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Sustainable and Impact Bond Funds: An Evolving Terrain

Green bond funds maintain the lead, while social and sustainability bond products find their footing.

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Executive Summary

The global sustainable bond landscape has grown in both size and diversity over the past decade, and wading through the multiple options available is a daunting task for investors. This paper first delves into the growth of the broader sustainable bond fund universe, then focuses more specifically on funds that aim to achieve positive impact by investing in the growing asset class of green, social, sustainability, sustainability-linked, and transition bonds, or GSS+. Green bond funds are the most mature segment of this cohort, both in size and length of track record, but have so far had mixed fortunes, with significant underperformance in 2022 owing largely to their longer duration than traditional peers. Meanwhile, social, sustainability, and sustainability-linked bonds have been a less fertile ground for dedicated fund launches.

Key Takeaways

- Assets in sustainable bond funds have grown 11 times over the past decade, reaching USD 516 billion globally at the end of 2022, of which 23% are in passive funds.
- Net inflows into sustainable bond funds slowed in 2022 but remained positive, while traditional bond funds experienced massive outflows in the challenging market environment.
- Bond investors have a wide palette of sustainable approaches at their disposal, including negative screening, positive screening, and funds that focus on impact bonds. Within the impact theme, the main conduit are funds investing in green, social, sustainability, and sustainability-linked bonds, or GSS+.
- Green bonds, whose proceeds are used to finance environmental projects, are by far the most mature segment of the GSS+ space (accounting for around two thirds of the market), with steady issuance and increased representation from emerging markets in addition to traditional developed-markets issuers. Unsurprisingly, green bond funds are the largest group identified for this study, with more than 100 funds currently on the market globally.
- 56% of sustainable bond funds in our database carry a Morningstar Sustainability Rating of 4 or 5 globes, suggesting that their sustainability features are credible. Of funds specializing in GSS+ bonds, that number is 83%.
- Social bonds, earmarked to finance social projects, are still in their infancy (accounting for roughly 20% of the GSS+ bond market), and are only targeted by a niche group of funds (12 identified funds in Morningstar's database, of which few have a sufficiently long track record to be meaningful).
- Sustainability bonds, which finance a mix of environmental and social projects, likewise account for roughly 20% of existing GSS+ debt. They are present in some generalist impact bond funds, but we have not identified dedicated funds investing in this space.

- Sustainability-linked bonds, or SLBs, account for less than 10% of the GSS+ universe. This new type of bond structure applies a penalty (usually a coupon step-up) if the issuer fails to meet specific ESG goals. While initially touted as the "next big thing" in impact investing, SLBs have not achieved widespread use by impact bond fund managers.
- Transition bonds, at less than 1% of total GSS+ issuance, finance projects in sectors that are structurally difficult to decarbonize, such as steel or chemicals, but their growth has been held back by the lack of internationally accepted standards for transition finance.
- Up until 2022, green bond funds experienced a relatively sanguine period of positive returns and low volatility compared with conventional bond products. That relationship flipped, however, last year, as green bond funds experienced steeper losses and higher volatility in 2022 because of the longer average duration of the green bond space.
- Investors looking to add green bond funds to their portfolio should remain cognizant of the inherent biases of the universe. This includes an overall longer duration than the traditional bond universe, a bias toward corporate bonds, agency, and supranational bonds at the expense of sovereign bonds, and higher representation of the financials and utility sectors at the expense of the energy sector. Such biases can severely affect relative performance, at least over the short to medium term.
- One silver lining for investors is that impact bond funds have not, on average, been sold at higher management fees than their traditional counterparts. Particularly in Europe, well-constructed passive green bond exchange-traded funds are available, enabling investors who truly wish to access the asset class to do so at very reasonable costs.

Sustainable Bond Funds: A Variety of Approaches

The Global Sustainable Bond Fund Universe

For the purposes of this paper, we define sustainable bond funds as open-end funds and ETFs that, by prospectus or other regulatory filings, claim to focus on sustainability or environmental, social, and governance—ESG—factors, or on achieving a positive impact[1].

Our universe of sustainable funds is based on intentionality rather than holdings. For example, a portfolio can score well on ESG metrics such as the Morningstar Sustainability Rating, but if ESG issues are not the focus of the fund's investment strategy, it will not be included in our universe. To identify intentionality, we relied on a combination of fund names (a strong indicator of intentionality) and information found in fund documents. The fund's documents should contain enough details to leave no doubt that ESG concerns figure prominently in the security-selection and portfolio-construction process.

The global sustainable fund universe does not contain the growing number of funds often referred to as "ESG integrated funds," which formally consider ESG criteria in the investment process and engage with issuers but do not make ESG considerations the focus of the investment process.

Furthermore, the global sustainable fund universe doesn't include funds that employ limited exclusionary screens such as controversial weapons, tobacco, and thermal coal (combined with an ESG integration approach or not). We do, however, include ESG-screened passive funds in our universe as, typically for these, the exclusions are the sole purpose of the strategy.[2]

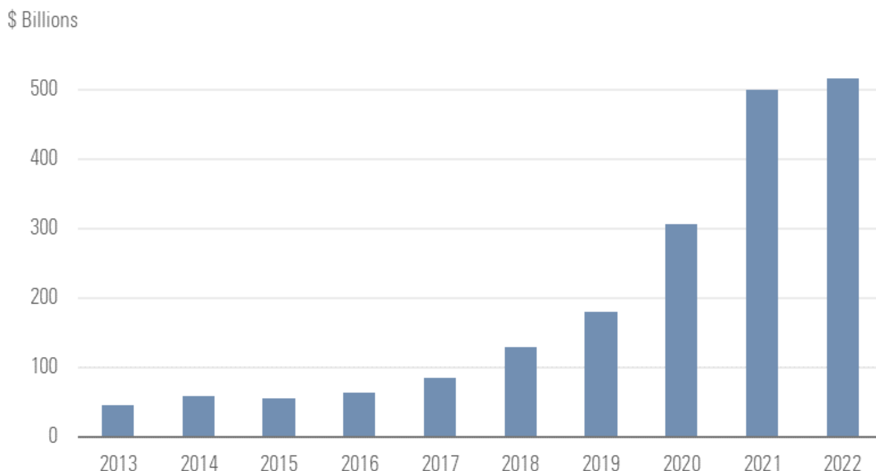
Growth in Sustainable Bond Funds Accelerates

Driven by increased interest in environmental, social, and governance issues and product development, assets in global sustainable fixed-income funds have grown 11 times in the past decade to USD 516 billion at the end of 2022. Growth accelerated in the past couple of years, boosted by record inflows of USD 120 billion in 2021.

1 This is not the same as the definition under the European Union's Sustainable Finance Disclosure Regulation, which defines "sustainable investments" at a holding level.

2 Feeder funds and funds of funds are excluded from the Morningstar sustainable funds universe to avoid double counting of fund assets. Money market funds are cash-equivalent investments and are also excluded from our universe as they tend to be rather volatile in terms of flows owing to the short-term horizon of those investing in them (which arguably is not consistent with the overall sustainability principles aiming for a long-term impact on sustainability goals).

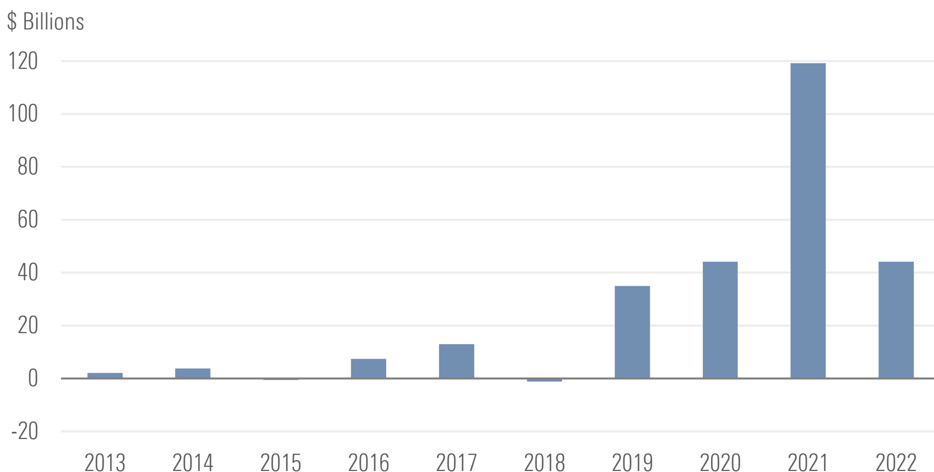
Exhibit 1 10-Year Growth in Sustainable Bond Fund Assets



Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

The year 2022 was challenging with inflationary pressures, rising interest rates, recession fears, and the energy crisis affecting almost all asset classes. As a result, investors pulled a record amount of money out of mutual funds and ETFs. Sustainable bond funds, however, attracted USD 44 billion of new money over the 12-month period ended 31 December 2022 (Exhibit 2). Net inflows into sustainable bond funds last year were lower than in 2021, but they were net positive every quarter, in stark contrast to traditional bond funds, which experienced continuous net outflows.

