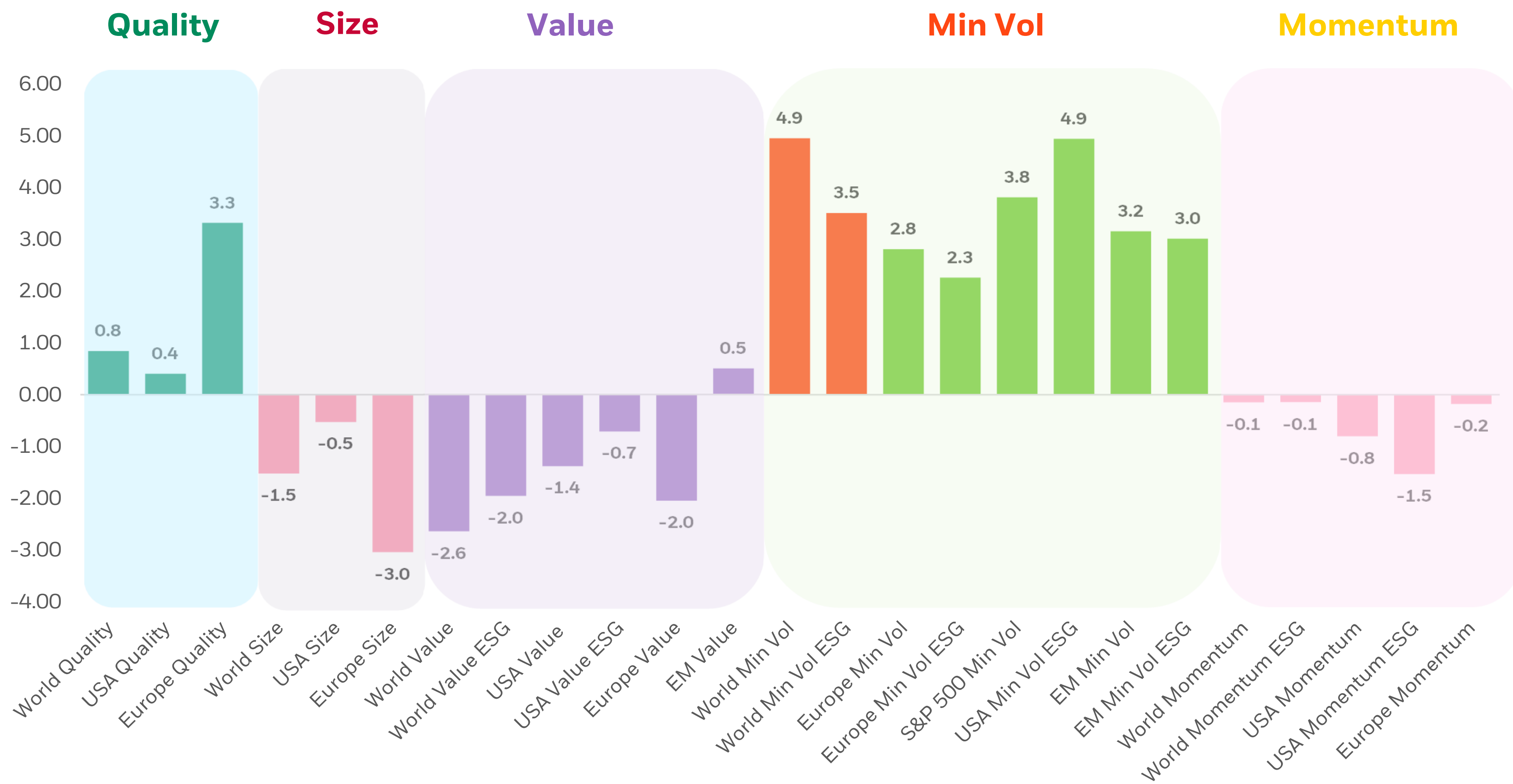
Active ESG exposure vs MSCI Europe Index

Pure factor portfolio ESG profile without ESG considerations in the selection process



Source: Chan, Y., K. Hogan, K. Schwaiger, A. Ang, 2020, ESG in Factors, Working Paper
Calculations by BlackRock. Data from Worldscope, IBES, MSCI ESG and Barra, period shown: January 2015 – September 2019. Factors portfolios shown are hypothetical and do not represent actual investible strategies.

Excess factor performance post invasion (February to April)



The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results.

Source: BlackRock, Bloomberg, as of 13/04/2022. Index returns are NTR for the period 24/02/2022 – 12/04/2022. Index returns are for illustrative purposes only. Index performance returns do not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index. The value of an investment can fall as well as rise and you may not get back the original amount invested.. There is a risk that the entire amount invested may be lost. BlackRock makes no representations or warranties as to the accuracy or completeness of any past, estimated or simulated performance results contained herein, and further nothing contained herein shall be relied upon as a promise by, or representation by BlackRock whether as to past or future performance results. This analysis contains back-tested index data. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only to indicate historical performance had the index been available over the relevant time period.

Historical performance

	31/03/2017 30/03/2018	30/03/2018 29/03/2019	29/03/2019 31/03/2020	31/03/2020 31/03/2021	31/03/2021 31/03/2022
World Quality	14.84%	7.00%	-7.56%	47.96%	10.26%
USA Quality	15.22%	8.51%	-7.17%	52.07%	11.53%
Europe Quality	14.05%	1.13%	-8.44%	42.15%	5.20%
World Size	15.00%	-2.51%	-20.03%	61.29%	0.54%
USA Size	11.85%	4.44%	-21.00%	78.86%	9.28%
Europe Size	18.08%	-8.04%	-19.45%	60.15%	-3.38%
World Value	15.61%	-5.40%	-20.04%	48.92%	4.41%
World Value ESG	15.18%	-3.37%	-14.03%	53.21%	4.42%
USA Value	14.14%	-0.69%	-19.36%	65.54%	4.10%
USA Value ESG	14.24%	-0.46%	-8.89%	61.79%	5.04%
Europe Value	14.52%	-8.55%	-25.04%	58.22%	4.47%
EM Value	19.48%	-11.09%	-19.36%	58.04%	-6.27%
World Min Vol	9.75%	9.71%	-5.96%	23.01%	9.54%
World Min Vol ESG	8.65%	10.10%	-5.49%	25.43%	9.41%
Europe Min Vol	14.79%	0.52%	-9.51%	26.67%	4.40%
Europe Min Vol ESG	16.25%	0.58%	-9.89%	31.14%	5.14%
S&P 500 Min Vol	9.92%	9.57%	-6.82%	38.63%	15.71%
USA Min Vol ESG	10.45%	14.90%	-6.57%	29.84%	13.30%
EM Min Vol	19.21%	-1.84%	-18.20%	38.35%	0.30%
EM Min Vol ESG	20.51%	-1.58%	-17.60%	42.45%	1.63%
World Momentum	25.44%	6.97%	-3.48%	50.60%	7.63%
World Momentum ESG	20.13%	5.48%	-3.53%	61.20%	5.79%
USA Momentum	28.90%	7.55%	-3.89%	51.65%	4.48%
USA Momentum ESG	20.96%	9.13%	-4.63%	63.67%	8.19%
Europe Momentum	16.98%	-3.37%	-3.90%	45.66%	0.01%

The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results.

Source: BlackRock, Bloomberg, as of 31/03/2022. Index returns are NTR for the period 31/03/2017 – 31/03/2022. Index returns are for illustrative purposes only. Index performance returns do not reflect any management fees, transaction costs or expenses. Indices are unmanaged and one cannot invest directly in an index. The value of an investment can fall as well as rise and you may not get back the original amount invested.. There is a risk that the entire amount invested may be lost. BlackRock makes no representations or warranties as to the accuracy or completeness of any past, estimated or simulated performance results contained herein, and further nothing contained herein shall be relied upon as a promise by, or representation by BlackRock whether as to past or future performance results. This analysis contains back-tested index data. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only to indicate historical performance had the index been available over the relevant time period.

