

**BlackRock**

# **Sustainability: the bond that endures**

Tools and insights for ESG investing in fixed income

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# Sustainable investing is going mainstream.

Evidence is building that a focus on sustainability-related factors — ranging from carbon efficiency to quality of governance — can help investors build more resilient portfolios. Many are starting to assess their exposure to climate and other sustainability-related risks — and regulators around the world are adding to this push. The risks can have a material impact on corporate performance, and may even give rise to financial instability as climate change affects banks and insurers, the International Monetary Fund argues in its most recent [Global Financial Stability Report](#).

The equity market has played an early role in the history of sustainable investing. The wide spectrum of different debt instruments in fixed income meant that data availability was more patchy, while tools and insights lagged. This is changing fast. We show how innovations such as ESG bond indexes have created building blocks that investors can now use to create sustainable multi-asset portfolios.

We believe it is time for a differentiated approach to sustainable investing in fixed income. We introduce a new lens for viewing the sustainability profile of 60 developed and emerging government debt issuers. We also build on the work done by leaders such as Sustainability Accounting Standards Board (SASB) to show how the financial materiality of different sustainability factors varies across industries. Our analysis adds a quantitative lens, widening the scope to the global credit market. We illustrate the results with a first-of-its-kind materiality matrix across 11 industries.

The need for sustainable fixed income solutions is pressing. Bonds are in high demand — against a backdrop of aging populations in search of yield, and geopolitical volatility that has sparked greater demand for “safe” assets. Many large investors, such as insurers and pension funds, hold the bulk of their assets in bonds. Sustainability-related risks are likely to take on greater importance over the long horizons of such investors. This piece builds on a growing body of sustainability-related research at BlackRock in 2019, including our cutting-edge work to pinpoint [the physical risks of climate change across asset classes](#).

## Our main findings

- Environmental, social and governance (ESG) investing is spreading to all pockets of fixed income markets. This includes sectors such as emerging market debt, which were until recently lagging in ESG data, tools and insights. We explain how sustainable investing in fixed income requires a differentiated approach. In contrast to equities, bond investors' main ESG focus is on mitigating downside risk, rather than capturing upside potential. We believe ESG metrics can help identify new risk factors. Yet the diverse spectrum of debt instruments, issuers and maturities calls for targeted analysis in fixed income.
- Innovations in ESG fixed income indexing have created sustainable building blocks that can form the core of portfolios. Our research suggests it is feasible to create portfolios that offer a significant uplift in key sustainability metrics — including ESG scores and measures of carbon intensity — while adhering closely to key characteristics of standard bond indexes, such as their duration and yield. The history of these indexes is relatively short. But the early evidence suggests it is possible for investors to adopt them without sacrificing their risk/return objectives.
- We introduce an ESG lens for viewing the sustainability of public debt issuers. This lens provides a framework to help gauge the performance of 60 issuers on key ESG issues. The goal: to uncover hidden strengths and vulnerabilities of issuers that may not be captured in traditional macro data. The gauge draws on 39 ESG metrics from the World Bank — and includes a proprietary big data component that scrapes thousands of news articles daily to gauge shorter-term sustainability trends.
- Using this lens, our research suggests sustainability-related factors explain a meaningful share of the variation in credit spreads across EM government issuers today. Poor ESG performers tend to pay a higher market premium to issue debt — and vice versa. Debt markets look to be already pricing in ESG-related risks — even as the ties between EM spreads and ESG scores can be swamped by macro forces such as risk-off episodes. We see the weight of sustainability in our EM credit analysis rising even further over time as regulatory pressures lead issuers to pay greater attention to sustainability.
- The financial materiality of different ESG pillars varies greatly across sectors. Our first-of-a-kind ESG materiality matrix for global credit reveals some key differences with standard findings. Among them: the “E” pillar may have a bigger sway on financial institutions than commonly thought. Loans to fossil fuel producers expose banks to financial risks in the transition to a low-carbon economy. We find some evidence that overweighting exposures to the most salient sustainability factors by industry can potentially enhance portfolio performance.
- We show how ESG indexes can be used to make a global multi-asset portfolio sustainable. To illustrate, we walk through implementing ESG in a hypothetical global factor strategy. We replace the fixed income and equity assets in the portfolio with sustainable equivalents. This results in a large uplift in key sustainability metrics. These substitutions have little impact on the portfolio's diversification or risk/return properties, strengthening our conviction that ESG integration is a “why not?” proposition.

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# Sustainable building blocks

Sustainable investing is no longer just a niche strategy in fixed income. New building blocks such as ESG indexes make it easier for investors to bring sustainability into the core of their portfolios.

## Playing catch-up

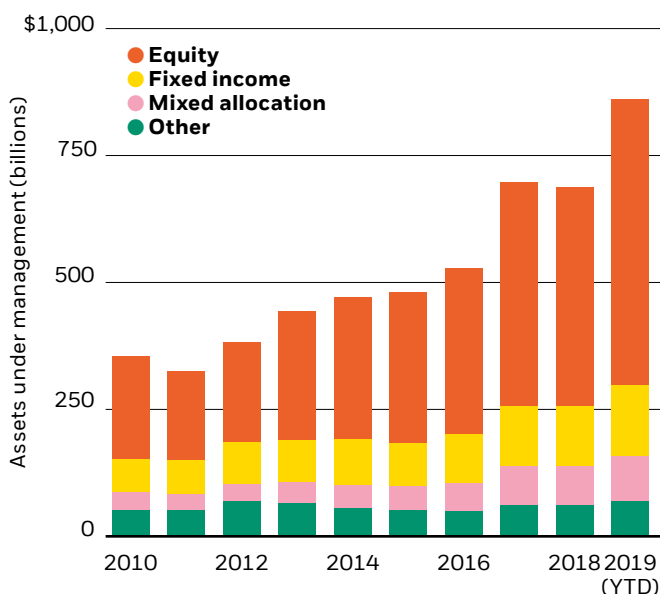
The equity market has historically taken the lead when it comes to ESG investing. Assets under management in dedicated ESG funds have been growing at a rapid clip over the past decade, yet fixed income strategies today still account for less than one fifth of the assets under management, according to IMF data as of mid-June. See the *Gathering momentum* chart below. This picture is set to change.

New ESG bond indexes are providing sustainable building blocks for low-cost strategies — at scale. The green bond market is steadily growing, helping raise funds for projects that have positive environmental or social impact. And improving coverage of ESG metrics allows investors to dig deeper for insights that may be financially material. For example, MSCI's ESG data covered 93% of the issuers in the Bloomberg Barclays U.S. Credit Index in 2018, versus 75% five years earlier.

Rating agencies such as S&P and Moody's are already integrating sustainability into their ratings frameworks in different ways — and such analysis may take on even greater importance. Some 11 sectors with \$2.2 trillion in rated debt were at risk of credit downgrades due to their exposure to environmental risks such as carbon transition, a Moody's analysis in September 2018 concluded. The electric utilities and the coal sector faced the most immediate risks, with auto makers, oil and gas, and commodity chemicals makers facing threats on a three-to-five year horizon.

### Gathering momentum

Growth in ESG funds under management, 2010-2019



Sources: BlackRock Investment Institute, with data from IMF, June 2019. Notes: Data are based on IMF staff calculations using Bloomberg Finance data. The year-to-date (YTD) 2019 data are as of June. The chart shows global ESG-mandated funds only.

## A differentiated approach

The application of sustainability-related concerns to fixed income can draw on many of the conclusions derived from equity-focused research: Strong “E” performers tend to have less exposure to environmental risks. High performance on “S” typically signals a greater ability to attract and retain skilled workers and customers. And companies or issuers with strong “G” scores tend to have better risk management than those with poor “G” scores.