Exhibit 2 Inflows Into Global Sustainable Bond Funds



Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

Sustainable bond strategies have seen their share of the global sustainable fund universe expand in the last two years to 21%, from 18% two years ago.

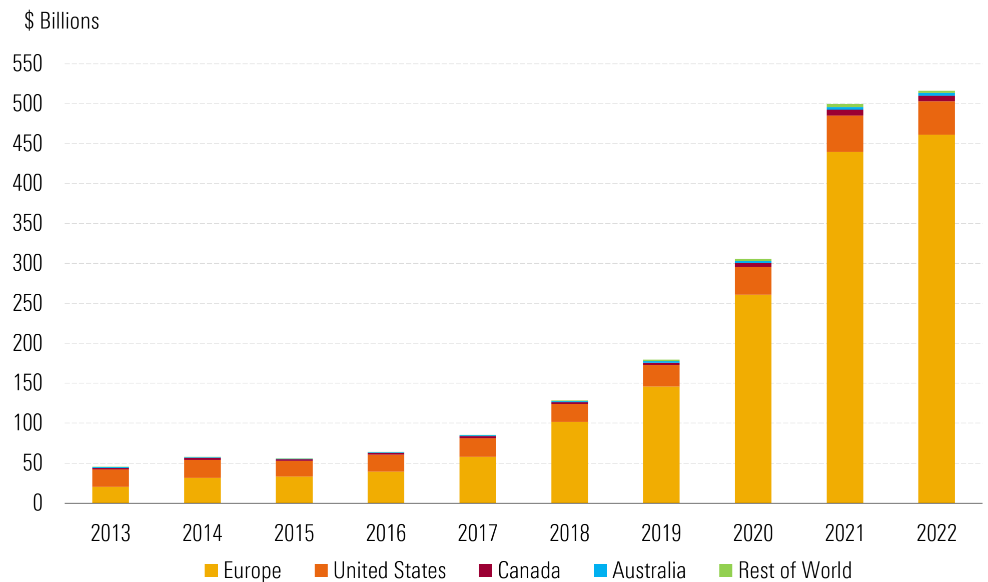
ESG integration in fixed income has long been held back by the inherent complexity of bond markets, with their wide spectrum of different debt instruments, issuer types, and maturities. This was compounded by concerns over data availability, quality, and comparability, especially for sovereign debt.

Despite all the challenges, however, ESG integration in fixed income has become more widespread in recent years as more investors seek to align their entire portfolios to their sustainability preferences and become more specific and targeted in their ESG approach to fixed income. Increased interest in impact investing, for example, has translated into higher demand for green and social bonds, or investments anchored in the United Nations Sustainable Development Goals.

Europe Dominates

ESG fixed-income fund assets are predominantly domiciled in Europe, which comprises nearly 90% of all assets (Exhibit 3). This is higher than Europe's share (83%) of the overall sustainable fund market. European asset managers pioneered ESG integration in fixed-income management, with many firms building ESG research teams and launching socially responsible fixed-income funds beginning in the early 2000s. Europe’s advantage in sustainable investing is driven largely by local investor preferences.

Exhibit 3 10-Year Growth in Sustainable Bond Fund Assets Split by Domicile



Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

In more recent years, the 2015 Paris Climate Agreement, the EU Action Plan on Sustainable Finance in 2018, and the Sustainable Financial Disclosure Regulation in March 2021 have accelerated the adoption

of ESG strategies by institutional investors across Europe. Retail investors have also contributed to this growth, though to a lesser extent. They still hold a smaller portion of European assets (between 10% and 25%, depending on classifications). This is in contrast with the United States where the retail/institutional fund asset split is closer to 50%/50%.

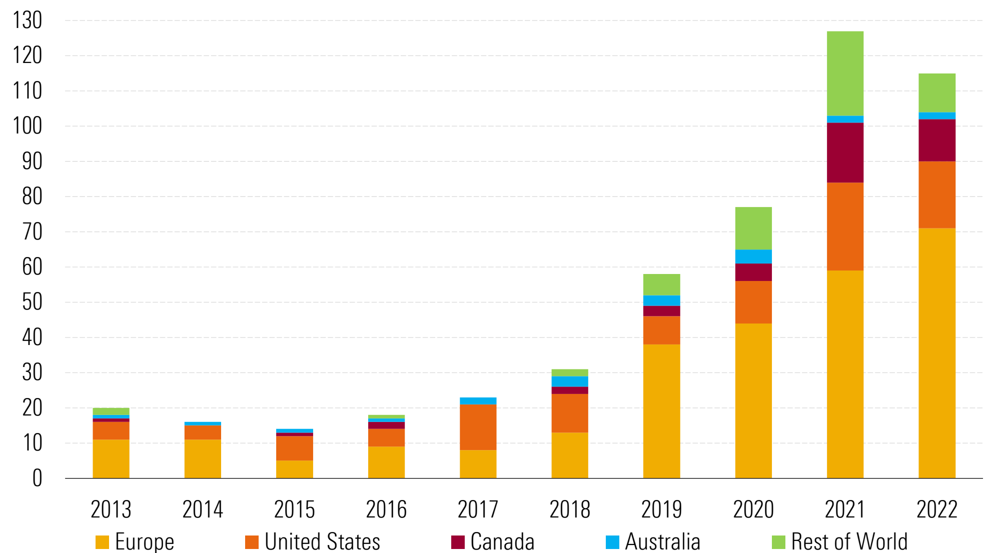
Despite rapid growth, the U.S. sustainable fund market continues to lag Europe, largely owing to the political and regulatory environment. U.S. regulation has fluctuated between a neutral stance and open discouragement by the previous Trump Administration. In 2022, the politization of ESG took another turn, with prominent politicians in Texas and other states taking steps to ban asset managers and funds viewed as "boycotting" fossil fuel companies and promoting an ESG agenda. The extent to which these events have affected investor sentiment is difficult to quantify, but they help explain the different trajectories ESG investing has taken in the U.S. versus Europe.

Outside of Europe and the U.S., assets in sustainable fixed-income funds are also increasing but from a very low base. As of December 2022, we identified just 130 such products, more than half of which were domiciled in Canada and Australia.

Product Development

Growing interest in sustainable and impact investing has encouraged more fund managers to launch suitable fixed-income products. Product development has accelerated since 2019, reaching an all-time high in 2021 with 115 new fund launches (Exhibit 4). The sustainable bond fund growth has been across many market sectors, including diversified bond funds, investment-grade and high-yield corporate bond funds, and emerging-markets debt funds.

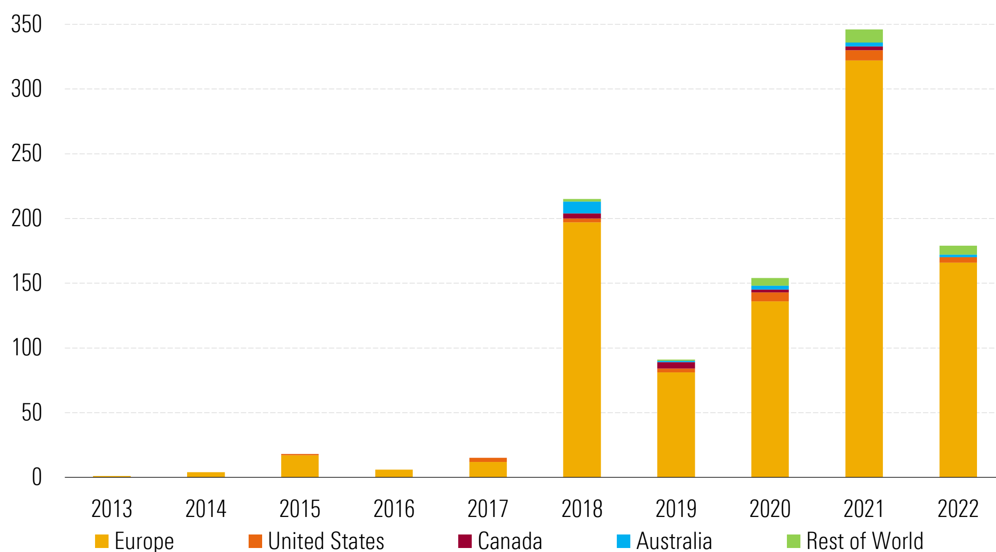
Exhibit 4 Growth in Sustainable Bond Fund Launches



Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

As of December 2022, there were 1,480 sustainable bond funds globally. Launching new funds is not the only way asset managers have been able to offer more choices to sustainability-oriented investors. They have also repurposed existing conventional strategies into sustainable ones. In many cases, managers have also rebranded the funds by adding ESG-related terms in the fund's name to make the new strategies more visible to investors.