Net zero investing

Decarbonization in practice

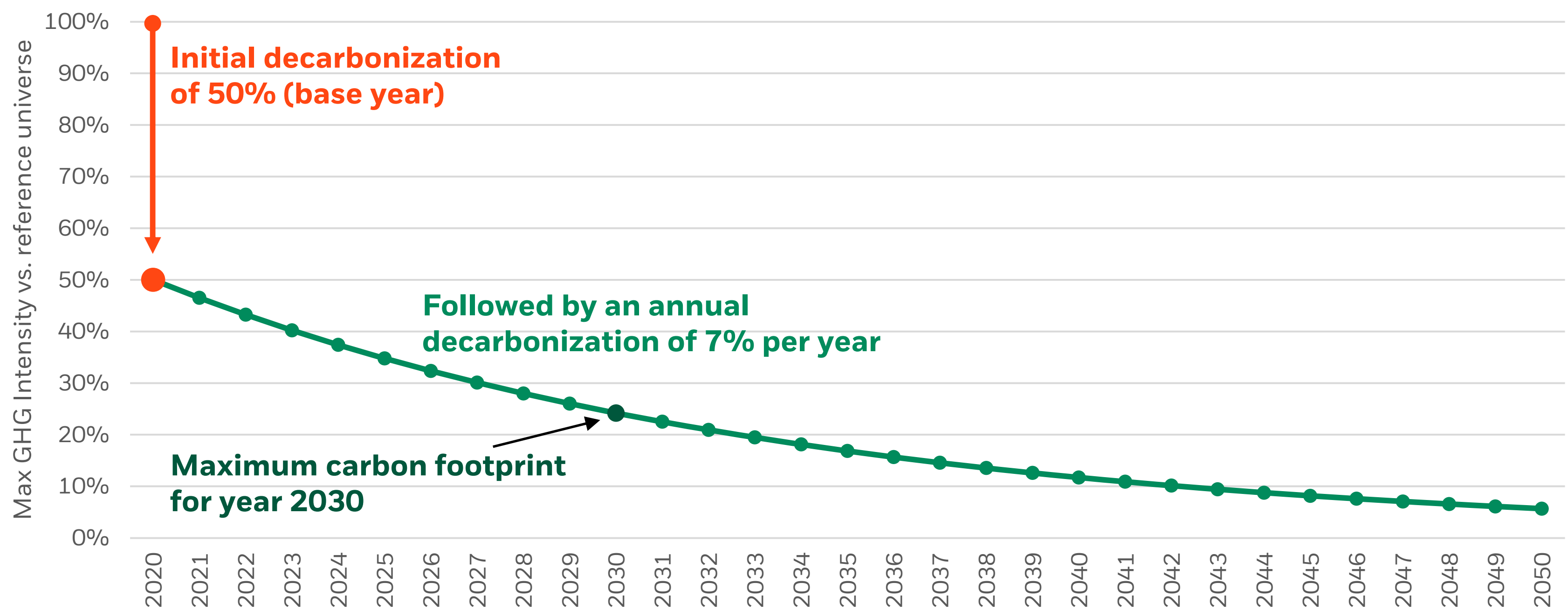
1 **Lower GHG intensity**

An initial decrease in GHG intensity by **50%** (using Scope 1+2+(3)) relative to the reference universe

2 **Self-decarbonization**

Every year after: on average, a **7%** GHG intensity reduction p.a. in line with or beyond the IPCC's 1.5° scenario with limited or no overshoot

Illustrative decarbonization path of a portfolio

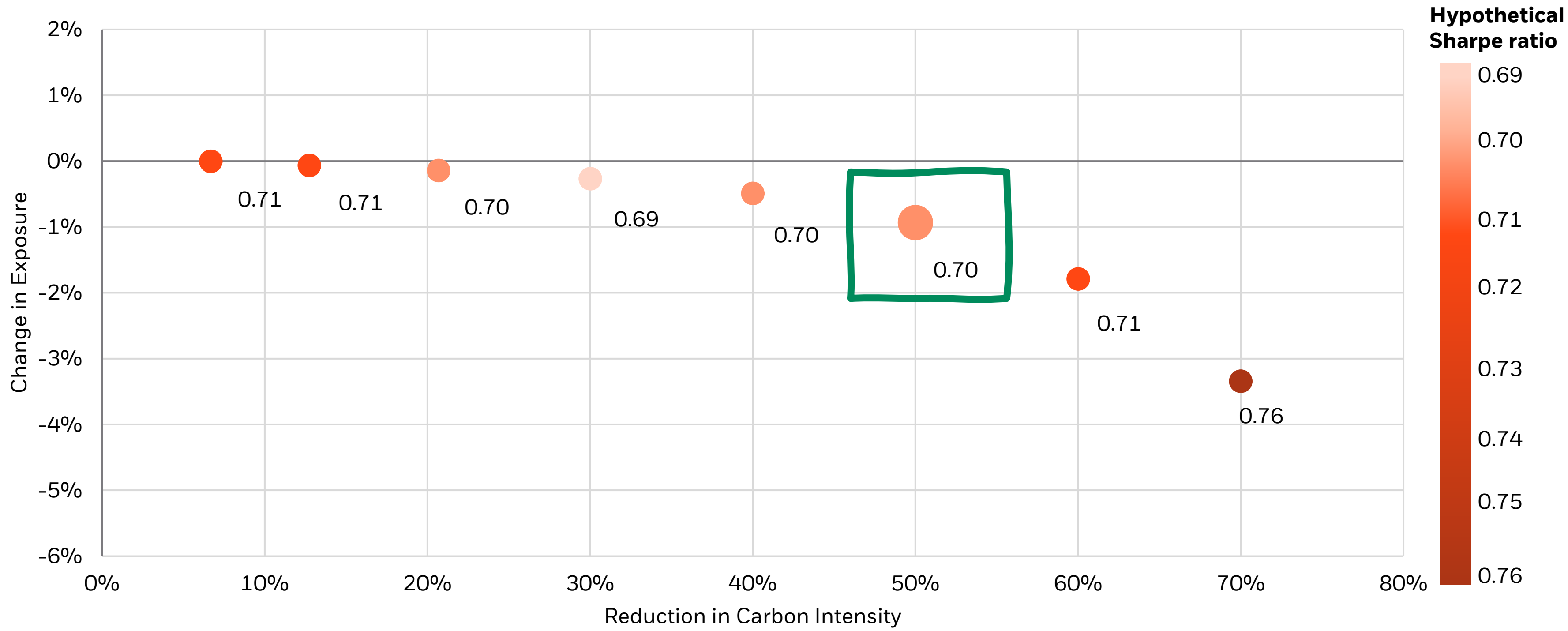


Source: BlackRock, as of October 2021. This graph is for illustrative purposes only, meant to illustrate visually the impact to a portfolio's GHG intensity in response to an initial 50% reduction followed by an annual 7% reduction in subsequent years. We assume a starting GHG intensity equal to that of the reference universe (I_0 = 100%). We cut the carbon intensity by 50% in year 1 (I_1 = 50%), and then reduce the GHG intensity by an additional 7% each subsequent year until 2050 ($I_t = I_{t-1}$*(100%-7%)). This decarbonization path is not representative of an actual portfolio or strategy.