Yet we believe applying sustainability to fixed income requires a nuanced approach that sometimes differs from equities. Among the reasons why:

- **Asymmetric risk:** Unlike equities, the ultimate value of a bond is capped by its par value. This means there is a greater focus on downside risk than upside potential. Much of the analysis centers on repayment and default risk. This raises the importance of controversy scores and other “red flag” ESG measures.
- **Sovereigns** require a different approach to credit. Opportunities to engage with issuers (large governments) on ESG issues are typically more limited than on the corporate level. And macro factors such as interest rates, inflation and safe-haven flows take on greater importance, making it harder to tease out which ESG metrics are financially material.
- **Securitizations**, such as commercial mortgage-backed securities, require analysis of all the underlying collateral in a deal, not just the issuer. This may extend to thousands of assets.
- **Use of proceeds:** ESG analysis in fixed income is sometimes more focused on the “use of proceeds” — or what type of project the proceeds of a particular bond issuance are earmarked for — than the sustainability of the issuer itself. Think of a green bond issued by a large oil company with a poor ESG issuer rating. The bond may still qualify as green if its proceeds are being used to advance sustainability.
- **Engagement:** Bond holders do not have the ability to vote or make their views known on ESG-related issues at annual shareholder meetings. Yet they do have the opportunity to engage — and potentially influence behavior — when issuers come to market with new debt or refinance their existing debt.

In this piece we focus primarily on government debt and corporate credit, which play important roles in many diversified fixed income portfolios. We stress, however, that ESG investing is coming to all pockets of the fixed income markets. This applies across geographies and asset classes, including mortgages, municipal bonds and cash investing.

## Quality tilt

Strong performance on key sustainability metrics is often viewed as a proxy for operational excellence. Researchers have found that companies with high ESG scores tend to have a lower cost of capital, higher profitability and a lower exposure to tail risks. See [Foundations of ESG Investing](#) in the July 2019 Journal of Portfolio Management, for example.

Our analysis suggests that — as in equities — ESG may serve as a proxy for quality in fixed income. To illustrate, we examined the top and bottom quintile of bonds by ESG score in the European credit universe (the ICE BofAML Euro Corporate Index), using MSCI’s ESG data. As of mid-2019 the bottom quintile of bonds (poorest ESG performers) traded at a spread around 25 basis points (bps) higher than the top quintile. In other words, poor ESG performers typically must compensate investors with higher spread premiums — and vice versa.

This implies that simply excluding issuers with the lowest ESG scores from a bond portfolio may result in a tilt to lower-risk — and lower yielding securities. Might this lower a portfolio’s returns over time? Our research suggests not. We studied the performance of the euro corporate index referenced above over the past three years. The top quintile of ESG performers outperformed the bottom quintile by around 50 bps cumulatively, despite its lower average yield. This bolsters our conviction that a tilt toward stronger ESG performers in fixed income need not entail sacrificing return objectives. See [page 7](#) for more.

## A spectrum of options

Sustainable investing takes many forms and need not be an all-or-nothing decision. At BlackRock, we distill client motivations into a spectrum from “avoid” to “advance.” See the *Avoid and advance* graphic below.

- “Avoid” strategies involve the elimination of certain issuers or sectors that are associated with increased ESG risk or which violate the asset owner’s values.
- “Advance” strategies focus on increasing exposure to positive ESG qualities to align capital with certain behaviors or target specific “E” or “S” outcomes.

In fixed income, impact investing can include specific mandates such as green bonds (see [page 16](#)). We also see potential in markets that may have been overlooked by impact investors. Take U.S. agency mortgages, which made up almost one third of the Bloomberg Barclays U.S. Aggregate Bond Index as of mid-2019. Here, we see room to focus on the “S” — through exposures to programs that promote access to credit, help underserved populations and foster community development.

Similarly, the U.S. municipal bond market is increasingly in the spotlight of ESG investors. We advocate a focus on issuers who excel in terms of environmental stewardship, social impact and the quality of policy decisions and implementation. We estimate some one third of issuance in the U.S. muni market as of mid-2019 maps to the United Nations Sustainable Development Goals (SDGs) — an increasingly important framework for guiding capital toward promoting a sustainable future.

## Avoid and advance

Sustainable investing styles

| Motivation         | Avoid   |   |  |  |
|--------------------|---|---|--|--|
|                    | Broad   |   | Thematic   |  |
| Approach           | Screened  | ESG   |  | Impact   |
|                    |   | Broad   | Thematic   |  |
| Objective          | Remove specific companies/industries associated with objectionable activities | Invest in securities based on overall ESG performance                 | Pursue specific E, S G or SDG issues   | Contribute to measurable positive outcomes alongside financial returns |
| Key considerations | Definition of and financial impact of screens                                 | ESG data sources; active risk taken                                   | Broad versus specific exposures  | Measurable contribution and reporting toward outcomes                  |
| Examples           | Screening out producers of weapons, fossil fuels and/or tobacco               | ESG benchmarks; active strategies overweighting strong ESG performers | Environmental focus (low carbon or renewable energy); social focus (diversity) | Specific green bond or renewable power mandates                        |

Sources: BlackRock Investment Institute and BlackRock Sustainable Investing, October 2019. Note: For illustrative purposes only.



## Beyond niche

Sustainable investing is no longer a niche strategy in fixed income. New building blocks such as ESG indexes make it easier for investors to build sustainability into their portfolios. Our previous work suggests these strategies may offer similar risk and return properties to traditional benchmarks — with a meaningful uplift in ESG outcomes. See [Sustainability: the future of investing](#) for details. This is why we see ESG investing evolving from a “nice to have” to a “must have” story. ESG indexes are likely to become strategic benchmarks for many investors over time, in our view.

The various approaches to ESG index investing include:

- Baseline screens that eliminate companies (or issuers) that pose certain risks or violate an investor’s values.
- Combining baseline screens with a focus on relatively strong ESG performers. This can be done by excluding all securities that fall below a cut-off ESG score.
- Leveraging optimization to maximize a portfolio’s weighted-average ESG score while closely tracking the properties of its traditional parent index.

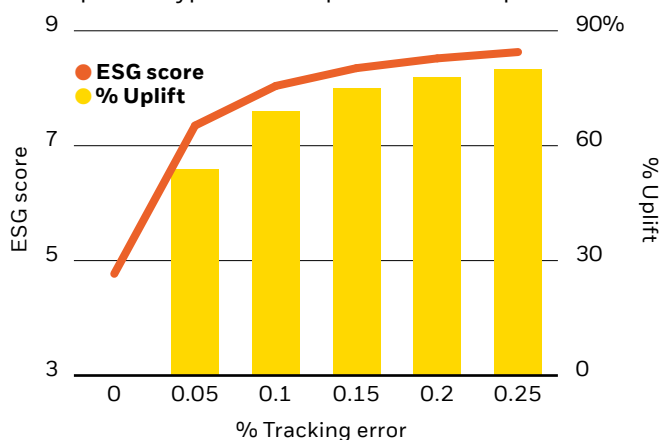
In the equity market, the first two of these approaches could lead to material “tracking error,” or deviations in performance relative to parent indexes. Yet we find this is less the case for bonds. Why? Macro risks such as interest rates make up the bulk of total risk in fixed income. Issuer over- or underweights are less impactful to total risk than in equities. As a result, we believe fixed income investors need not sacrifice their yield, diversification or return targets under such approaches to ESG bond indexing.

What about the optimization approach? We illustrate the potential trade-offs of integrating sustainability by constructing hypothetical credit portfolios designed to track the Bloomberg Barclays U.S. Corporate Index. The goal: to maximize the overall ESG rating for a given tolerance of active risk, while matching the duration, credit quality and sector weights of this parent benchmark. We also introduced a yield constraint: requiring the hypothetical portfolios’ average yield to be equal to or greater than the parent index. What we found: It was possible to generate an uplift of more than 50% in a hypothetical portfolio’s weighted average ESG score with a tracking error of just five basis points relative to the parent benchmark. Relaxing the tracking error to 10 basis points resulted in a 69% ESG score uplift. See the *Trade-offs* chart on the upper right.