Exhibit 5 Growth in Repurposed Sustainable Bond Funds



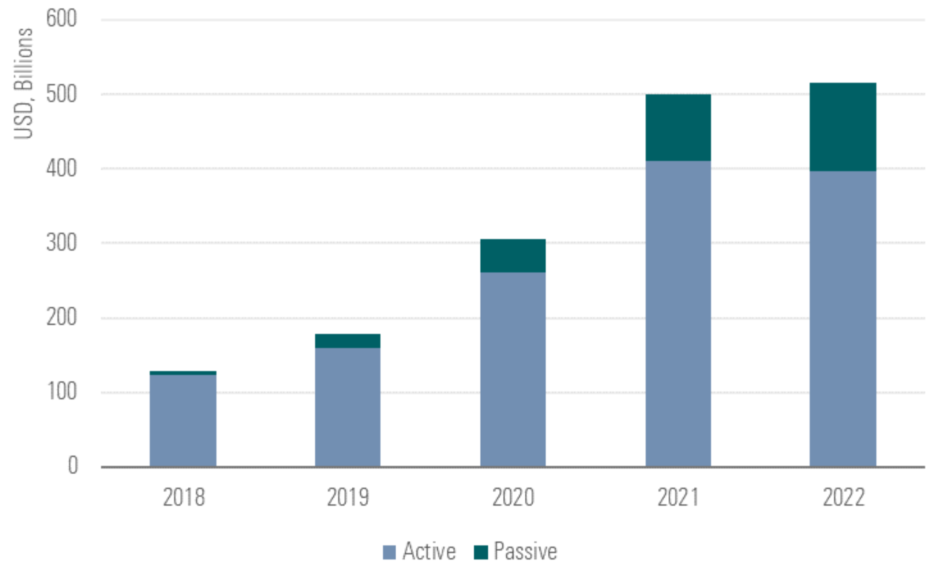
Source: Morningstar Research. Data as of December 2022.

Repurposing funds has been more prevalent in Europe, where the number of repurposed funds exceeds the number of launches. This practice took off in Europe in 2018, coinciding with the EU Action Plan on Sustainable Finance and peaked in 2021 following the implementation of the SFDR in March that year. Repurposing funds allows asset managers to leverage existing assets to build their ESG fund offerings but has also been used in some cases to reinvigorate funds that had difficulties in attracting inflows or were struggling to deliver compelling performance, as discussed in Morningstar's "Rebranded ESG funds" report published in February 2023.

Passive Sustainable Bond Funds

Thanks to the increased amount of ESG data and the development of new and innovative indexes, the passive ESG fixed-income fund space has expanded significantly in recent years. At the end of 2022, there were 194 such open-end and exchange-traded funds available globally, almost double the number of two years ago. These funds track indexes that employ exclusions, best-in-class, tilting, optimization, and/or thematic approaches (see next section). Global assets in passive ESG bond funds totaled nearly USD 120 billion at the end of 2022, from just USD 44 billion a couple of years ago. Their market share in the overall ESG bond fund market swelled to over 23%, from 14.5%.

Exhibit 6 Active vs. Passive Sustainable Bond Funds



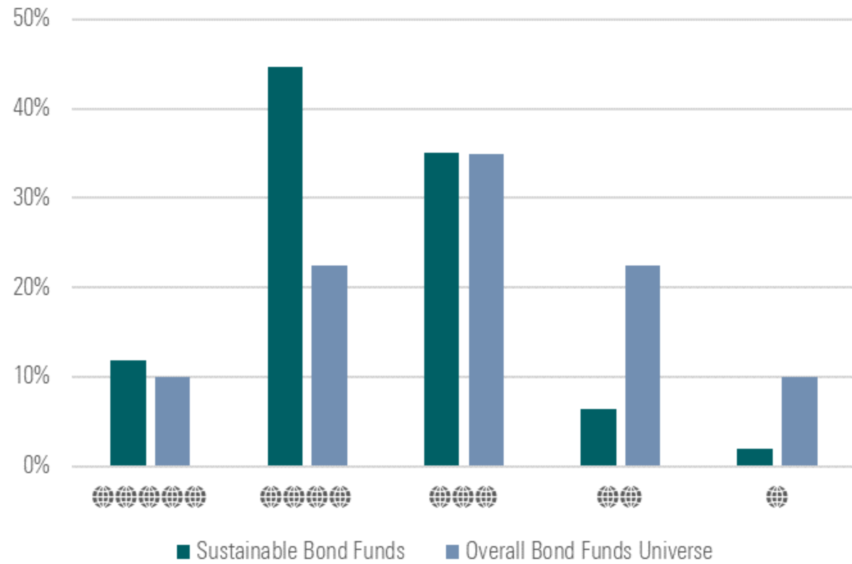
Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

How Do Sustainable Bond Funds Stack Up on the Morningstar Sustainability Rating?

Morningstar uses legal filings to identify its universe of sustainable funds. It is important therefore to apply some additional layers of analysis, both qualitative and quantitative, to see if these funds deliver on their promises. Here, we look at the extent to which ESG bond funds perform through the lens of the Morningstar Sustainability Rating.

The Morningstar Sustainability Rating™—also known as the globe rating—is a measure of how well a fund's holdings are managing their ESG risks relative to the fund's peer group. Globes are awarded based on a normal distribution within each Morningstar Global Category. Certainly, we should expect sustainable funds to be holding bonds of companies and entities that are managing their ESG risks better than those in conventional funds. As seen in Exhibit 7, that is indeed the case. Fifty-six percent of sustainable bond funds receive the top ratings, 4 or 5 globes, compared with only one third of funds overall. At the other end of the scale, only 8.3% of sustainable bond funds receive the lowest ratings of 1 or 2 globes compared with one third of funds overall.

Exhibit 7 Globe Distribution for Sustainable Bond Funds Compared With the Overall Bond Fund Universe (in %)



Source: Morningstar Direct, Morningstar Research. Data as of December 2022.

Meanwhile, limiting the analysis to only funds investing in Green, Social or more diversified GSS+ bonds also shows that the majority (83%) of funds carry 4 or 5 globes. It's crucial to emphasize however that the number of globes reflects the ESG risk profile of the issuers, not the ESG risk of the projects financed by the bond proceeds.

Exhibit 8 Share of Green, Social, or GSS+ Bond Funds Earning Morningstar Sustainability Ratings

Morningstar® Sustainability Rating™	% of GSS+ bond funds with available Morningstar Sustainability Ratings
🌐🌐🌐🌐🌐	24.1%
🌐🌐🌐🌐	58.9%
🌐🌐🌐	16.1%
🌐🌐	0.89%
🌐	None

Source: Morningstar Direct, Morningstar Research. Data as of March 2023.

A Broad Array of Approaches

Sustainable bond funds use various approaches to incorporate ESG factors into their strategies and address investors' preferences and investment objectives. These range from applying exclusions, limiting ESG risks, and seeking ESG opportunities, to practicing active ownership, targeting sustainability themes, and integrating impact assessments into security selection and portfolio construction. These approaches are often used in combination and not mutually exclusive.

Screening

Screening uses a set of filters to determine which sectors, issuers, or activities are eligible to be included in or excluded from a portfolio based on values, norms, or ESG scores.

a) Negative screening—also referred to as *exclusions*—focuses mostly on avoiding securities, issuers, or industries based on certain activities and business practices. Commonly, negative screening targets companies in breach of the United Nations Global Compact principles and those associated with controversial weapons and tobacco. More recently, amid a heightened public awareness of environmental issues and rising concerns about climate risks, the list of common exclusions has expanded to include thermal coal, tar sands, Arctic oil, oil sands, traditional oil and gas producers, and the highest carbon emitters.

While negative screening for corporate bonds is comparatively straightforward to implement, it is more challenging to apply to sovereigns, especially in developed markets. For example, excluding key countries like the U.S. based on its defense spending or environmental record could make sense from a purely ESG perspective but would lead to undesirable outcomes for investors from a return perspective. Negative screening is more easily applicable to emerging-markets countries where there is greater disparity in ESG profiles and where excluding countries based on, for example, their human rights records or corruption levels would not disproportionately affect portfolio composition.

b) Positive screening—also referred to as *best-in-class*—aims to invest in or tilt toward securities with strong or improving ESG characteristics. Typically, these strategies focus on the bonds of issuers that fund managers, analysts, or third-party ESG data providers believe are addressing sustainability challenges that will make them better investments. Some target a theme such as climate change and focus on selecting or overweighting the lowest emitters and/or those with a net-zero strategy in the investment universe.