Carbon intensity reduction analysis

Changes in hypothetical portfolio exposure as a function of reduction in carbon intensity

We can reduce the carbon intensity of the hypothetical portfolio with minimal impact to the portfolio's exposures or hypothetical Sharpe ratio

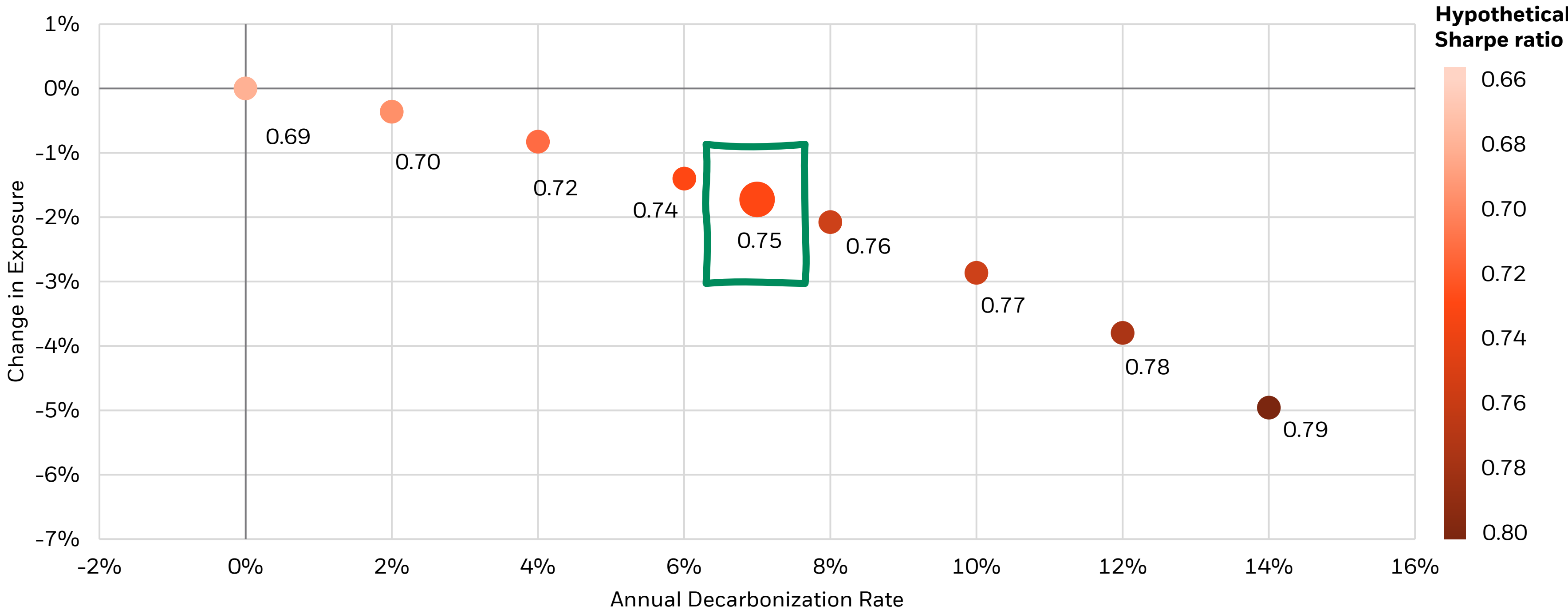


Source: BlackRock, MSCI. Chart shows the average exposure change of simulated climate-aware alpha-optimized portfolios with varying constraints on carbon emissions intensity. We begin with the universe defined by the MSCI World Index. From that group of securities, we apply the methodology outlined on slide 9, varying the level of initial reduction in carbon intensity to construct 8 portfolios. The reduction in emissions intensity for each portfolio is represented on the x-axis, and the average exposure change the y-axis. The Sharpe ratio of each simulation is color-coded, using the color scale shown to the right of the chart. Portfolios are long-only, target 1% annualized tracking error, and enforce constraints on security, country, and industry exposure. Analysis performed in April 2021 for the period from Jan 2009 through Dec 2020. The model is shown for informational purposes only and does not account for fees. It is not meant to represent actual returns of, or to be a prediction or projection, of a Paris-aligned equities strategy. It is provided to illustrate the trade offs between changes to exposure and carbon intensity reduction. Actual returns may vary. The model is based purely on assumptions using available data, based on past and current market conditions, and assumptions relating to available investment opportunities, each of which are subject to change. The underlying assumptions in the model do not include all assumptions that may have been applied to a particular model, and the model itself does not factor in every performance factor that can have a significant impact on a Paris-aligned equities portfolio. Since many potential scenarios exist, it is impossible to show all of the potential circumstances that could yield similar results. Actual events will vary and may differ materially from those assumed. The model is subject to significant limitations. It cannot account for the impact that economic, market, and other factors may have on the implementation of an actual investment. In addition to the variables identified above, the return of any portfolio will vary materially from the return shown based on numerous factors including, but not limited to, varying constraints on carbon emissions intensity. The model's simulated performance also has inherent limitations. The results do not represent actual trading, and thus may not reflect material economic and market factors, such as liquidity constraints, that may have had an impact on our actual decision-making. No representation is made that a client account will achieve results similar to those shown, and performance of actual client accounts may vary significantly from the hypothetical results due to the customization of advice to each client and other factors.

Ongoing reduction in carbon intensity analysis

Changes in hypothetical portfolio exposure as a function of the decarbonization rate

We can achieve the annual decarbonization rate of the hypothetical portfolio set by the PAB guidelines with minimal impact to the portfolio's exposures or hypothetical Sharpe ratio



Source: BlackRock, MSCI. Chart shows the average exposure change of simulated climate-aware alpha-optimized portfolios with varying constraints on the portfolio self-decarbonization rate, using 2009 as the base year for calculation. We begin with the universe defined by the MSCI World Index. From that group of securities, we apply the methodology outlined on slide 9, varying the level of initial decarbonization rate to construct 8 portfolios.The minimum rate of annual decarbonization for each portfolio is the x coordinate, and the average exposure change is the y coordinate. The Sharpe ratio of each simulation is color-coded, using the color scale shown to the right of the chart. Portfolios are long-only, target 1% annualised tracking error, and enforce constraints on security, country, and industry exposure. Analysis performed in April 2021 for the period from Jan 2009 through Dec 2020. The model is shown for informational purposes only and does not account for fees. It is not meant to represent actual returns of, or to be a prediction or projection, of a Paris-aligned equities strategy. It is provided to illustrate the minimum rate of decarbonization. Actual returns may vary. The model is based purely on assumptions using available data, based on past and current market conditions, and assumptions relating to available investment opportunities, each of which are subject to change. The underlying assumptions in the model do not include all assumptions that may have been applied to a particular model, and the model itself does not factor in every performance factor that can have a significant impact on a Paris-aligned equities strategy. Since many potential scenarios exist, it is impossible to show all of the potential circumstances that could yield similar results. Actual events will vary and may differ materially from those assumed. The model is subject to significant limitations. It cannot account for the impact that economic, market, and other factors may have on the implementation of an actual investment. In addition to the variables identified above, the return of any portfolio will vary materially from the return shown based on numerous factors including, but not limited to, the minimum rate of decarbonization. The model's simulated performance also has inherent limitations. The results do not represent actual trading, and thus may not reflect material economic and market factors, such as liquidity constraints, that may have had an impact on our actual decision-making. No representation is made that a client account will achieve results similar to those shown, and performance of actual client accounts may vary significantly from the hypothetical results due to the customization of advice to each client and other factors.

ESG *in* Factors

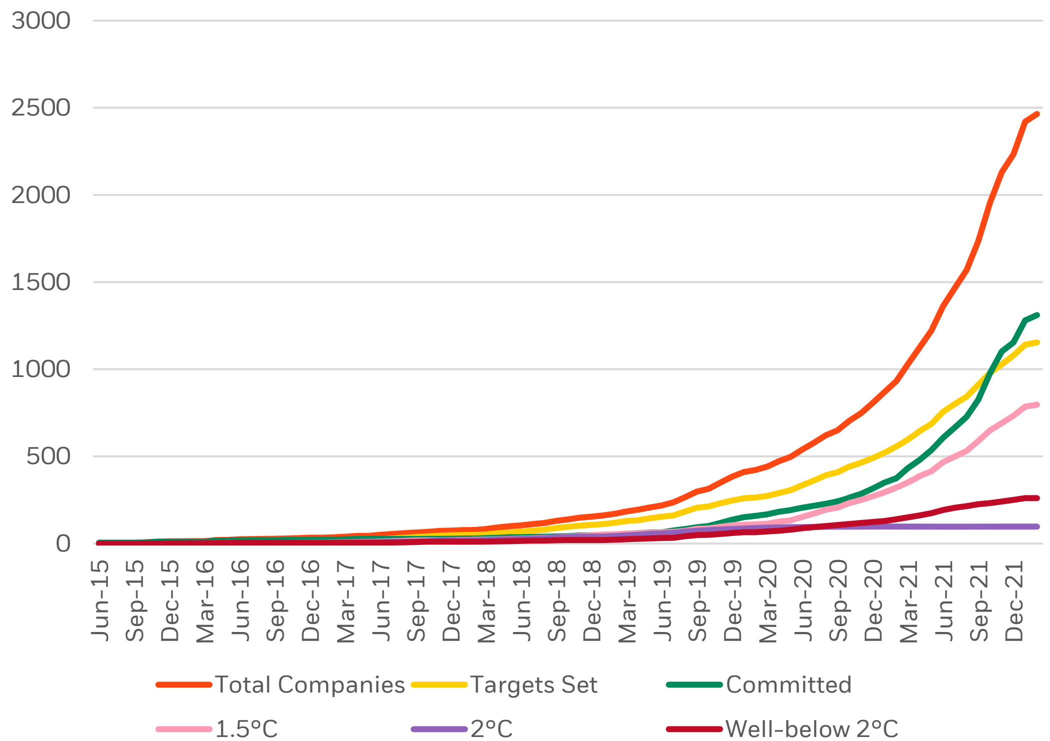
...and evolving style factor definitions