**Bottom line:** Our work suggests investors can potentially boost the ESG score of a credit portfolio even more than in an equity portfolio — with less active risk.

## Trade-offs

ESG uplift of hypothetical optimized credit portfolio



Source: BlackRock Investment Institute, with data from MSCI, October 2019. Notes: The above is based on a simulation that aims to maximize a hypothetical credit portfolio’s ESG score. BlackRock takes the constituents of the Bloomberg Barclays U.S. Corporate Index and performs a standard mean variance optimization for each given tracking error, using MSCI ESG scores (1-10 scale). The orange line represents the average ESG score of the optimized index. The “% uplift” bars show the percentage gain in average ESG score relative to the parent index. This does not represent an actual portfolio, or fund managed by BlackRock or investable product, nor is it a recommendation to adopt any particular investment strategy. Indexes are unmanaged and used for illustrative purposes only. They are not intended to be indicative of any fund or strategy’s performance. It is not possible to invest directly in an index. The analysis is based on a hypothetical simulation and assumes no changes in external factors or transaction costs. It is not indicative of actual or future returns.

## New tools for EM investors

In the emerging market debt space, it has been just over a year since investors have had access to a new set of ESG indexes launched by JPMorgan — the fruit of a collaboration with BlackRock. These indexes reweight EM exposures based on ESG scores, as well as excluding the bottom quintile of ESG performers.

The new ESG benchmarks would have produced risk-adjusted returns in line with their traditional counterparts over the past five years, according to J.P. Morgan analysis that relies on back-tested data. Example: an annualized return over the period of 5.7% for the JESG EMBI Global Diversified Index, versus 5.6% for the JPMorgan EMBI Global Diversified Index. The ESG benchmark also exhibited slightly lower volatility over the period (4.2% versus 4.4%). It is early days to clearly point to a trend. This lower volatility could be attributed to the ESG benchmark’s “quality bias:” the exclusion and/or reduction in weight of higher-yielding and often more volatile index constituents.

To be sure, this “quality bias” means that ESG exposures — in EM debt and elsewhere — may underform in “risk on” periods when lower-quality market segments lead performance. Yet the early evidence on ESG index performance bolsters our conviction that sustainable investing should not be viewed as an exercise of trading returns for better ESG outcomes.

# Sovereign sustainability

We introduce an ESG lens for viewing the sustainability of government bond issuers and explore the relationship between ESG performance and bond spreads.



## An ESG lens for governments

Credit analysis of government debt has traditionally focused on macroeconomic indicators such as debt-to-GDP ratios and other measures of debt sustainability. Other important factors include the issuer's current account position, the health of its financial sector and its willingness to pay – or willingness to meet its debt obligations. A slew of metrics related to the latter – ranging from political stability to government effectiveness – have long been viewed as important markers of credit risk by bond investors. Such measures are captured in the “G” of ESG.

But can the addition of a broader ESG lens enhance our understanding? This has historically been tough to prove – at least for developed economies. The reason: The relationship between sustainability metrics and government bond spreads can often be drowned out by macro factors that are more financially material. Think of moves in interest rates and inflation, and swings in risk sentiment that trigger flights into – and out of – government debt.

For this reason we investigated an alternative approach. Rather than mining historical data in an attempt to tease out which sustainability-related factors were most financially material, we look to the UN Sustainable Development goals (SDGs) to help identify key factors tied to the sustainability of a public debt issuer. The SDGs are a set of 17 goals – ranging from poverty reduction to clean energy to sustainable cities – that seek to create a more sustainable world by 2030.

### Under the microscope

Selected components of a government debt sustainability lens, 2019

| Environmental  | Social  | Governance   |
|--|---|--|
| <ul style="list-style-type: none"> <li>Electricity production from coal sources</li> <li>Renewable electricity output</li> <li>Annual freshwater withdrawals</li> <li>Droughts, floods, extreme temperatures</li> <li>Mean annual exposure to air pollution</li> <li>Natural resources depletion</li> <li>Population density</li> <li>CO<sub>2</sub> emissions per capita</li> </ul> | <ul style="list-style-type: none"> <li>Fertility rate</li> <li>Income share held by lowest 20%</li> <li>Access to electricity</li> <li>School enrollment</li> <li>Net migration</li> <li>Share of seats held by women in national parliaments</li> <li>Mortality rate (under five-years old)</li> <li>Poverty rate</li> </ul> | <ul style="list-style-type: none"> <li>Control of corruption</li> <li>Government effectiveness</li> <li>Political stability and absence of violence/terrorism</li> <li>Regulatory quality</li> <li>Rule of law</li> <li>Voice and accountability</li> <li>Ease of doing business</li> <li>Government expenditure on education</li> </ul> |

Source: BlackRock Investment Institute and World Bank, 2019. Notes: The table shows a subset of the 39 World Bank indicators used in the government debt sustainability gauge. Other “E” components are: energy intensity (ratio of energy output to GDP), net greenhouse gas emissions, terrestrial and marine protected areas, hot days, cold days (below freezing), number of days with rainfall above 50mm. Other “S” components: ratio of male to female participation rate, share of individuals using internet, life expectancy at birth, share of children in employment, deaths by communicable diseases and malnutrition, prevalence of undernourishment and prevalence of overweight (population share). For definitions of these World Bank indicators see the following site: <http://datatopics.worldbank.org/esg/framework.html>

## Ingredient selection

Overall, we see three key drivers that can influence an economy's long-term standing from an ESG viewpoint:

- 1 How do the issuer's actions and policies impact the environment and how exposed is it to climate risk?
- 2 How is the issuer investing in its citizens?
- 3 How effectively is the issuer governing its people?

We used these overarching principles to guide the selection of 39 underlying indicators – all from the World Bank's new ESG data portal – to provide a holistic view of each public issuer's sustainability. See the *Under the microscope* graphic below for a sample of the individual components under each E, S and G pillar – for the full list. The rich set of World Bank ESG data allows us to drill down on metrics such as renewable energy output and exposure to extreme weather such as droughts and floods (E), female labor force participation and fertility rates (S), as well as measures of the rule of law and corruption (G).

Through this lens, we seek to understand vulnerabilities and management of sustainability issues that may not be captured by traditional economic indicators. We performed this exercise for 60 developed and EM debt issuers. The underlying indicators were used to formulate scores for each of the three key pillars: E, S and G. An equal-weighted combination of the three pillar scores provides an overall ESG score for each market.

## Data: moving, fast and slow

It takes a long time for a government to improve its ESG fundamentals in a meaningful way. Material gains in education and health metrics, for example, can take years — if not decades. The same goes for shifting an economy’s energy mix to renewables. Many of the sustainability metrics we watch are inherently slow-moving, and some are reported only annually.

To compensate for the slow-moving nature of these indicators, we explored a proprietary big data approach to track shorter-term progress on sustainability. This involves sorting through thousands of news articles and measuring the frequency of keywords related to each ESG pillar. These words are tagged for positive and negative content. Examples of the former: renewable (E), literacy (S) or anti-corruption (G). The latter includes emissions (E), conflict (S) and bribery (G). A higher sentiment score means that positive content outweighs negative content. This can help reveal trends not yet visible in slow-moving official data.

For example, a strong sentiment score offsets some of India’s ESG weakness based on World Bank data alone. The reason: our text mining has been picking up a high frequency of keywords such as “solar” in news articles, as India gradually shifts toward renewable energy and away from heavy reliance on coal. See the map below for rankings by quintile.

## Scoring sustainability

Here is how we explored scoring public debt issuers on their sustainability credentials:

**Raw scores:** Rebase each of the 39 World Bank indicators on a 1-10 scale. Higher scores indicate positive performance.

**Pillar scores:** Calculate individual scores for each of the Environmental (E), Social (S) and Governance (G) pillars by taking an average of the indicators under each pillar.