Impact

From being a niche approach, "impact" is receiving increasing attention from investors, despite the lack of a standardized definition. Impact investing is generally defined as allocating capital toward issuers or projects that aim to contribute to positive environmental and/or social outcomes. In most cases, investors expect the impact achieved by the investment to be intentional, measurable, and additional. (Additionality denotes the positive outcomes that would otherwise not have occurred if investors had not expressly engaged with the company or directed their capital toward specific projects.)

In this study, we make the distinction between funds that focus on impact bonds—a rapidly growing segment of fixed-income products specifically earmarked to finance environmental and/social projects—and funds that invest in conventional bonds issued by companies deemed to have environmental or social benefits.

a) General impact funds—Impact strategies can invest in conventional "general purpose" bonds of companies or countries with a high level of alignment with one of more of the U.N. Sustainable Development Goals. These typically are companies that offer products and solutions across the themes of healthcare, education, energy transition, food security, financial inclusion, water, and waste management. One example is the USD 2.1 billion RobecoSAM Global SDG Credits fund, which invests in companies whose business models and operational practices are aligned with targets defined by the 17 U.N. SDGs.

a) Impact bond funds—When bond proceeds are explicitly dedicated to specific environmental and social projects and causes, these instruments are referred to as "impact bonds." This type of bond, encompassing green, social, sustainability, sustainability-linked, and transition bonds (commonly called GSS+ bonds), is the focus of the remainder of this paper.

Green, Social, Sustainable, and Sustainability-Linked Bonds: A Burgeoning Asset Class

The GSS+ Universe

Representing roughly USD 3.3 trillion in cumulative issuance as of June 2022, GSS+ (green, social, sustainability, and sustainability-linked bonds)—also collectively referred to as "impact bonds"—have flourished in recent years. However, these bonds remain a small chunk of the more than USD 230 trillion fixed-income universe.

Of the handful of categories that make up the GSS+ universe, the largest three (green, social, and sustainability bonds) are issued to fund initiatives deemed to be sustainable. Green bonds, accounting for roughly two thirds of the overall GSS+ universe, finance projects that aim to achieve positive environmental impact, such as renewable energy development or energy efficiency improvements. Social bonds are typically tied to projects aimed at achieving positive social outcomes, such as improving access to affordable housing, increasing food security, or helping individuals with disabilities. Social bond issuance has grown quickly since the 2020 onset of the coronavirus pandemic. Sustainability bonds, meanwhile, finance a mix of green and social projects. Both social and sustainability bonds had accounted for roughly a fifth of total GSS+ issuance through mid-2022, according to the Climate Bonds Initiative, an international organization dedicated to mobilizing capital to fight climate change.

Sustainability-linked bonds, or SLBs, use a different structure. Representing less than 10% of overall GSS+ assets, SLBs finance day-to-day issuer activities rather than specific "green" or "social" projects. However, specific features of the bonds (usually a bond's coupon) can be adjusted depending on whether the issuer meets its sustainability performance targets. The bond's covenants set the terms of the penalties applied if targets (typically greenhouse gas emissions goals) are not met. SLBs are a recent entrant to the GSS+ bond arena, having first appeared in 2019.

The final piece of the GSS+ puzzle, transition bonds, represented less than 1% of GSS+ issuance volume in the first half of 2022, according to Climate Bonds Initiative data. Transition bonds are similar to green and social bonds in that their proceeds are earmarked for specific projects but in sectors that are structurally difficult to decarbonize, such as steel, chemicals, aviation, and some utilities. In layman's terms, transition bonds usually finance projects that can't be inherently "green" but are trying to become "less brown," or less carbon-intensive. No internationally established norms and definitions exist around transition finance yet, which has limited the scale of such offerings for now.

Norms and Labels

As the GSS+ bond market matures, norms and standards governing the bonds' structure, labeling, and use continue to evolve. So far, no government regulatory bodies currently exist to police the application of the labels like "green" or "social" bond. However, several entities have developed voluntary frameworks aimed at establishing standards for bond issuance within the GSS+ space.

The most widely used framework is that issued by the International Capital Markets Association, a global trade association for market participants that promotes standardized documentation and market practices for equity and debt instruments. ICMA's Green Bond Principles (first published in 2014), Social Bond Principles (first published in 2017), and Sustainability Bond Principles (also first appearing in 2017) are generally considered the leading standards in determining whether or not bonds qualify for certain GSS+ labels. They specify the kinds of projects ICMA deems eligible to be considered "green" or "social," as well as the terms for project evaluation, management of proceeds, and reporting that should be built into each deal. Since 2020, ICMA has also published voluntary guidelines for sustainability-linked bonds that specify best practices to be followed for defining green and social performance indicators, structuring bond covenants, and evaluating outcomes.

However, ICMA is not the sole arbiter of GSS+ credibility. In February 2023, the European Commission published its own "European Green Bond Standard" with the stated goal of setting the "gold standard" for green bond issuance practices. As of yet, neither body offers official guidelines for bonds that aspire to the "transition" label.

While the ICMA and European Commission guidelines provide frameworks for determining whether a given bond qualifies for one of the primary GSS+ categories, they do not issue certifications of compliance to issuers. For this, market participants rely on evaluations furnished by outside experts. There are many companies and organizations offering to carry out such evaluations, and their methods vary in terms of rigor. Audit firms issue "third-party assurances," which determine whether or not an offering is broadly aligned with ICMA guidelines. "Second-party opinion providers," such as Morningstar Sustainalytics (a division that provides sustainability research) or ratings agency S&P, provide more detailed analyses that include an assessment of whether the underlying projects themselves are likely to achieve their stated environmental or social goals. The Climate Bonds Initiative offers a widely respected certification scheme that evaluates bonds' alignment with the goals of the Paris Climate Agreement. There is evidence that market participants generally view external evaluations of bonds' GSS+ credentials as valuable; according to a recent Intercontinental Exchange, or ICE, report, 88% of self-labeled green, social, and sustainability bonds issued in 2022 were verified by external evaluators, up from 84% in 2021.

Indexing the GSS+ Universe

The growth of the GSS+ bond sector has gone hand-in-hand with the development of indexes covering these markets, including green bond indexes, social bond indexes, and those that cover broader groupings of GSS+ categories. Given the lack of an official GSS+ designation, one challenge for index providers has been deciding which bonds are "green," "social," or "sustainable" enough for inclusion.

Construction rules of indexes from different providers tend to show a fair level of overlap, but there are also important nuances that set them apart.

Green bonds form the largest cohort within the GSS+ universe, and they are also the most established category with the most indexes. (The first green bonds were issued in 2007, five years before the first social bonds came onto the scene.)

To illustrate the different approaches taken by index providers to defining an investable universe, Exhibit 9 summarizes the key characteristics of the five green bond index families most used by funds in Morningstar's database. (For simplicity, the table focuses on global indexes. However, each index provider typically offers multiple regional or currency-based as well.)

Exhibit 9 Global Green Bond Indexes: Key Features

	Bloomberg		ICE BofA	JP Morgan	Solactive	S&P Global iBoxx
	MSCI Global Green	Global Agg Green (launched in Oct 2022)				
Green bond criteria	Any bond deemed green by MSCI ESG Research.	Any bond deemed green by Bloomberg Sustainable Finance Solutions.	Any bond with a defined use of proceeds that fits the ICMA Green Bond Principles.	Climate Bond Initiative	Climate Bond Initiative	Climate Bond Initiative
Country coverage	Developed and Emerging Markets.	Developed and Emerging Markets.	Developed and Emerging Markets.	Developed and Emerging Markets.	Developed and Emerging Markets.	Developed and Emerging Markets.
Type of issuer	Sovereign, quasi-sovereign and corporate issuers.	Sovereign, quasi-sovereign and corporate issuers.	Sovereign, quasi-sovereign and corporate issuers.	Sovereign, quasi-sovereign, corporate and supranational issuers from developed markets. Sovereign only from emerging markets.	Sovereign, quasi-sovereign and corporate issuers.	Sovereign, quasi-sovereign and corporate issuers.
Minimum maturity	12 months for inclusion. Bonds held until maturity.	12 months for inclusion. Bonds held until maturity.	18 months for inclusion. Bonds held until one month to maturity.	2 years for inclusion. Bonds held until 6 months to maturity.	6 months for inclusion. Bonds held until one month to maturity.	18 months for inclusion. Bonds held until one month to maturity.
Credit quality	Investment-grade.	Investment-grade.	Investment-grade.	Investment-grade.	Investment-grade.	Investment-grade and high yield.