Innovating quality with ESG insights

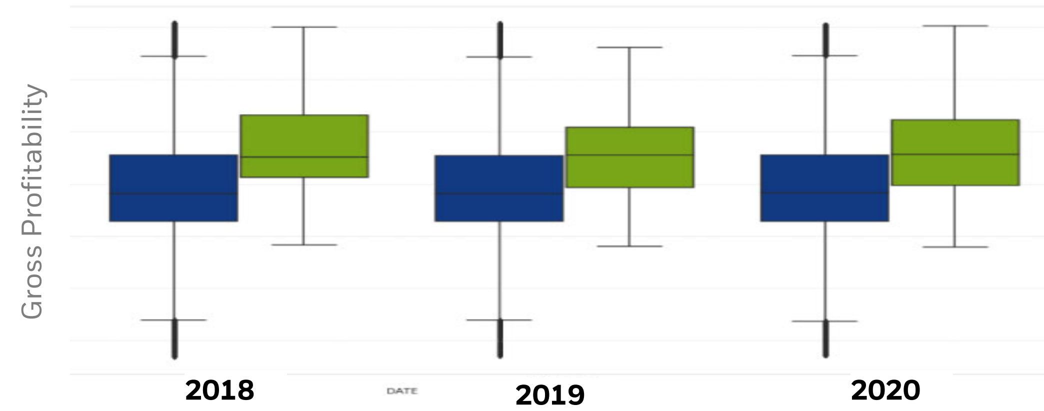
Carbon commitments and lower carbon emissions are a form of quality

Science-Based Targets Initiative (SBTi)

Number of companies committing to SBTI

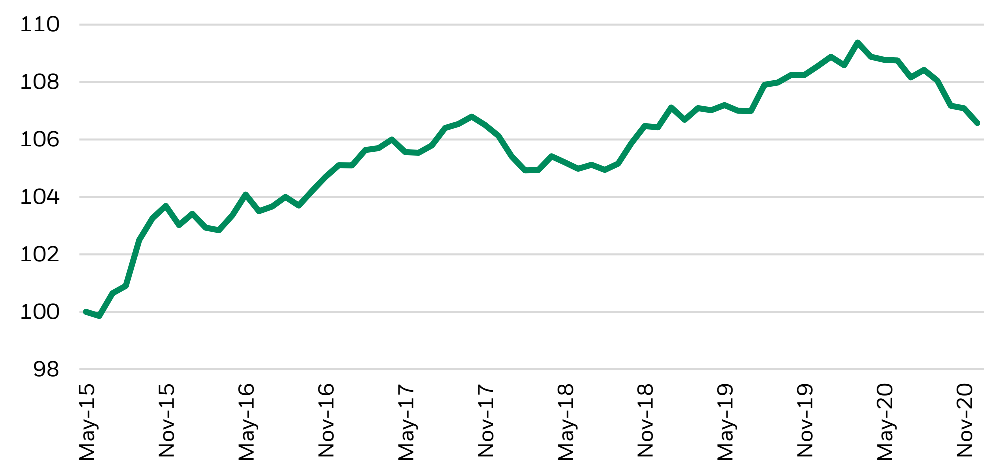


Companies with pledges have higher levels of Gross Profitability



Source: BlackRock and sciencebasedtargets.org, 2021.

Companies with pledges have subsequently outperformed those without



As of July 2021. Chart source: BlackRock and sciencebasedtargets.org as of July 20, 2021. Target Qualification can be 1.5C, 2C, WB2C (well below 2C) and Committed (not specified).

Source: BlackRock, Worldscope, sciencebasedtargets.org, December 2020.