**Combined ESG score:** Take an average of the E, S, and G pillar scores, weighing the three pillars equally.

**Sentiment score:** Calculate a sentiment score (1-10 scale) daily for each E, S and G category and market, based on Bloomberg newswire headline and story content.

**Final score:** Compute a final score: using this calculation:  $0.8 \times \text{combined ESG score} + 0.2 \times \text{sentiment score}$

See the map below for the outcomes of the markets we analyzed.

## Around the world in sustainability

Rankings by quintile in government debt sustainability gauge, October 2019



Sources: BlackRock Investment Institute, with data from Bloomberg and World Bank. Notes: The chart shows rankings of government debt issuers as of October 2019, from an ESG perspective. Our gauge divides 39 World Bank development indicators into E (environmental), S (social) and G (governance) pillars. These equal weighted pillars make up 80% of a market’s sustainability score. The remainder of the score comes from a proprietary text analysis of Bloomberg news articles. We measure the frequency of around 125 key words related to sustainability (across the three pillars) for each issuer on a daily basis. A high score means that the frequency of words with a positive association to sustainability outweighs that of negative ones. Rankings are bucketed into quintiles. High rankings indicate positive performance on ESG criteria. See page 9 for the underlying components of the index. See pages 9-10 for the methodology, including the sidebar above. For illustrative purposes only.

## Putting the ESG lens to work

What's the relationship between ESG performance and government bond spreads? Our sustainability gauge was not designed with financial materiality in mind. Yet we found preliminary evidence that our lens can reveal some insights into the variation in credit spreads across EM government issuers.

Our starting point to investigate was a hypothetical government bond pricing model. This included drivers such as economic structure (GDP growth), government finance (debt/GDP ratios) and vulnerability indicators (adequacy of foreign reserves). See the sidebar below for further details. We added our gauge to this model and attempted to find out what proportion of the variation in bond spreads across EM issuers — and various maturities — could be explained by each driver.

We performed this analysis for maturities ranging up to 30 years. The key finding: ESG performance — proxied by our sustainability gauge — explains up to 25% of the variation in EM sovereign spreads today. See the *Key driver* chart. For five-year debt, ESG was the most powerful driver in our model. And for all maturities we examined, ESG had greater explanatory power than traditional credit ratings by agencies.

### Key drivers of hypothetical government bond pricing model

#### Credit rating

This reflects the practical reality that many institutional investors define their holdings of EM debt based on published credit ratings from international agencies.

#### Economic structure

Indicators capturing economic prosperity, resilience and growth trends, such as nominal GDP, growth, investments and savings.

#### ESG

Our sustainability lens based on World Bank data and sentiment scoring.

#### External payments and debt

Indicators measuring external liabilities, balances and liquidity such as FX reserves and foreign debt/GDP ratios.

#### Government finance

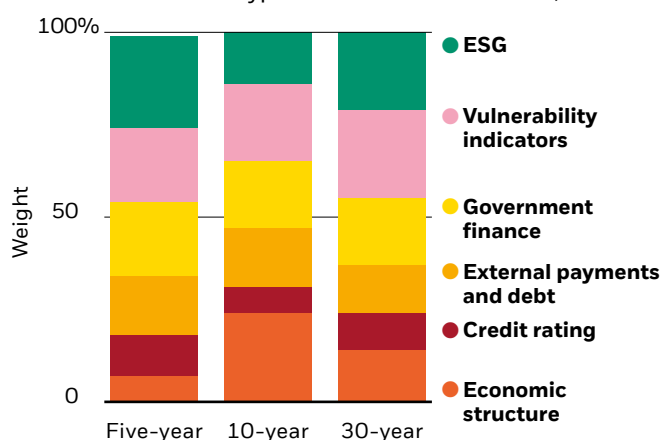
Indicators capturing government budget flexibility, balance sheet strength and potential off-balance sheet liabilities such as debt/GDP ratio and fiscal deficit.

#### Vulnerability indicators

Reserve adequacy, market access and leading indicators of sovereign crises such as FX reserve ratios, asset-liabilities and credit growth.

## Key drivers

Estimated drivers of hypothetical EM credit model, 2019



Source: BlackRock Investment Institute, with data from Bloomberg, Moody's and World Bank, October 2019. Notes: We constructed a hypothetical credit model to explain the relative importance of common drivers of bond pricing across all the EM government issuers in the sovereign sustainability gauge described on pages 9-10. We perform this exercise for 5-, 10- and 30-year maturities. The model uses a technique called quadratic optimization to adjust the weights of the six key drivers to best explain the variation of credit spreads across EM issuers as of October 2019. The six drivers are explained in the sidebar at left. We use our sustainability gauge as a proxy for ESG performance. Note that there are inherent limitations to such models. Not all relevant factors may be included. Other factors such as geopolitics may also impact debt prices. For illustrative purposes only.

## A key driver

The addition of ESG resulted in the weight of credit agency ratings in the model shrinking to 10% or lower. This compares with as high as 35% in a model that did not include sustainability. How to explain this result? Our sustainability gauge may be capturing much of the subjective judgment by rating agencies around the "G" in ESG — on good governance and willingness to pay — that is not fully reflected in traditional economic data. Markets may not have been assessing these risks explicitly. But they likely were implicitly outsourcing part of this judgment to credit rating agencies. We believe increasing regulatory demands to increase oversight on ESG risks will lead to a further increase in the weight of such factors in our EM credit analysis.

The results above are based on a snapshot as of early 2019. We also backtested the simple hypothetical model using historical data, focusing this time on seven- to 10-year maturities. What we found: markets have been giving a material weight to sustainability-related factors in their pricing of EM debt for at least the past five years. The relative importance of the various building blocks in our model — including ESG — has been surprisingly steady over time. There is more work to be done in understanding the link between ESG and public debt markets. This includes drilling deeper to find which ESG metrics are most financially material: an exercise we apply to global credit markets on [page 14-15](#). Yet these early results give us greater confidence that ESG is a material driver in emerging market debt.

## Kicking the tires

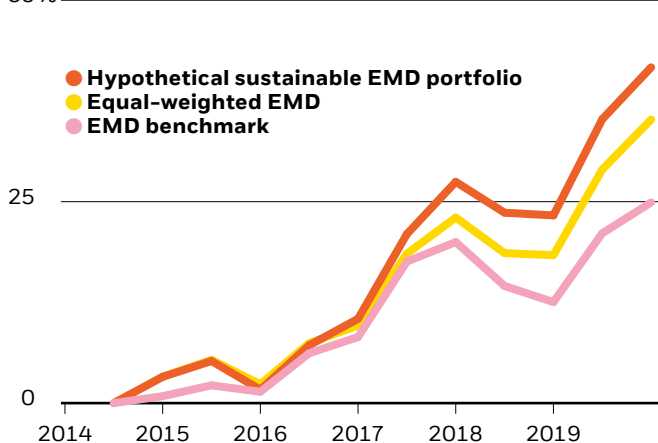
Can the addition of an ESG lens help enhance returns in an EM debt portfolio? We backtested a simple hypothetical strategy: buying all the EM sovereign bonds that were “cheap” in our ESG-integrated sovereign credit model and rebalancing twice a year with the most recently available ESG and macro data. The results can be seen in the *Sustainable returns?* chart below. An equal-weighted hypothetical portfolio made up of these cheap bonds outperformed over the five-year period starting in June 2014 — not just against a standard EM debt benchmark (the JPMorgan EMBI Global Index) but also against an equal-weighted portfolio of all the EM bonds we analyzed.

The period included a significant EM sell-off in 2018, as well as a rally in the first half of 2019. The hypothetical ESG portfolio exhibited slightly higher volatility than the EM benchmark, but greater risk-adjusted returns over the period, we found.