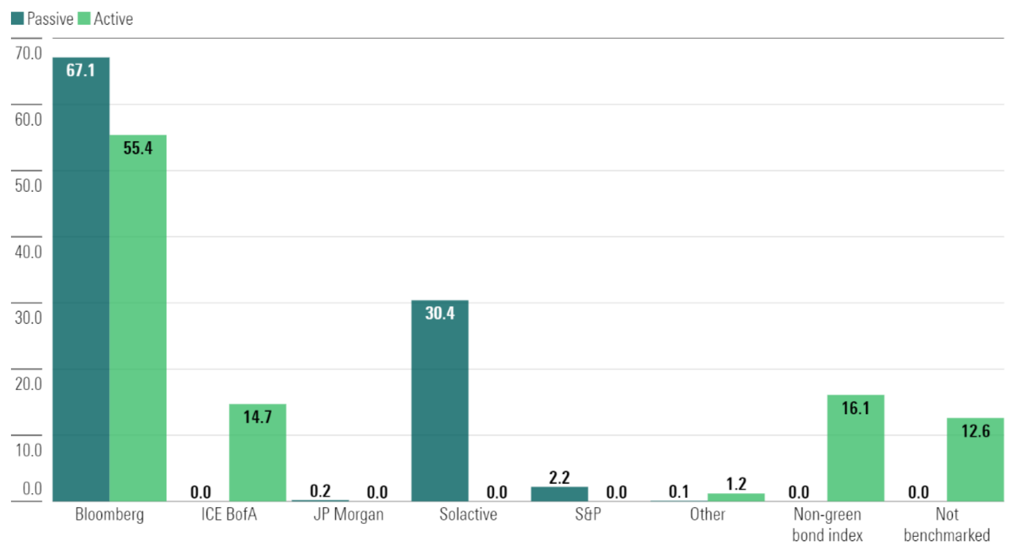
Source: Morningstar Research.

While all six of the major index providers broadly define green bonds in accordance with ICMA's Green Bond Principles, there are differences in how each player evaluates whether individual bonds meet this standard. ICE accepts as green any bond for which the issuer claims that the use of proceeds is compliant with the Green Bond Principles, without performing additional checks to assess the veracity of the claims. JP Morgan, Solactive, and S&P Global iBoxx rely on the Climate Bonds Initiative's green bond database, which takes as its starting point all bonds that are labeled by their issuers as green, and then filters out those that Climate Bonds Initiative analysts believe do not meet the standards of the Green Bond Principles, as well as its own set of more-specific guidelines related to the use of bond proceeds.

Bloomberg holds the market-leading position as the index house of reference for the green bond market for active and passive funds. In its initial index launches, Bloomberg relied on the ESG expertise of MSCI to screen the bond universe for issues sufficiently green for inclusion. However, in October 2022, Bloomberg launched a new suite of green (as well as social and sustainable) bond benchmarks leveraging the expertise of the in-house Bloomberg Sustainable Finance Solutions group with the support of additional screening by Sustainalytics. In both of Bloomberg's index suites, the selection pool includes bonds classified as green by analysts (whether at MSCI or BSFS), rather than relying exclusively on external certifications or labels. Thus, Bloomberg's indexes may include bonds that the issuer has self-labeled as "green" but whose label was not vetted by outside experts. They may also include bonds that lack a "green" label entirely but are identified by MSCI or Bloomberg as meeting the criteria laid out in ICMA'S Green Bond Principles, including commitments about a bond’s stated use of proceeds, project evaluation and selection, management of proceeds, and ongoing reporting on the environmental performance of the use of proceeds.

Active fund managers who reference green bond indexes show a clear preference for the fixed-income pedigree of Bloomberg and the ESG research capabilities of MSCI. These include funds from BNP Paribas, Mirova, Pimco, and Robeco. However, while still retaining a commanding lead, Bloomberg has lost market share in the passive fund space since our previous review in June 2021. Back then, 83% of assets in passive green bond funds were tied to Bloomberg indexes, but this has come down to 67%. Two factors explain this. First, the Ireland-domiciled iShares Green Bond Index Fund lost over half of its assets because of a redemption in March 2022. Still, it remains the largest passive green bond fund in the world. Second, in the last two years, we have seen a flurry of ETF launches and several have opted to track indexes from other houses.

Exhibit 10 Index House of Reference for Green Bond Funds (% of Total Assets)



Source: Morningstar Research. Data as of February 2023.

Roughly 30% of global assets in passive green bond funds follow Solactive indexes. Solactive is the index house of reference for three of the four-strong suite of Lyxor-branded green bond ETFs (Lyxor is now part of Amundi): Lyxor Green Bond ETF CLIM, the second largest passive green bond fund in the world; Lyxor Corporate Green Bond ETF PLANFP; and Lyxor Euro Government Green Bond ETF EAH. Solactive is also used by two ETFs in Canada and Australia. However, no active fund is referenced to a Solactive green bond benchmark.

The remaining 3% of global assets in four passive green bond funds are tied to indexes from S&P (now owner of iBoxx Markit) or JP Morgan. Of these, the L&G ESG Green Bond ETF GBNB remains the only passive strategy tracking a JP Morgan index, which includes a small sliver of high-yield issuers. No active strategy is referenced to green bond indexes from S&P or JP Morgan.

The case of the ICE Bank of America green bond index is somewhat peculiar. Eight active funds, representing 15% of assets in active green bond funds, use the benchmark. These include large funds from the likes of Allianz and AXA in Europe and Calvert in the United States. No passive funds track the index, most likely because of its inclusion of unverified, self-reported green bonds. However, some active managers have said that ICE's broad selection approach, combined with the expertise of their in-house sustainable research teams, may allow them to find interesting opportunities among unvetted bonds. On this point, it is important to underline that some active managers referenced to other green bond benchmarks may also seek value in off-benchmark positions, and this can include self-labeled, unvetted green bonds or even standard bonds from issuers deemed as “sustainability champions.” This means that investors must do proper due diligence of managers to avoid ending up with a portfolio that doesn't meet expectations.

While all passive funds track green bond indexes, not all active green bond funds are referenced to them. Twenty-three active funds, representing 16% of assets in the space, measure their performance against non-ESG bond and even money market indexes. Meanwhile, 20 active funds, representing 13% of assets, are not benchmarked, thus leaving investors to seek their own yardstick to assess the success or failure of the strategy.

Social bond and sustainability bond indexes have developed at a slower pace than the larger business of green bond benchmarking. Indexes like the ICE Green, Social & Sustainable Bond Index offer broad exposure to the GSS+ bond market, acknowledging that many investors interested in these bonds are equally interested in directing proceeds to green and social projects. The combination of the three bond markets in one benchmark can also bring benefits for passive fund providers as it widens the liquidity pool, which can facilitate replication. As of March 2023, Morningstar data did not show any ETF passive fund replicating the ICE GSS index. Three active strategies, however, used the ICE GSS index as their primary prospectus benchmark, and the actively managed JPMorgan Green Social Sustainable Bond ETF (launched in February 2023) used the Bloomberg Global Aggregate Green Social Sustainability Bond 1-10 Year index.

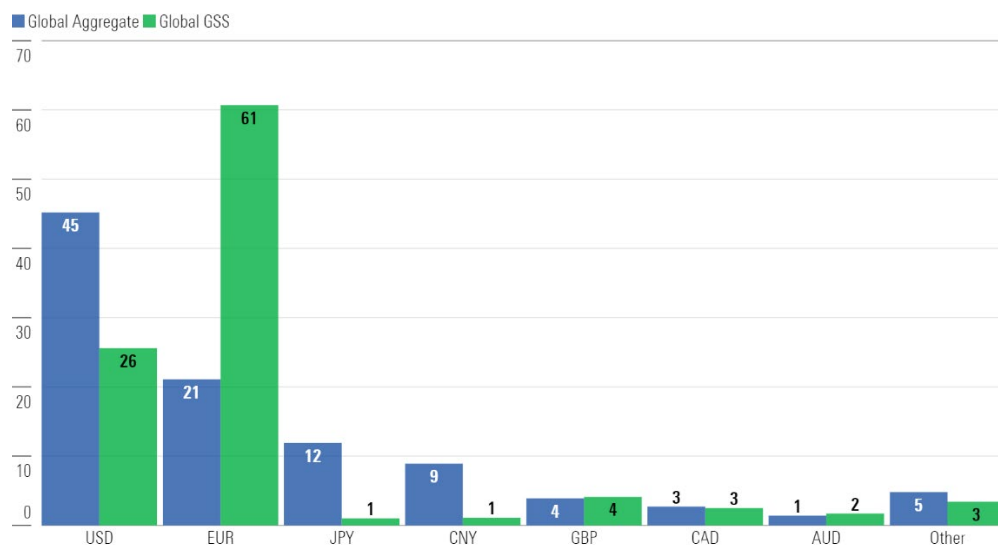
The index construction framework used by different index providers to construct their social and sustainability bond market benchmarks is like-for-like to the one described for the green bond market. As the starting point, index houses rely on the ICMA Social Bond Principles and Sustainability Bond Guidelines to define the universe. They then follow the same approach to build the benchmarks, meaning that an index house that only considers green bonds screened by the Climate Bonds Initiative (CBI) would only consider social and sustainability bonds captured in the CBI's social & sustainability bond database. In the case of a new suite of Bloomberg benchmarks launched in October 2022, the selection universe consists of all bonds vetted as either social or sustainability by the in-house BSFS group. Meanwhile, ICE indexes allow for the inclusion of any bond that claims to meet the ICMA Social Bond Principles or Sustainability Bond Guidelines criteria, without further vetting.