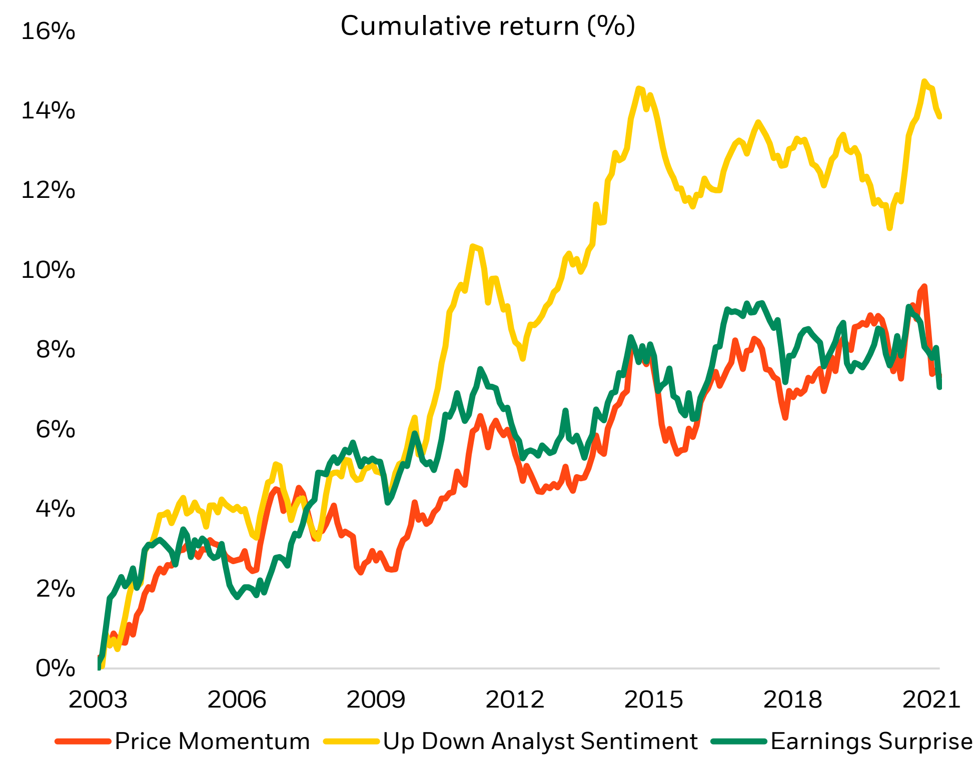
Differentiating momentum

Momentum seeks to capture trends – but there are different kinds of trends

Momentum signal correlations

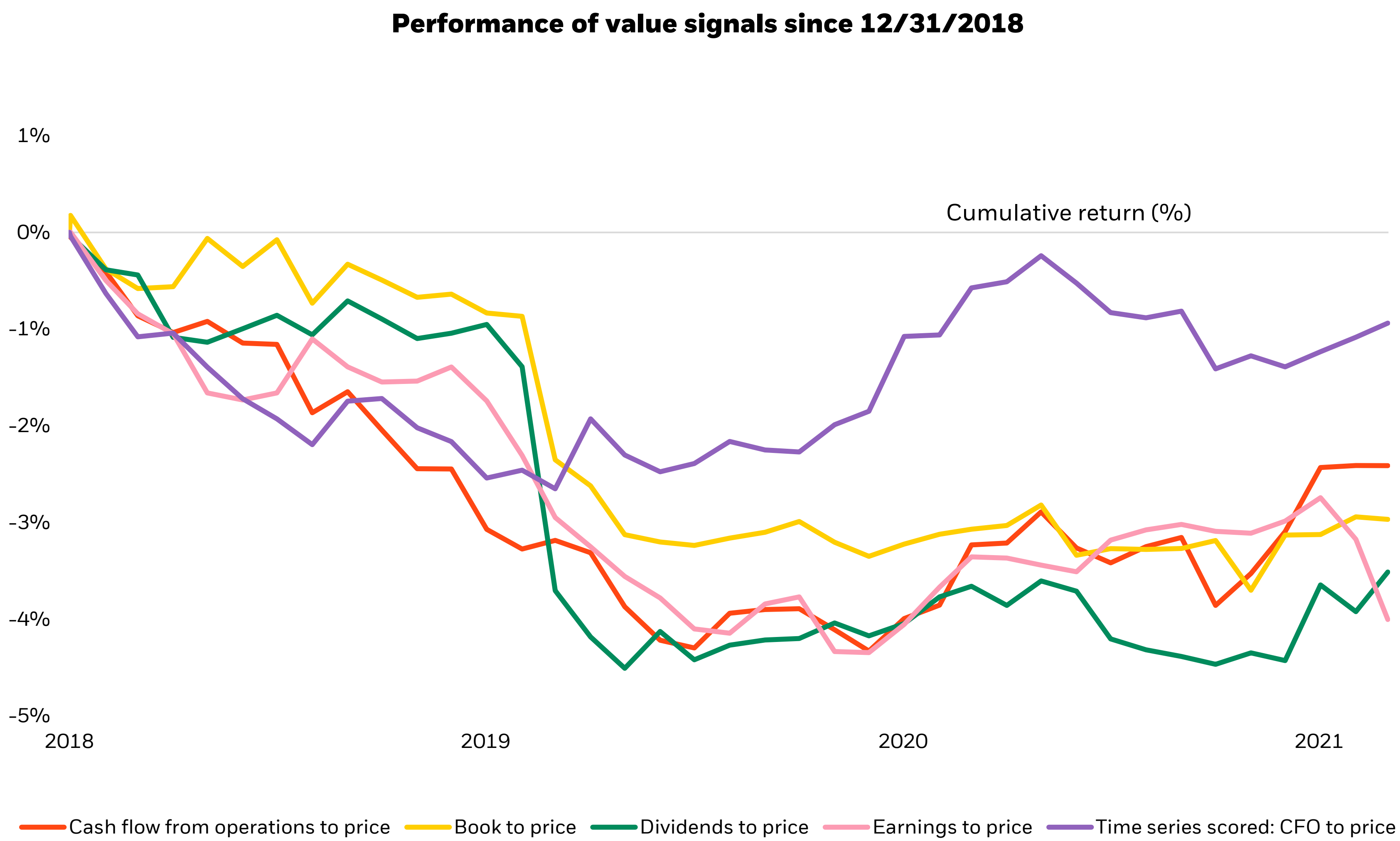
	Price Momentum	Up Down Analyst Sentiment	Earnings Surprise
Price Momentum	1.00		
Up Down Analyst Sentiment	**0.62**	1.00	
Earnings Surprise	**0.51**	**0.42**	1.00

Performance of momentum signals (2003-2021)



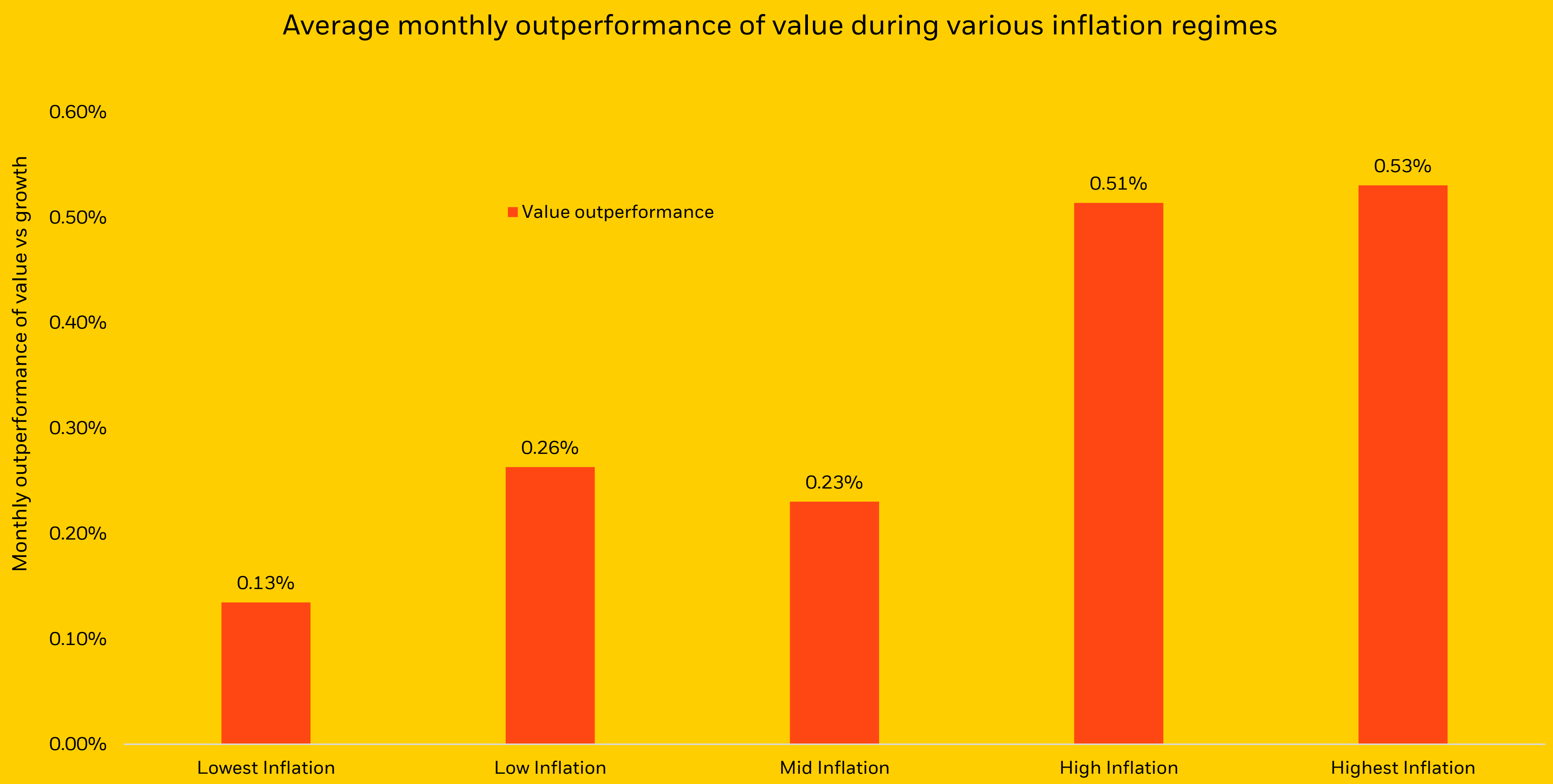
Source: BlackRock Factor Research as of 3/31/2022. Correlations and returns for charts use data from 1 January 2003 to 31 March 2022. Based on a hypothetical long/short global equity portfolio across the three momentum insights shown above. Does not reflect actual returns of any fund or strategy. For illustrative purposes only

Redefining value



Source: BlackRock Factor Research as of 3/31/2022. Returns use data from 31 December 2018 to 31 March 2022. Based on a hypothetical long/short global equity portfolio across the five value insights shown above. Does not reflect actual returns of any fund or strategy. For illustrative purposes only