More work is needed to validate these results. Part of the ESG portfolio’s outperformance came from its avoiding exposure to Argentina, which faced another economic crisis in 2019. Yet overall, we see this as encouraging evidence that ESG data can be used to help identify “cheap” bonds in the EM sovereign debt space, with potential to enhance risk-adjusted performance.

### Sustainable returns?

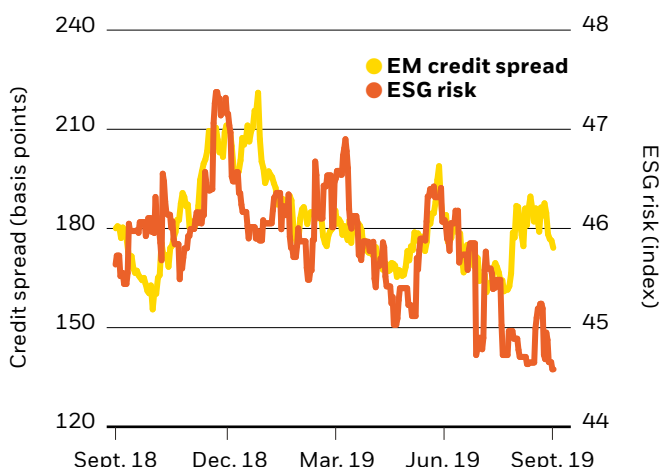
Backtested returns of hypothetical portfolio, 2014–2019



**Past performance is not a reliable indicator of current or future results.** Source: BlackRock Investment Institute, with data from Bloomberg, Moody’s and World Bank. Notes: This analysis focuses on the seven- to 10-year bonds of all the EM issuers in our 60-issuer sovereign sustainability gauge. Our six-factor hypothetical sovereign credit model (see page 1.1) generates a “fair value” for each bond analyzed. The orange line shows the performance of a hypothetical strategy that buys all the bonds in our universe that are cheap relative to this fair value assessment (see page 1.1), rebalancing the portfolio each six months. EM benchmark refers to the JPMorgan EMBI Global Index. The equal-weighted line takes a simple average of the performance of all the EM bonds analysed. Returns do not reflect any management fees, transaction costs or expenses. Backtested performance is hypothetical, simulated and is not indicative of actual or future returns. It is also developed with the benefit of hindsight, has inherent limitations and invariably shows positive rates of return. For illustrative purposes only.

## Moving together

EM credit spread vs. average ESG risk, 2018–2019



**Past performance is not a reliable indicator of current or future results.** Sources: BlackRock Investment Institute, with data from Bloomberg and RepRisk, October 2019. Notes: The chart shows the average credit spread of all investment grade rated sovereign names in the JPMorgan JESG EMBI Global Diversified Index (weighted by market cap), plotted against the average ESG risk of those sovereign names (again by benchmark weight). We use RepRisk ESG scores as a proxy for ESG risk, lagged by three months. RepRisk uses a 1–100 scale, with higher scores indicating a poor ESG profile.

## High ESG score = tighter spread

Other work we have done using ESG metrics from external providers reinforces the view that sustainability is a relevant concern for sovereign debt. A key conclusion: Credit spreads are negatively correlated with ESG scores. In other words, issuers with poor ESG characteristics must compensate investors with higher yields. The chart above shows this trend for investment grade rated EM issuers. Note that this relationship is not perfect; the paths of EM sovereign spreads and ESG scores can decouple during sharp sell-off periods. One such example was August of 2019, when an escalation in global trade tensions and a crisis in Argentina hit EM assets. In such periods, overall risk appetite and global macro conditions can have an overwhelming effect on EM bond spreads. This can cause market pricing to become temporarily de-anchored from fundamentals such as ESG.

In our view, this speaks to the need for investors to consider fully integrating ESG considerations into their overall investment process. ESG needs to be considered in combination with economic fundamentals and the market backdrop. In the EM world, a noticeable improvement in ESG data coverage over the past couple of years has made this task easier. Expanded and high-frequency datasets, increasingly leveraging big data techniques such as text mining, allow for a systematic deployment of ESG information and its integration in investment processes. We find this helps active EMD investors to complement ESG analysis that used to be skewed toward a qualitative approach.

# ESG in credit – what's material?

We show which ESG characteristics we see as most financially relevant across industries in global credit. Our early work shows potential to improve risk-adjusted performance by tilting toward such exposures.

## Measuring materiality

What are the ESG factors that really move the dial when it comes to financial performance? This involves digging below headline scores. For example, some environmental factors such as water management are key drivers in the materials sector — but of little-to-no relevance for financials. Governance factors such as the strength of risk controls lie at the heart of past financial crises — and are the key driver for banks.

What do we mean by materiality? It is the connection between exposure to given sustainable properties and returns or risk. Organizations such as the Sustainability Accounting Standards Board (SASB) and Task Force on Climate-related Financial Disclosures (TCFD) have been leaders in identifying and communicating the importance of materiality-based analysis, particularly on environmental and social factors. Much of our understanding of which sustainability metrics are most relevant is based on studies of equities. Yet companies issue a broad range of other securities beyond common stock. We set out to develop a “materiality matrix” for the global credit market to get better insights on how *bond* investors can integrate ESG characteristics. Our starting point: six broad sustainable categories that BlackRock sees defining the E, S and G properties of companies. See the graphic below.

### Defining sustainability

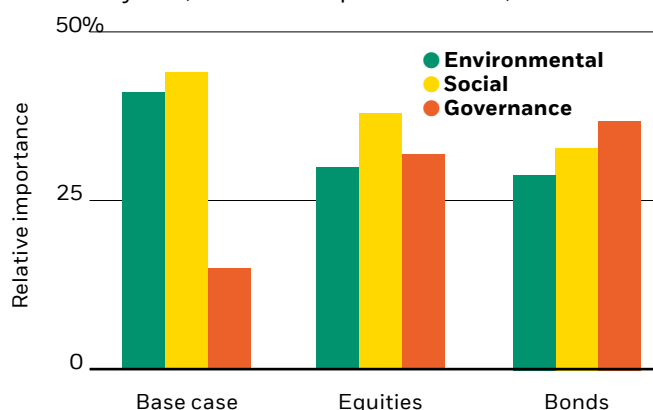
Six categories of BlackRock’s sustainability framework

|          |   |          |  |
|----------|---|----------|--|
| <b>E</b> | <b>Low carbon transition</b>  | <b>E</b> | <b>Natural resource management</b>   |
|          | <ul style="list-style-type: none"> <li>Carbon emissions</li> <li>Clean technology</li> </ul>      |          | <ul style="list-style-type: none"> <li>Energy management</li> <li>Water &amp; wastewater management</li> <li>Waste &amp; hazardous materials management</li> </ul> |
| <b>S</b> | <b>External stakeholder management</b>  | <b>S</b> | <b>Internal stakeholder management</b>   |
|          | <ul style="list-style-type: none"> <li>Customer relations</li> <li>Community relations</li> </ul> |          | <ul style="list-style-type: none"> <li>Talent management</li> <li>Inclusion &amp; diversity</li> <li>Workers’ rights</li> </ul>                                    |
| <b>G</b> | <b>Board quality</b>  | <b>G</b> | <b>Corporate culture and management</b>  |
|          | <ul style="list-style-type: none"> <li>Board effectiveness</li> <li>Board independence</li> </ul> |          | <ul style="list-style-type: none"> <li>Audit, tax &amp; risk management</li> <li>Business ethics</li> <li>Ownership &amp; control</li> </ul>                       |

Source : BlackRock Investment Institute and BlackRock Sustainable Investing, November 2019. Notes: The graphic shows the six main categories of BlackRock’s ESG framework, with 15 underlying descriptors. These are informed by more than 300 key performance indicators (KPIs) taken from ESG data providers, specialized data sources and internal data developed by BlackRock.