Characteristics of a Typical GSS+ Portfolio

The GSS+ universe shares many characteristics with the broad-market, investment-grade aggregate bond indexes typically referenced in global, European, or U.S.-focused core bond portfolios, including featuring a mix of government and corporate issuers. However, there are also key differences, making GSS+ bond funds likely to be imperfect substitutes for standard core bond funds.

An investor switching a mainstream global bond portfolio (as measured by the Bloomberg Global Aggregate Bond Index) to one exclusively composed of GSS+ bonds (as represented by the Bloomberg Global Aggregate Green Social Sustainability Bonds index) would see their exposure to euro-denominated issuers almost triple to 61%, as shown in Exhibit 11. This would come largely at the expense of U.S. dollar exposure, which would decrease to 26%, while exposure to Japanese yen and Chinese yuan would be minimal.

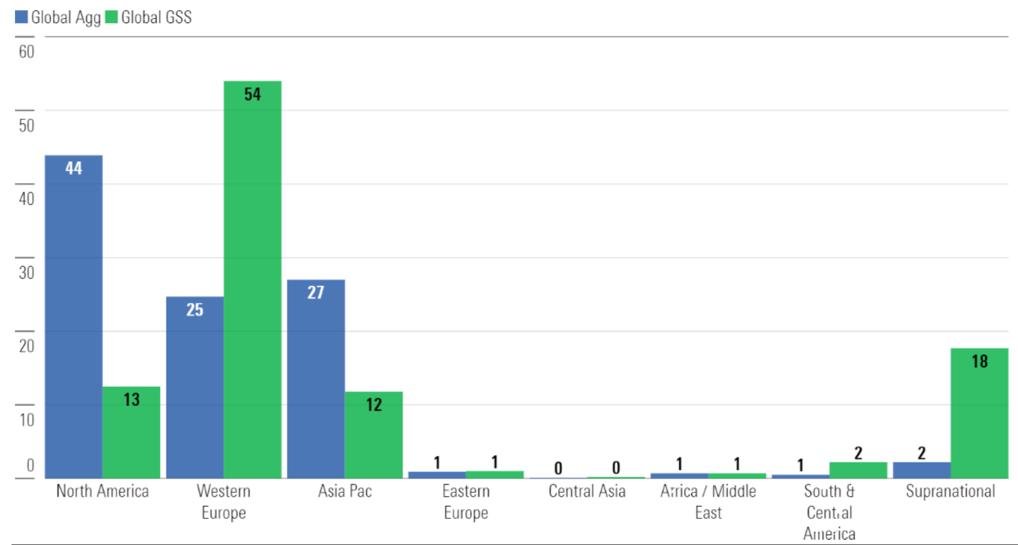
Exhibit 11 Currency % Exposure of Bloomberg Global Aggregate Index vs. Bloomberg Global Green, Social and Sustainable Bond Index



Source: Bloomberg. Data as of February 2023.

The currency distribution reflects the dominance of European issuers in the GSS+ bond market relative to the core role that the United States plays in a traditional global bond portfolio.

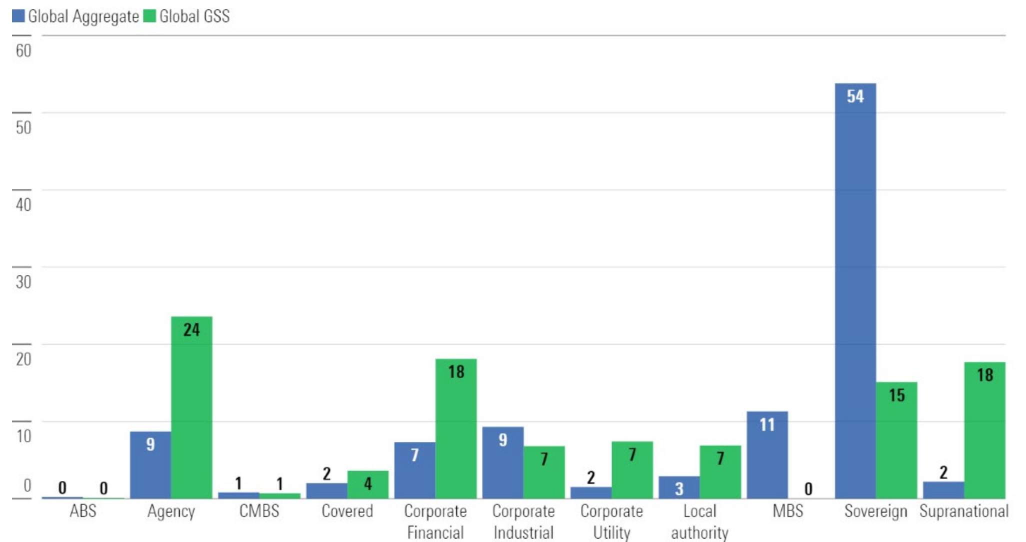
Exhibit 12 Region % Exposure of Bloomberg Global Aggregate Index vs. Bloomberg Global Green, Social and Sustainable Bond Index



Source: Bloomberg. Data as of February 2023.

Simply considering the effect on currency valuations of different monetary policy regimes across regions, the risk/return pattern of a standard global impact bond portfolio can deviate significantly from that of a standard global bond proposition. But the differences between the two portfolios are also considerable in terms of sector distribution, as shown in Exhibit 13.

Exhibit 13 Sector % Exposure of Bloomberg Global Aggregate Index vs. Bloomberg Global Green, Social and Sustainable Bond Index

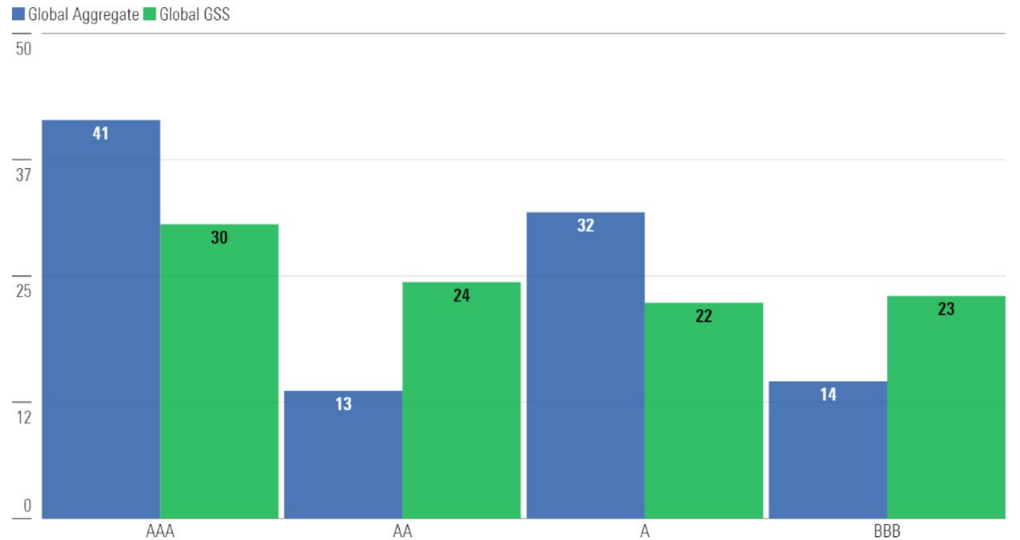


Source: Bloomberg. Data as of February 2023.

The GSS+ portfolio is severely underweighted in sovereign bonds relative to a standard global bond proposition (15% versus 54%), although this is partly compensated by higher exposure to agency and supranational bonds, which typically have a government backing. The GSS portfolio also takes on more corporate bond market risk, particularly in financials and utility companies, while excluding mortgage-backed securities altogether.