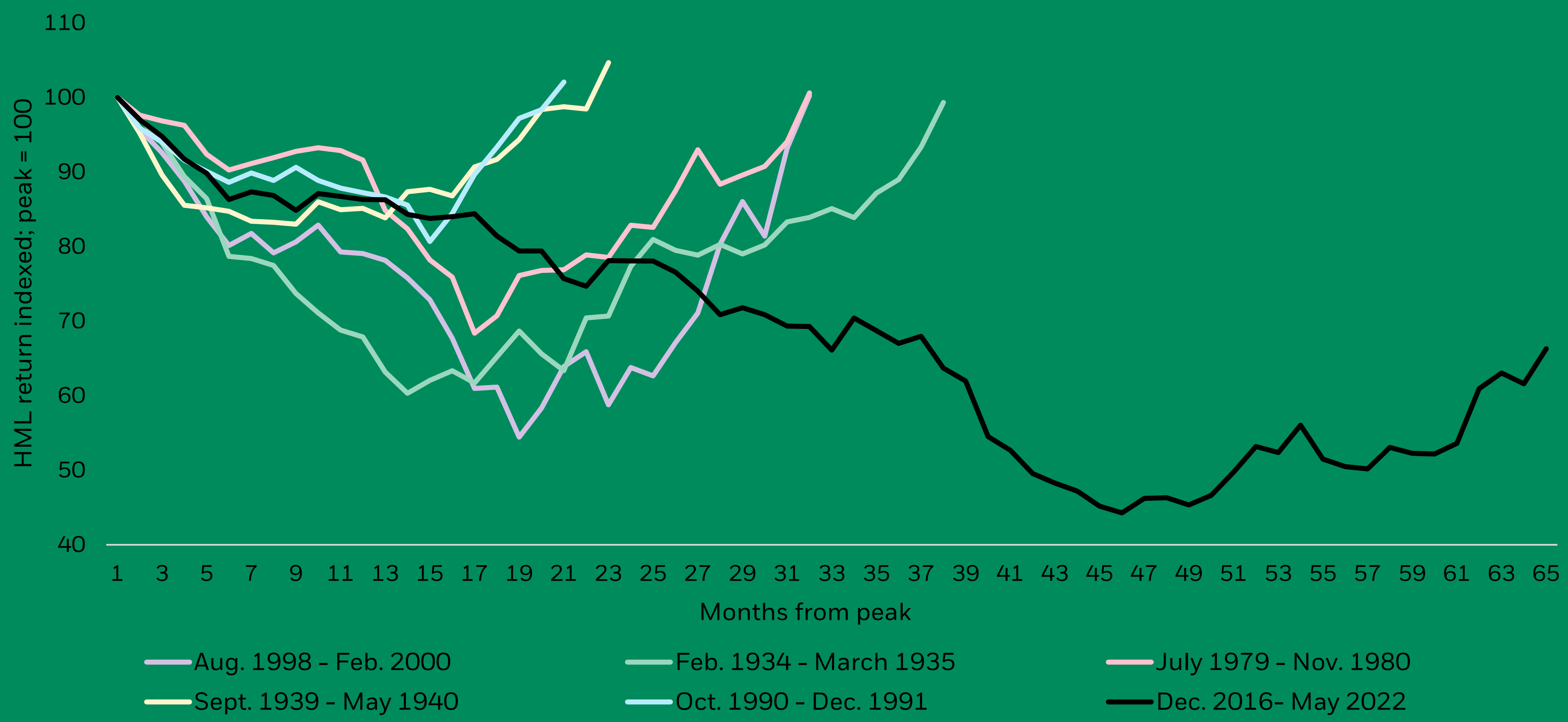
Value outperformance in inflationary regimes



Source: BlackRock with data from Kenneth R. French Data Library and Robert J. Shiller. http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Data from 7/1926 to 10/2021. Fama and French data uses the CRSP universe which includes all companies incorporated in the U.S. and listed on the NYSE, AMEX or NASDAQ exchanges. Inflation determined by using YoY changes in CPI and breaking into quintiles. "Value outperformance" represents performance of value stocks minus growth stocks as defined by the Fama and French HML research factor (high book to price minus low book to price). **For illustrative purposes only. Performance does not reflect any management fees, transaction costs or expenses. Past performance does not guarantee future results.**

Value drawdown

The worst value drawdown in approximately a century is 2016 to 2021



Source: BlackRock; http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Data from July 1926 – May 2022. Start date represents earliest data available for the Value premium (HML). Factor Premiums are for educational purposes only to demonstrate historical context and are not indicative of future results. The performance shown does not represent the performance of an investible product or portfolio and is not reflective of any investment opportunity available on BlackRock's platform. **Past performance does not guarantee future results.**

Climate alpha

Environmental innovation

Leadership in Energy and Environmental Design

LEED is the most widely followed green certification program in the world.

Companies with LEED certification tend to be more efficient

Companies with LEED certified buildings have significantly lower operating costs.

They use less power, renewable materials, better construction, leading to enhanced efficiency and greater profitability.

Efficiency is a behavioral trait

LEED data can be an indicator of future performance and should be incorporated into the investment mosaic of data used to predict performance.

Source: BlackRock, 2022. The environmental, social and governance ("ESG") considerations discussed herein may affect an investment team's decision to invest in certain companies or industries from time to time. Results may differ from portfolios that do not apply similar ESG considerations to their investment process.

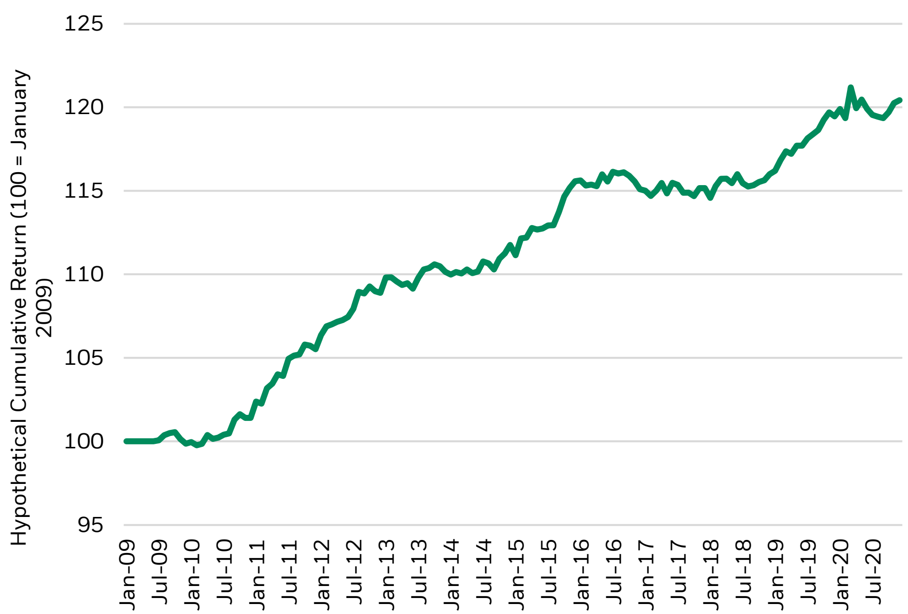
Incorporating climate-aware alpha signals

Carbon emission intensity (emissions to sales)

Our research has shown that companies with lower carbon emission intensity tend to be characterized by higher productivity with greater operational efficiency

According to our analysis, we find that companies with lower carbon intensity than their peers have historically outperformed

Our portfolio over (under) weights those companies in the MSCI World universe with lower (higher) emissions intensity relative to peers



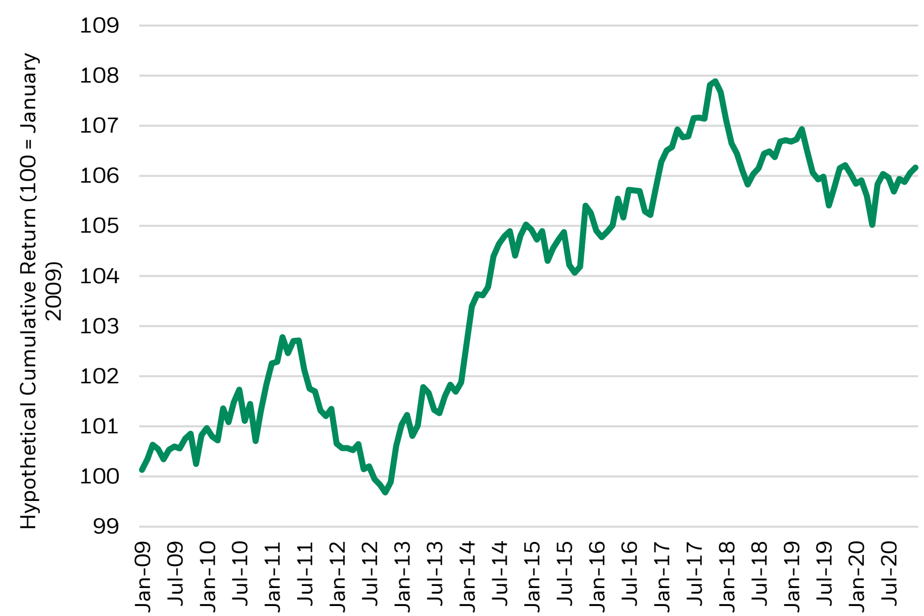
Source: BlackRock. Chart shows the performance of a hypothetical long/short global equity portfolio that goes long (short) companies with low (high) carbon intensity (measured as emissions-to-sales), controlling for industry and size exposures over the MSCI World universe. Analysis period: Jan 2009 – Dec 2020. This is a hypothetical portfolio for illustrative purposes only.