## What’s material?

Materiality of E, S and G in equities & credit, 2015–2019



Source: BlackRock Investment Institute, with data from MSCI, Sustainalytics and Refinitiv, October 2019. Notes: The chart shows BlackRock’s estimate of the financial materiality (or relative importance, in percentage terms) of E, S and G factors in driving performance in the equities and global credit market over the five-year period through June 2019. We use regression analysis to estimate the relationship between each ESG pillar and monthly excess returns over the period. The “base case” is derived from BlackRock’s numerical interpretation of the Sustainability Accounting Standards Board (SASB)’s “materiality map.” Equities analysis is based on the MSCI World Developed index. Bonds are based on credit spread returns of the Bloomberg Barclays Global Aggregate credit index. For illustrative purposes only.

## Defining the base case

We applied our fixed income analytics and quantitative tools to measure the connection between these six categories and variations in global credit spreads. This helped us to see which of the three overarching ESG pillars best explained global corporate bond returns since 2015, after managing for common risk factors such as duration, credit ratings, country and currency. For this analysis, we considered the ESG characteristics of each parent issuer and analyzed the performance of its most liquid bond. This built on a similar analysis we have performed for equities.

Our point of comparison for both: SASB’s assessment of which sustainability topics are likely to have material impacts on the financial condition or operating performance of companies in a particular industry. We converted SASB’s “materiality map” into numerical weights for BlackRock’s six sustainability categories — and the three main ESG pillars. We use this as the “base case” for comparison against our own materiality matrix. The high level results are shown in the *What’s material* chart above.

**The key takeaway:** We find much higher materiality for the “G” in ESG than the base case, both in equities and credit markets. Our analysis also finds a moderately lower role for “E” and “S.” Overall, our research suggests each of the three ESG pillars are of roughly equal importance for both credit and equities markets. Yet variations across sectors reveal key insights on the materiality of pillars. See the following page for details.



## Sector spotlight

To gain greater insight into our results on materiality, we ran the analysis at the sector level. The results are shown in the materiality matrix below. Two highlights:

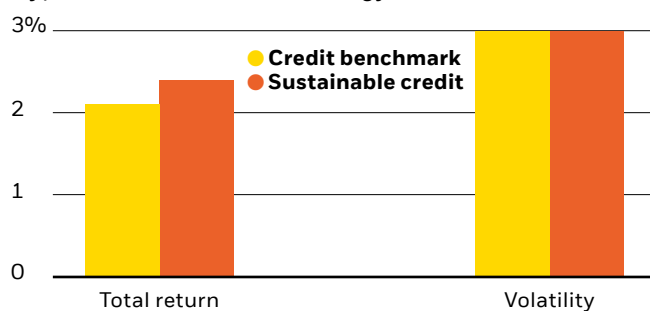
**Financials** — We found a meaningful link between financials valuations and our two “E” categories. Since bank operations themselves have little exposure to environmental factors, what could be affecting valuations? We believe investors are considering the fossil fuel and green energy exposure in banks’ loan books. For example, banks’ loans to fossil fuel producers may be at risk of future losses in a scenario in which carbon taxes are introduced.

**Utilities** — Environmental risks such as exposure to extreme weather pose tangible risks to the electric utilities sector, as we demonstrated in [Getting Physical](#) of April 2019. Yet we found the pricing of utilities’ corporate debt in recent history does not reflect this, as the matrix shows. Instead, it has been more sensitive to measures of corporate governance.

How might an investor use the information in a financial materiality matrix? We see potential use as a tool for security selection: overweighting issuers with exposure to the sustainability metrics that we find are most relevant for each industry. We tested this theory with a hypothetical global credit portfolio. We performed an optimization on the Bloomberg Barclays Global Credit Index that sought to maximize such sustainability exposures while matching the parent index’s country and industry weights, duration, yield and credit ratings.

## Sustainable credit

Hypothetical ESG credit strategy backtest, 2015–2019



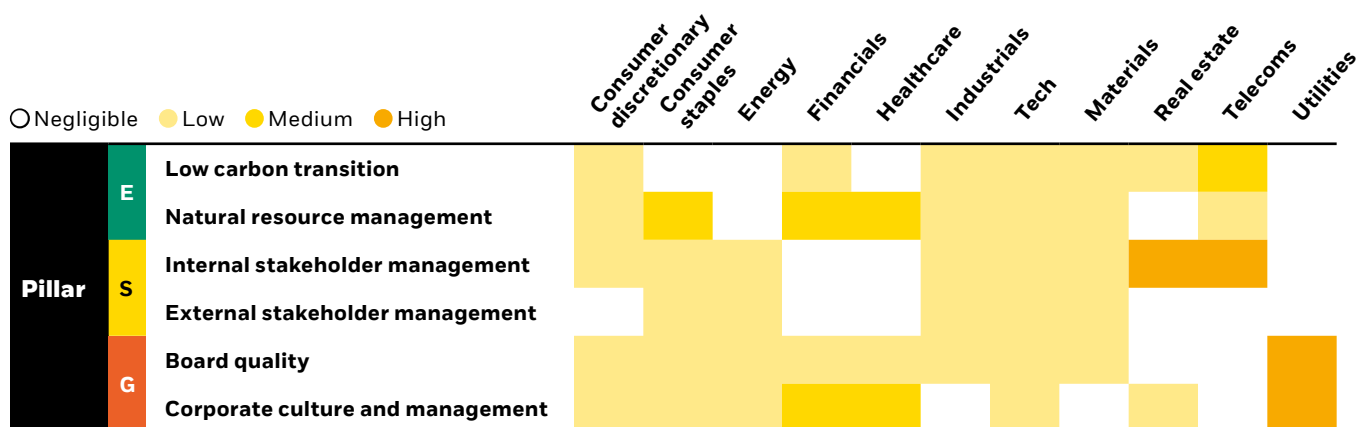
**Past performance is not a reliable indicator of current or future results.** Sources: BlackRock Investment Institute, with data from Bloomberg, MSCI, Sustainalytics and Refinitiv, November 2019. Notes: The chart shows annualized total returns and volatility of a hypothetical ESG global credit portfolio indexed to the Bloomberg Barclays Global Corporate Index, backtested over the period January 2015 through June 2019. The sustainable version optimizes the exposures of this parent index, seeking to maximize exposure to the sustainability metrics that BlackRock finds most material for each industry (based on the materiality map shown below), while matching key benchmark characteristics (duration, country and industry weights, yield to maturity and credit ratings). Total returns are net of trading costs. Estimated trading costs include two components: a fixed cost (bid-asks) and a variable cost depending on trade size. Backtested performance is hypothetical, simulated and not indicative of actual or future returns. It is developed with the benefit of hindsight, has inherent limitations and invariably shows positive rates of return.

These results are based on a limited four-year time period, but we find them encouraging. The backtested hypothetical portfolio modestly outperformed its global credit benchmark, with similar volatility. See the *Sustainable credit* chart. It offered above-benchmark exposure to almost all of our key sustainability metrics.

**Bottom line:** We find some early evidence that a deeper understanding of materiality can help deliver a financial edge in credit markets. We also see it as a useful tool for engagement, arming investors with the information to question companies about areas of perceived weakness.

## Material world

Financial materiality of BlackRock ESG pillars in global credit, 2015–2019



Source: BlackRock Investment Institute and BlackRock Sustainable Investing, with data from Bloomberg, MSCI, Sustainalytics and Refinitiv, November 2019. Notes: The chart shows BlackRock’s assessment of the financial materiality of key ESG pillars in the global credit market over January 2015 through June 2019. We use regression analysis to estimate the strength of the relationship between each pillar and monthly excess returns (ex duration effects) of 11 credit sectors over the period. “Negligible” indicates that there was little relationship between a particular ESG factor and monthly returns over the period studied; “high” indicates a relatively strong relationship. Note that this analysis is based upon a limited historical period and the materiality of sustainability-related factors may change over time. For illustrative purposes only.