This feeds into a significantly different credit rating distribution between the GSS+ and standard global bond portfolios, with the GSS+ proposition showing a higher exposure to BBB rated bonds and lower in AAA (Exhibit 14).

Exhibit 14 Credit Rating % Exposure of Bloomberg Global Aggregate Index vs. Bloomberg Global Green, Social and Sustainable Bond index

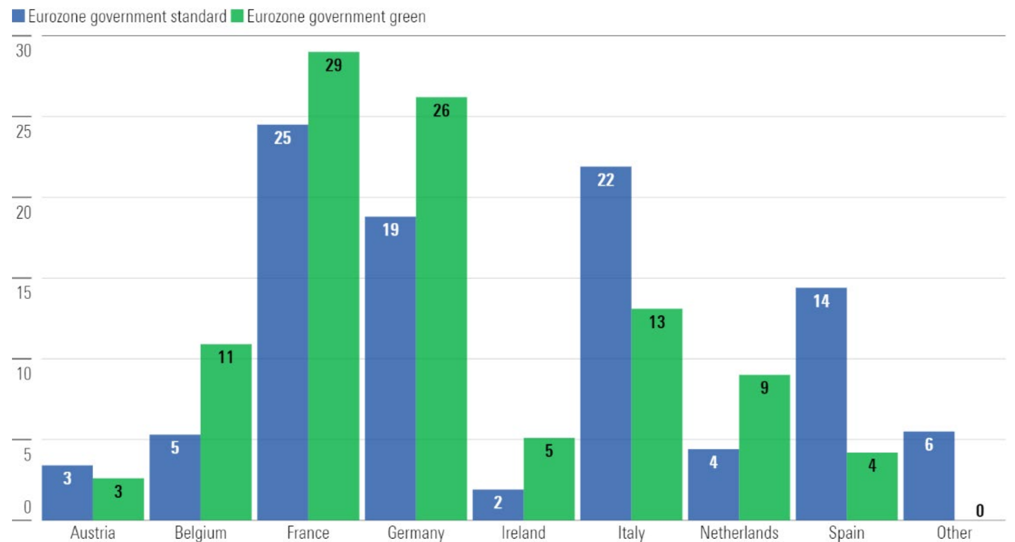


Source: Bloomberg. Data as of February 2023.

Also, the GSS+ portfolio exposes investors to slightly higher duration of close to 8.0 years compared with 6.8 years for a standard global bond proposition. This translates into higher average yield to maturity (3.8% versus 3.5% as of this review).

Within the sovereign bond market, differences between standard bond portfolios and GSS+ portfolios are even more pronounced. For example, compared with a standard European sovereign portfolio, one that invests in European green sovereign bonds would result in a country distribution skewed to core issuers at the expense of peripheral countries such as Italy and Spain.

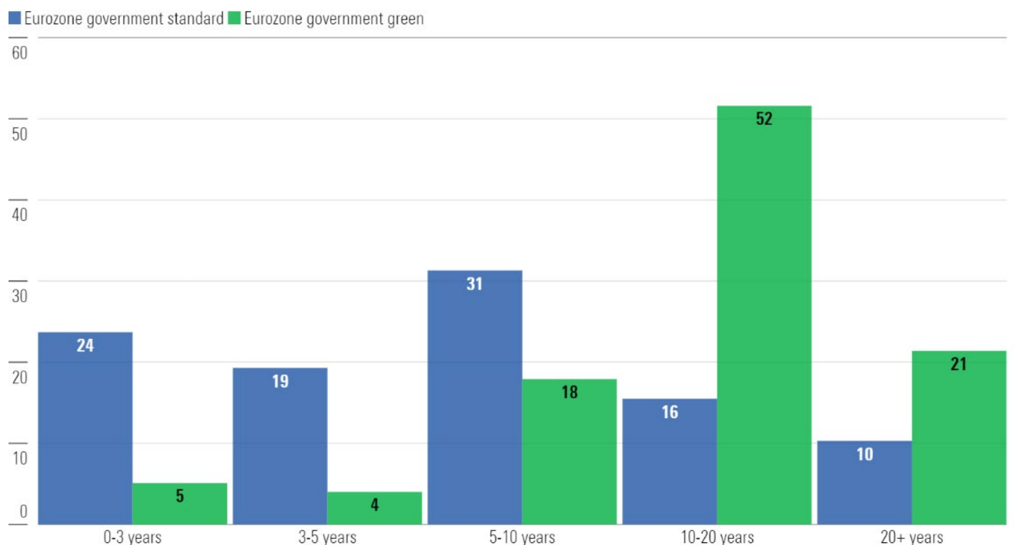
Exhibit 15 Country % Exposure of Bloomberg Euro Aggregate Treasury Total Return Index vs. Markit iBoxx EUR Eurozone Sovereigns Green Bond Index



Source: Bloomberg. Data as of February 2023.

The average credit quality of the European green sovereign debt portfolio would be higher than that of the standard portfolio, but this wouldn't necessarily translate into a lower average yield as the maturity profile of the eurozone sovereign green bond market is heavily biased to the longer end. As of this review, the average duration of a green sovereign bond portfolio is 12.7 years compared with 7.0 years for a standard sovereign bond proposition.

Exhibit 16 Maturity % Exposure of Bloomberg Euro Aggregate Treasury Total Return Index vs. Markit iBoxx EUR Eurozone Sovereigns Green Bond Index



Source: Bloomberg. Data as of February 2023.

The green portfolio would thus have a higher-quality tilt as measured in terms of credit ratings but would be undesirably exposed to high duration risk, making it a poor choice to play an anchoring role in a typical investor's portfolio.

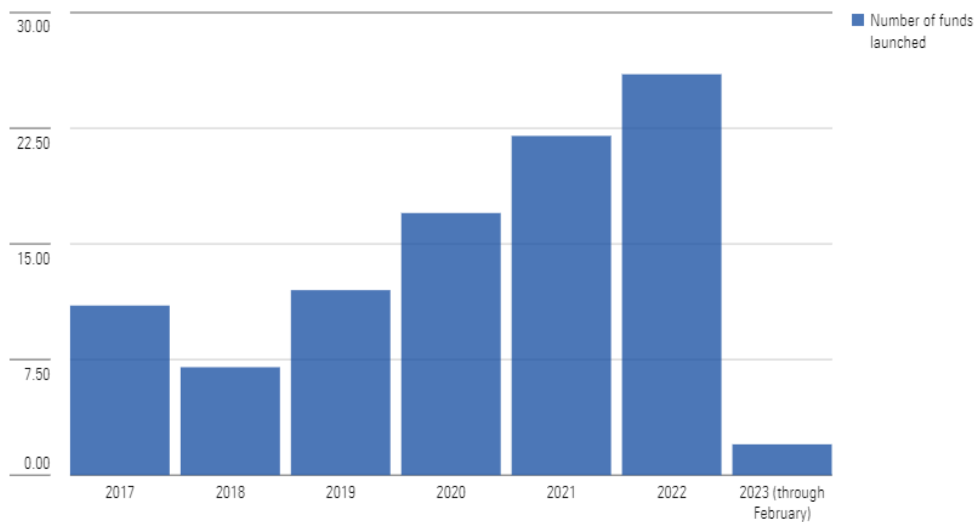
The GSS+ Fund Universe

The universe of funds focusing on the GSS+ bond market has continued to expand. As of the time of this writing, Morningstar's fund database included 96 open-end dedicated green bond funds, accounting for USD 25.5 billion in total assets as of 31 March 31 2023, and 17 exchange-traded green bond funds, totaling USD 2.6 billion in assets. The list includes vehicles domiciled in the U.S., Canada, Australia, and Asian countries, though the vast majority (92 funds of the 113 total) are domiciled in Europe.

Given the relative newness of the social bond universe (as well as its less diversified nature, making portfolio management a greater challenge in the space), the list of social bond strategies is significantly smaller, numbering just 12 open-end funds. As of March 31, 2023, these accounted for a combined USD 2.7 billion in assets. No funds could be identified that focus exclusively on the smaller sustainable bond and sustainability-linked bond universes.

More recently, a handful of funds have also come to market that invest across a broader swath of the GSS+ market. The largest of these is UBS' Multi Manager Access Green, Social and Sustainable Bonds LU2421069035, with USD 2.3 billion in assets as of March 2023. It joins similar Europe-domiciled offerings from BlackRock, JP Morgan, and Azimut that also aim to invest across the green, social, and sustainable bond segments.

Exhibit 17 Number of New GSS+ Fund Launches (Active and Passive)



Source: Morningstar Direct, Morningstar Research. Data as of February 2023.