Green patents

Our research has shown that green patents foster sustainable economic growth and may signal opportunities for climate-related investments

We've found a higher number of green patent filings may indicate better preparedness for the transition to a green economy

Our portfolio over (under) weights those companies in the MSCI World universe with a relatively higher (lower) number of green patent filings relative to peers



Source: BlackRock. Chart shows the performance of a hypothetical long only global equity portfolio that over (under) weights companies with a high (low) number of green patent filings, controlling for industry and size exposures over the MSCI World universe. Analysis period: Jan 2009 –Dec 2020. This is a hypothetical portfolio for illustrative purposes only.

ESG alpha

Diverse management

Better decision making
Diversity fosters innovation and creativity through a greater variety of problem solving approaches, perspectives, and ideas.

Stronger customer and supplier relationship
A wide range of backgrounds increases the probability of success in reaching out to a larger array for customers and suppliers and establishing long lasting relationships.

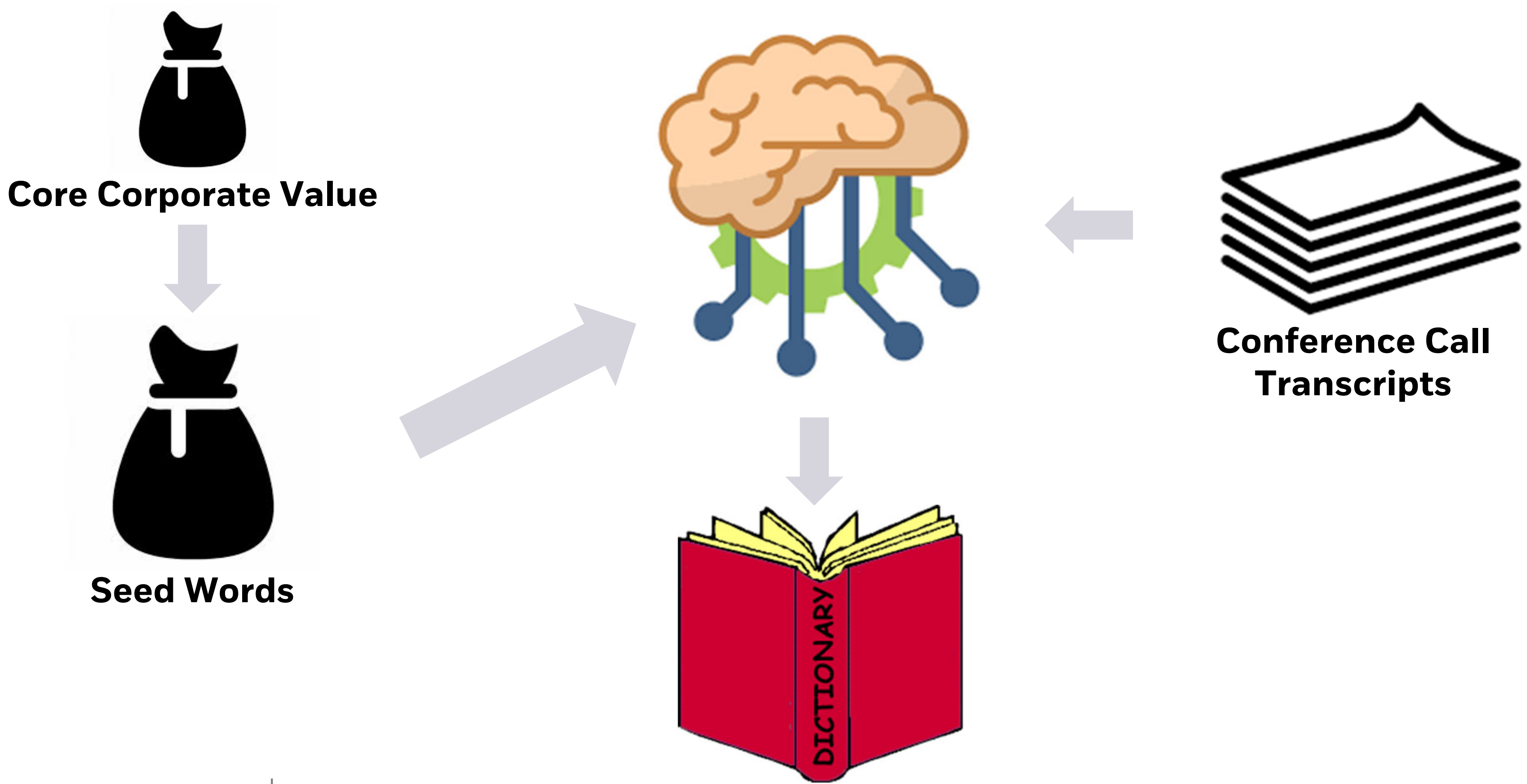
Increased employee satisfaction
Management diversity reduces conflicts between groups, improving collaboration and loyalty.

Satisfaction leads to innovation
Employee satisfaction can be the key to value creation through innovation and client relationships.

More culturally diverse management leads to better financials
Companies with more culturally diverse management have higher ROI, ROA, and stock growth.