# Growing green bonds

The green bond market is maturing. Outstanding issuance of green bonds, which help finance projects with environmental benefits, hit \$590 billion in August, almost eight times the size of the market in 2015, according to IMF data as of October.

BlackRock has helped devise the Green Bond Principles (GBP), a set of voluntary guidelines that aim to foster transparency and integrity of the market. The four components of the GBP form BlackRock's minimum requirement for a green bond label: declaring the eligible project categories up front, working to establish environmental sustainability objectives, reporting at least annually on the measured use of proceeds, making sure they are ring-fenced for the projects declared. What qualifies as green? The GBP recognizes 10 broad categories, ranging from renewable energy to energy efficiency and sustainable water.

Yet qualifying for green bond status is more than just a binary decision. BlackRock has developed a new rating system that rates green bonds according to their "greenness" — or the impact of the proceeds use. While various "shades of green" spectra have been used more broadly to compare environmental impacts across a range of investments, we find the concept useful to compare among the narrower set of investments that qualify under the GBP. See the *Shades of green* chart.

"Dark green" bonds attract our highest rating: these are projects that BlackRock sees as most likely to help put the world on a long-term track toward a zero-carbon economy. Examples include projects in renewable energy and electric transportation. Lighter shades of green include green building projects that include less stringent energy efficiency standards.

An "off-scale" category covers projects that we consider ineligible for green bond status. These include improvements to fossil fuel infrastructure, such as technologies aimed at reducing the environment impact of coal burning. Such projects may have clear environmental benefits. Yet any intervention that prolongs the useful life of brown (fossil fuel) assets is not consistent with an eligible green project within best market practice for green bonds, in our view. Nuclear energy projects are also excluded due to the potential environmental impacts of radioactive waste — despite their zero-carbon benefits.

Do green bonds trade differently than their standard counterparts? We studied the green bonds of 40 major U.S. dollar and euro issuers — government and corporate. What we found: There was no material pricing difference between green and non-green bonds as of October 2019. Credit risk was identical, as was liquidity. We found no material difference in bid-offer spreads. Overall, this strengthens our conviction that green bonds are coming of age — and are no longer just a niche strategy for impact investors.

## Shades of green

BlackRock's green bond rating categories, 2019

| Very light green   | Light green   | Medium green   | Dark green  |
|--|---|--|---|
| Projects that yield only marginal improvements over baseline energy consumption and CO <sub>2</sub> emissions.   | Projects that yield improvements over baseline energy consumption and CO <sub>2</sub> emissions, but are not yet aligned with long-term decarbonization.                                | Projects that yield improvements over baseline energy consumption and CO <sub>2</sub> emissions, and show some signs of alignment with long-term decarbonization.              | Projects that BlackRock determines are most likely to help put the world on the long-term path to decarbonization.                              |
| <b>Examples</b> <ul style="list-style-type: none"> <li>• "Sustainable" plastic packaging</li> <li>• High speed mobile networks</li> <li>• Green buildings with silver LEED rating</li> </ul> | <b>Examples</b> <ul style="list-style-type: none"> <li>• Non-electrified public transit</li> <li>• Environmental remediation</li> <li>• Adaptation projects (e.g. sea walls)</li> </ul> | <b>Examples</b> <ul style="list-style-type: none"> <li>• Green buildings (stringent standards)</li> <li>• Hybrid electric vehicles</li> <li>• Waste water treatment</li> </ul> | <b>Examples</b> <ul style="list-style-type: none"> <li>• Renewable energy</li> <li>• Electric transportation</li> <li>• Smart meters</li> </ul> |
| <b>Share of index</b><br>2%  | <b>Share of index</b><br>33%  | <b>Share of index</b><br>17%   | <b>Share of index</b><br>48%  |

Source: BlackRock Investment Institute, with data from Bloomberg, November 2019. Notes: For illustrative purposes only. Share of index refers to the share of green bonds under each BlackRock rating category in the Bloomberg Barclays U.S. Aggregate Index as of June 2019.

# Building sustainable portfolios

We demonstrate how adding fixed income ESG exposures to a diversified multi-asset portfolio can meaningfully increase its sustainability without sacrificing return objectives.

## Making multi-asset sustainable

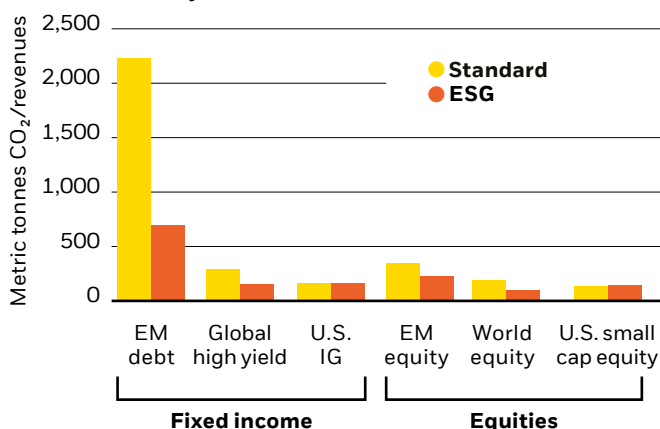
Recent advances in ESG fixed income indexes have deepened the toolkit for multi-asset investors. Fixed income allocations often comprise more than half of such portfolios. This means equity-focused ESG allocations alone can only do so much to improve the sustainability profile of such portfolios.

These indexes can help boost the average ESG score of a portfolio and reduce its carbon footprint. The recent availability of sustainable indexes in emerging market debt is a particularly important step forward: Many EM debt issuers are significant emitters of greenhouse gases. Their “carbon intensity” is therefore much higher than other asset classes. Yet new sustainable EMD indexes allow for a dramatic reduction in the carbon emissions embedded in such exposures. See the *Curbing carbon* chart below.

We used a hypothetical global multi-asset strategy to illustrate how ESG indexes can be utilized to integrate sustainability into such a portfolio. The portfolio seeks balanced exposures to six key macroeconomic factors, or persistent drivers of asset class returns: economic growth, real rates, inflation, credit, emerging markets and liquidity. This translates into a global asset allocation that spans large- and small-cap equities, sovereign debt, credit, commodities and property across developed markets and EMs. See the top-right chart.

### Curbing carbon

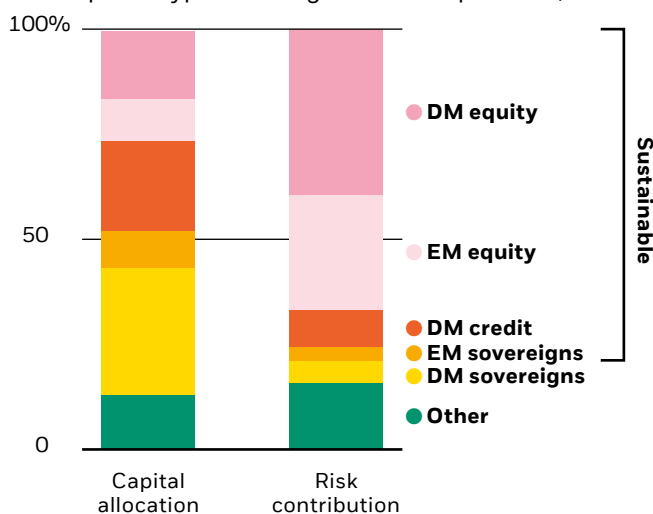
Carbon intensity: standard vs. ESG indexes, 2019



Source: BlackRock Investment Institute, with data from MSCI, October 2019.  
Notes: The chart shows the carbon intensity (metric tonnes of CO<sub>2</sub> emissions divided by total revenues) of standard equity and bond indexes versus their ESG counterparts. Standard indexes are represented by: JP Morgan EMBI Global Diversified Index, Bloomberg Barclays Global HY Index, Bloomberg Barclays U.S. Corporate Index, MSCI Emerging Market Index, MSCI World Index and MSCI USA Small Cap Index. ESG indexes: JP Morgan ESG EMBI Global Diversified Index, Bloomberg Global HY Sustainable SRI, Bloomberg Barclays MSCI US Corporate ESG Focus Index, MSCI Emerging Market ESG Enhanced Focus Index, MSCI World ESG Enhanced Focus Index and MSCI USA Small Cap Extended ESG Focus Index.

## Sustainable substitutions

Makeup of a hypothetical global factor portfolio, 2019



Source: BlackRock Investment Institute, October 2019. Notes: The chart shows the allocations of a hypothetical global multi-asset portfolio. DM sovereigns include inflation linked debt. DM credit includes both investment grade and high yield debt. Other includes property, commodities and cash. Indexes used are: MSCI World ESG Enhanced Focus Index and MSCI USA Small Cap Extended ESG Focus Index (DM equity), MSCI Emerging Market ESG Enhanced Focus Index (EM equity), JP Morgan ESG EMBI Global Diversified Index (EM sovereigns), Bloomberg Barclays MSCI US Corporate ESG Focus Index and Bloomberg Global HY Sustainable SRI (DM credit), BAML Global IL Government and Barclays Global Treasury G7 Countries (DM sovereigns), FTSE EPRA Nareit Developed (other) and Bloomberg Commodity Index (other). For illustrative purposes only.

The goal of this hypothetical portfolio: to demonstrate a tangible improvement in portfolio level ESG metrics and a reduction in portfolio-level carbon emissions, while delivering better diversification than traditional 60/40 portfolios. Fixed income allocations, including emerging market debt, make up around 60% of the hypothetical portfolio. Replacing a portion of this with sustainable indexes can meaningfully boost the overall portfolio's ESG profile, we found. This came without changing the risk-return profile or the need to venture into more niche indexes such as green bonds. See [page 19](#) for details.

Using available sustainable fixed income and equity indexes we can substitute the following assets: all equity exposure, investment grade and high yield credit, and emerging market sovereign debt. This allows us to replace more than 50% of the hypothetical portfolio by market weight (and risk contribution). See the *Sustainable substitutions* chart for the portfolio's exposures by capital allocation and risk contribution.

Why not replace 100% of the portfolio with sustainable assets? For some asset classes, such as property and commodities (in the “other” slice of the chart), it is harder to find substitute assets that offer similar underlying exposures. Green properties, for example, offer such promise, but remain a niche investment area. Similarly, ESG indexes are yet to come to asset classes such as developed market inflation-linked debt.

## Our key findings:

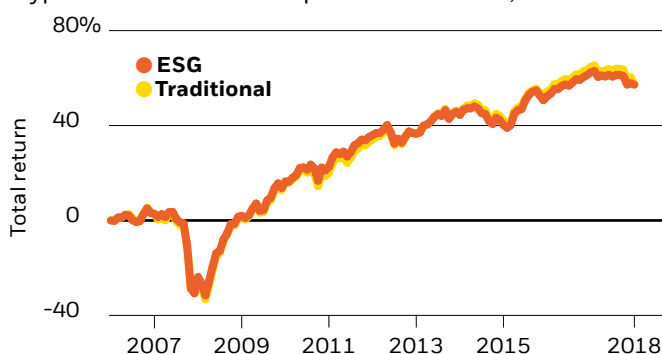
The hypothetical sustainable multi-asset portfolio retained a similar risk-return profile to its traditional counterpart. It delivered a 20% improvement in the portfolio's overall ESG score — and a carbon intensity almost 50% lower, according to calculations based on our market-weighted allocations and ESG scores and carbon data from index providers. Other key findings:

- Total returns were roughly identical to the traditional portfolio over the period studied, which included the global financial crisis and several bouts of volatility in the period since. See the *Drawing even* chart.
- The replacement of traditional assets with their sustainable versions did not meaningfully impact the diversification properties of the multi-asset portfolio.
- The relatively low correlations across asset classes — which help cushion such a portfolio against episodes of volatility — remained largely unchanged.

**Bottom line:** The toolkit for multi-asset investors is deepening when it comes to integrating sustainability-related factors. Our work shows how global factor investing and sustainable investing can be combined. The resulting portfolio matches returns of its standard counterpart while significantly improving upon its sustainable characteristics. Such portfolios may offer greater resilience in the future as ESG-related risks such as the increasing incidence of extreme weather events compound over time. We see this as further evidence of a “why not?” moment in sustainable investing.

### Drawing even

Hypothetical multi-asset portfolio backtest, 2007–2018



**Past performance is not a reliable indicator of current or future results.**

Source: BlackRock Investment Institute, with data from Bloomberg and MSCI, November 2019. Notes: The chart shows backtested performance of a hypothetical multi-asset portfolio from 2007 through 2018. See the previous page for the portfolio's risk and asset composition. We show a traditional portfolio (non-ESG) versus its ESG counterpart. The hypothetical ESG portfolio substitutes out standard (non-ESG) indexes for ESG replacements based on availability of backtested data for the latter, as follows: global equities (from 2007), global credit (2007), EM equities and EM debt (2013). Returns do not reflect any management fees, transaction costs or expenses. Backtested performance is hypothetical, simulated and is not indicative of actual or future returns. It is also developed with the benefit of hindsight, has inherent limitations and invariably shows positive rates of return. For illustrative purposes only.

## A different lens

Duration-adjusted ESG scores of hypothetical portfolio

|             | Bond                        | Allocation | Duration | ESG score |
|-------------|-----------------------------|------------|----------|-----------|
| Portfolio A | 1-year                      | 50%        | 0.9      | 10        |
|             | 30-year                     | 50%        | 25       | 0         |
|             | Average ESG score           |            |          | 5         |
|             | Duration-weighted ESG score |            |          | 0.35      |
| Portfolio B | 1-year                      | 50%        | 0.9      | 0         |
|             | 30-year                     | 50%        | 25       | 10        |
|             | Average ESG score           |            |          | 5         |
|             | Duration-weighted ESG score |            |          | 9.65      |

Source: BlackRock Investment Institute, October 2019. Notes: For illustrative purposes only. The table shows the allocations of two simplified hypothetical portfolios and their ESG scores. ESG scores are on a 0 (bad) to 10 (good) scale. The duration-weighted ESG portfolio score is calculated by multiplying the duration contribution of each bond (duration of the particular bond divided by total portfolio duration) by its ESG score and summing up these contributions.

## Scoring ESG scores

How to compare the ESG profile of two sustainable funds? The most common approach: taking a market-value weighted average of the issuer ESG scores held in a portfolio. This intuitively makes sense — you want to allocate more in dollar terms to issuers with better ESG ratings and less to issuers with poor ESG ratings. But it potentially overlooks a key nuance: Unlike equities, fixed income instruments have a maturity date. Longer dated bonds are more risky; this is why short- and long-term bonds of the same issuer often carry very different credit ratings. An ESG-relevant example: The risk of future carbon regulations is much more material for a 10-year corporate bond than for a short-term one. A potential solution could be for fixed income investors to look at duration-weighted ESG scores for portfolios.

Let's see how this might work. Consider two simplified portfolios. Both have equal-weighted exposure to two bonds: a 1-year and a 30-year. In Portfolio A, they are issued by companies with the highest and lowest possible ESG rating respectively. Portfolio B is a mirror image: see the *A different lens* chart. Both portfolios have identical average ESG scores, but very different *duration-weighted* ESG profiles. Portfolio B scores much more highly on sustainability on this measure.

To be sure, this is an extreme example. The effects of using a such a methodology on a broad and diversified portfolio would be less stark. We are not arguing that this is the definitive approach to calculating a portfolio-level ESG score in fixed income. And we see room to further refine this analysis, by incorporating credit spreads, for example. Yet we believe this thought exercise offers a useful lens for viewing some of the nuances of ESG integration that are unique to bonds.

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