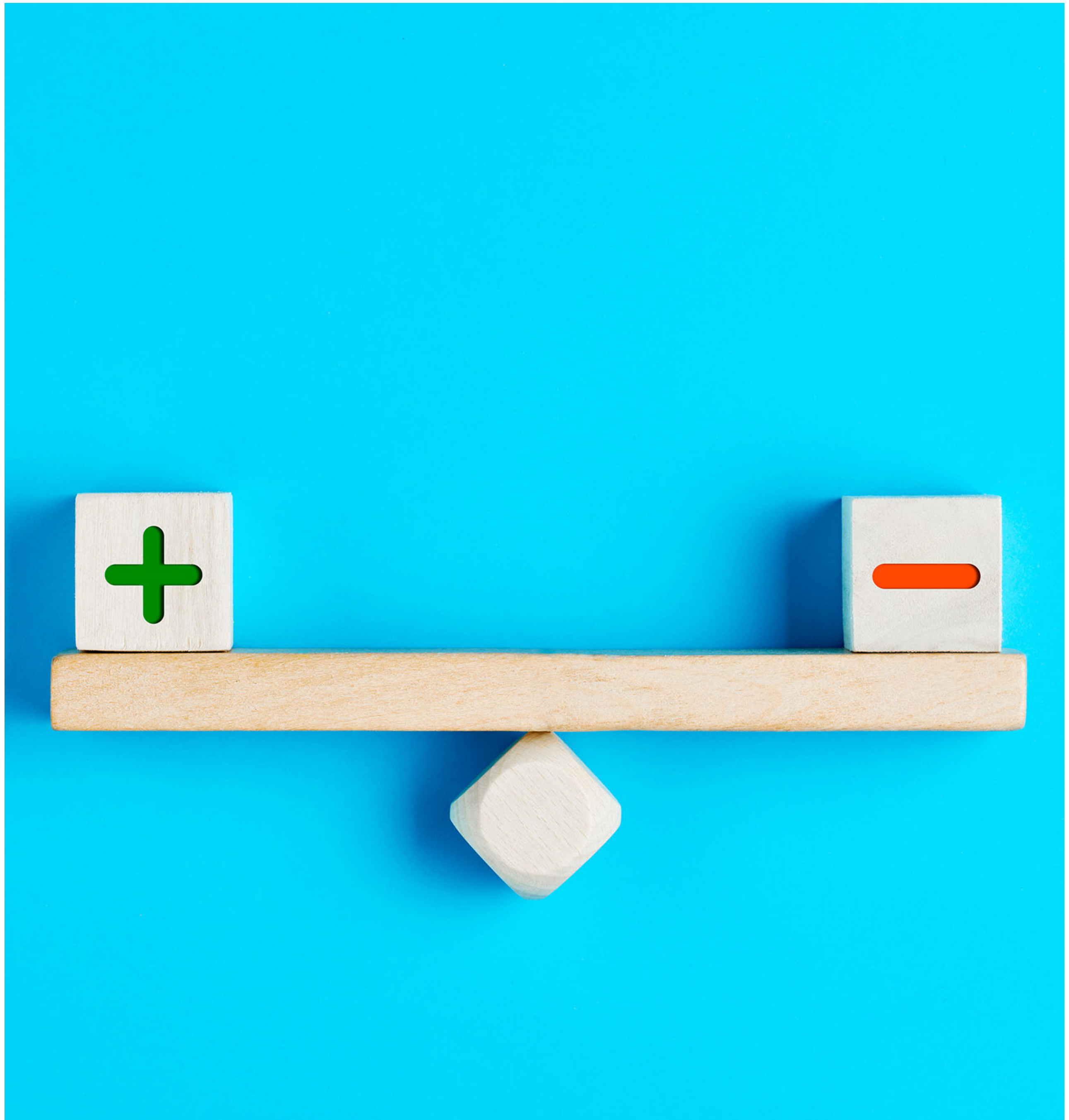
Corporate Culture

Measuring corporate culture



Core Corporate Values	Seed Words
Innovation	Creativity, Excellence, Passion, Pride, Leadership, Growth, Performance, Efficiency, Results, Innovation
Integrity	Integrity, Ethics, Accountability, Honesty, Fairness, Responsibility, Transparency
Quality	Quality, Customer, Commitment, Dedication, Value, Expectations
Respect	Respect, Diversity, Inclusion, Development, Talent, Employees, Dignity, Empowerment
Teamwork	Teamwork, Collaboration, Cooperation

Source: Chan, Y., Hogan, K., Schwaiger, K., Ang, A. "ESG in Factors" 2020. Available at: https://papers.ssrn.com/abstract_id=3522354 For illustrative purposes only. This material is not intended to be relied upon as a forecast, research or investment advice, and is not a recommendation, offer or solicitation to buy or sell any securities or financial product or to adopt any investment strategy. The opinions expressed are as of May 2020 and may change as subsequent conditions vary.



Employee sentiment

Understanding employee sentiment

There is a causal link between corporate performance and employee sentiment.

Satisfied employees drive better financial performance

Important links exist between intangible factors such employee satisfaction and corporate culture, which enhance organizational performance.

Satisfaction leads to innovation

Employee satisfaction can be the key to value creation through innovation.

Increases in firm value are predictable

Employee ratings predict Tobin's Q and Return on Assets.

Veterans hiring

Reintegrating veterans into society is a challenge with a social cost

The unemployment rate of recent US veterans tends to be higher than the non-veterans *; unemployment associated with mental health issues, already an issue for many combat veterans

Growing number of companies incorporate veteran hiring in talent acquisition strategy

Companies with greater veteran hiring tend to have higher MSCI ESG Social Scores

Veteran hiring helps firms win business

Government contractors with a higher proportion of veterans in their incoming new hires tend to be awarded more government contracts and these firms outperform

Higher veteran employment delivers better health outcomes

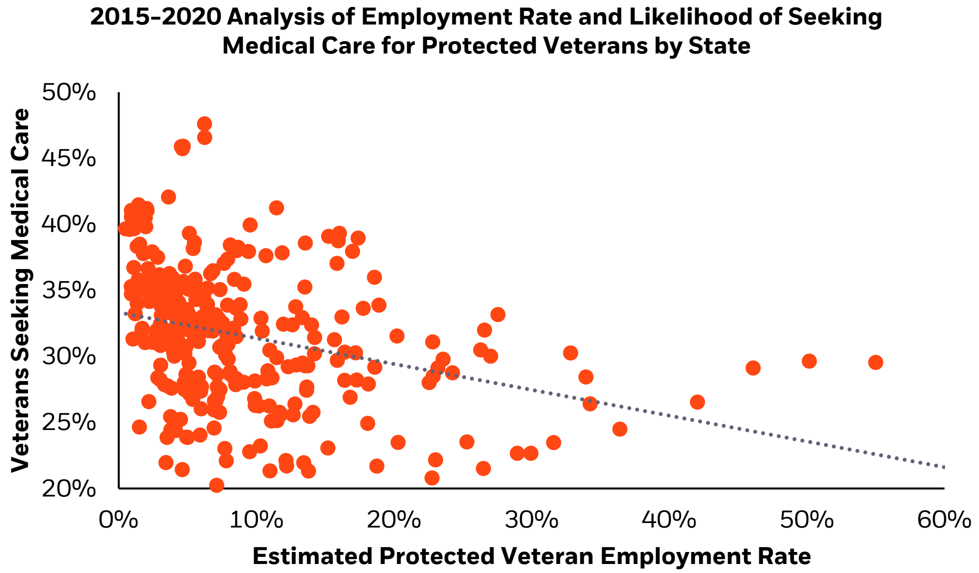
US States with more veteran hiring tend to have better health outcomes for veterans, as measured by lower outlays of Insurance & Indemnities

SOURCE: BLACKROCK, 31 MARCH 2021. *SOURCE: US BUREAU OF LABOR STATISTICS

Firms and society benefit from veteran hiring

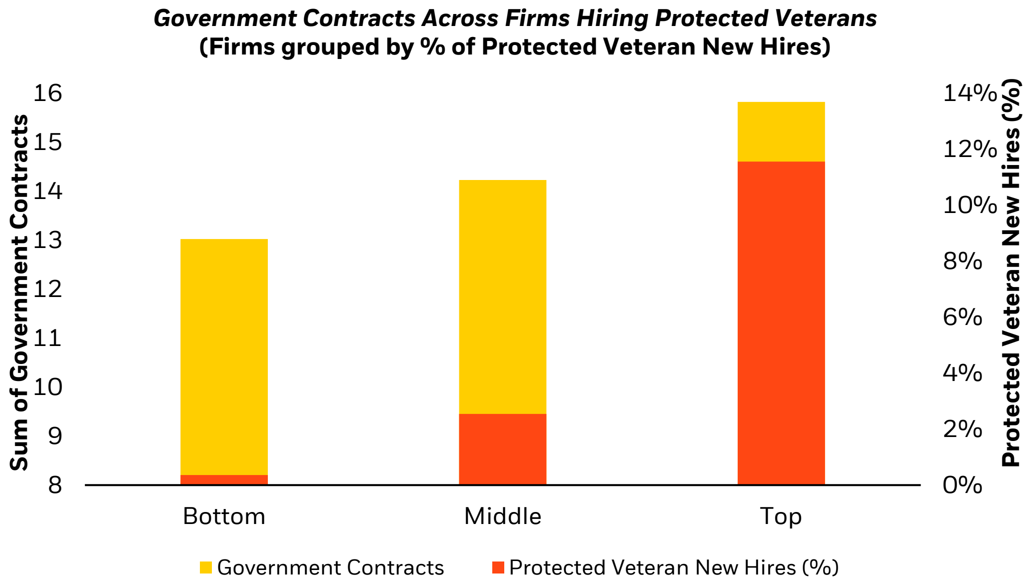
Social alpha research has revealed a link between companies hiring more veterans and improved social and financial outcomes

Social outcome



Source: Veterans Affairs Geographic Distribution of Expenditures across all US states, BlackRock Systematic Research as of December 2020.

Financial outcome



Source: VETS-4212 Reports, USASpending.gov, BlackRock Systematic Research on firms across all GICS sectors, December 2020.
https://www.blackrock.com/us/individual/insights/veteran-hiring

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