Overall, the group has grown at an accelerated pace, with more new funds being launched each year. Our database also lists 35 GSS+ bond funds with a nominal inception date prior to 2017, though the majority of those offerings were initially run with a different mandate and switched to a green, social, sustainability, or GSS+ focus later in their life.

Exhibit 18 Largest Green, Social, Sustainability Bond Funds

Name	ISIN	Morningstar Category	Fund Size USD	Inception Date
MMA Green, Social and Sst Bds USD F-acc	LU2421069035	EAA Fund Global Flexible Bond - USD Hedged	2,357,608,278.00	3/10/2022
GS Green Bond-I Cap EUR	LU1365052627	EAA Fund EUR Diversified Bond	2,134,892,815.66	3/1/2016
Eurizon Absolute Green Bonds Z Acc	LU1693963883	EAA Fund Global Bond	1,614,390,789.34	1/10/2018
AXA WF ACT Green Bds I Dis EUR	LU1300811699	EAA Fund Global Bond - EUR Hedged	1,472,159,702.26	11/5/2015
iShares Green Bd Idx (IE) D H Acc EUR	IE00BD0DT578	EAA Fund Global Bond - EUR Hedged	1,436,666,870.14	3/16/2017
BNP Paribas Green Bd I Cap	LU1620157534	EAA Fund Global Bond - EUR Hedged	1,378,670,736.77	9/7/2017
GS Corp Green Bnd-I Cap EUR	LU2102358178	EAA Fund EUR Corporate Bond	1,344,669,869.47	1/30/2020
Amundi Rspnb Invest Imp Green Bds I C	FR0013188729	EAA Fund Global Bond - EUR Hedged	1,166,474,561.68	9/27/2016
Allianz Green Bond W EUR	LU1297616101	EAA Fund Global Bond - EUR Hedged	1,048,271,335.10	11/17/2015
Mirova Global Green Bd I/A (EUR)	LU1472740502	EAA Fund Global Bond - EUR Hedged	946,689,883.07	6/2/2017

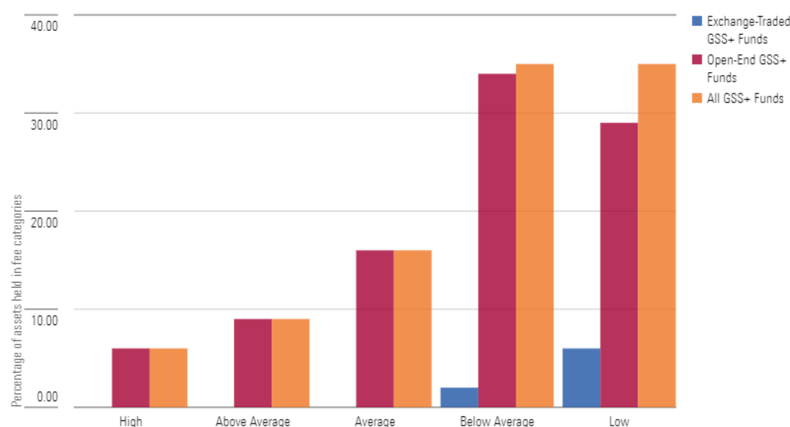
Source: Morningstar Direct. Data as of April 20, 2023.

On Fees, Most GSS+ Fund Investors Are Getting a Relatively Good Deal

Of the roughly USD 33 billion in assets held across green bond-, social bond-, and GSS+ debt-focused mutual funds and ETFs for which fee data was available in March 2023, the vast majority (70% of the total) was held in share classes that ranked in the cheapest or second-cheapest quintiles of their respective Morningstar peer groups, while only 14% of the total was held in share classes in the two most expensive quintiles. This pattern was roughly consistent across funds domiciled in Europe, the United Kingdom, and the United States and results likely from the strong skew toward large institutional investors in this space.

However, this is not to say that retail investors necessarily have to stomach high fees in order to access the GSS+ market. Particularly in Europe, this list features a number of widely available and affordable passive options, such as the Ireland-domiciled ETFs Xtrackers USD Corporate Green Bond IE00028H9QJ8, with an ongoing charge of 25 basis points, or iShares Green Bond Index IE00BD8QG463, with a mere 0.1% fee.

Exhibit 19 Distribution of Assets Held in GSS+ Products by Morningstar Fee Level



Source: Morningstar Direct. Data as of April 20, 2023.

Recent Performance Has Been Disappointing for GSS+ Strategies

Given the relatively recent emergence of GSS+ debt and the eclectic nature of strategies in this universe, it is difficult to generalize about the performance of GSS+ bond funds. This is especially true of the less than 20 funds in Morningstar's database dedicated to the social bond sector or to the broader GSS+ market. Of these, only seven have existed for a period of three years or more.

Within the subset of funds that specialize in green bonds, however, some observations can be made. Of the roughly 112 green bond mutual funds and ETFs tracked by Morningstar, the majority are domiciled in Europe and benchmarked to broadly diversified global or European fixed-income indexes. Among these are eight strategies belonging to the euro-hedged global bond Morningstar Category, while another 22 sit in the euro diversified bond category.

The most recent three-year period has proved particularly difficult for green bond strategies when compared with their traditional bond-fund competitors. Over the trailing three-year period through March 2023, euro-hedged global green bond funds lost an average of 4.76% annually (in euro terms), 177 basis points more than the euro-hedged global bond Morningstar Category average. The green bond fund cohort also experienced more volatility and greater maximum drawdowns.

The pattern was repeated within the euro diversified bond Morningstar Category: The typical green bond fund in the category fell by 4.17% over the past three years (compared with the average 2.73% loss of the overall category), with worse risk metrics.

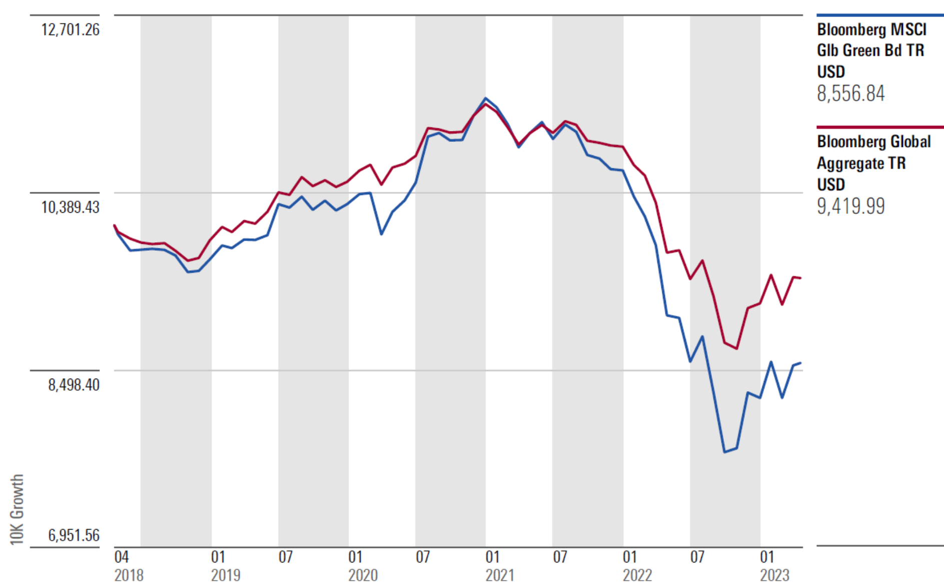
Exhibit 20 Green Bond Funds Have Underperformed the Broad Market Over Three Years

	Total Return (3 Year)	Sharpe Ratio (3 Year)	Standard Deviation (3 Year)	Max Drawdown (3 Year)	Morningstar Risk (3 Year)
Euro-Hedged Global Green Bond Funds	**(4.76)**	**(0.59)**	**7.50**	**(21.68)**	**0.52**
EAA Fund Global Bond - EUR Hedged	(3.01)	(0.53)	5.29	(15.39)	0.30
Euro Diversified Green Bond Funds	**(4.17)**	**(0.54)**	**6.56**	**(19.19)**	**0.46**
EAA Fund EUR Diversified Bond	(2.73)	(0.42)	5.29	(14.33)	0.30

Source: Morningstar Direct. Data as of March 31, 2023.

These results are unsurprising, given that 2022's turbulent market environment was particularly challenging for the green bond universe. In fact, at the end of 2021, green bond investors could look back on a relatively sanguine five-year period of positive returns and low volatility compared with conventional bond products. As of Dec. 31, 2021, the MSCI Bloomberg Global Green Bond Index boasted a higher five-year trailing return, lower standard deviation and maximum drawdown, and significantly better Sharpe ratio than the Bloomberg Global Aggregate Index (in euro-hedged terms). By March 2023, the relationship had flipped; over both the three- and five-year trailing periods, the euro-hedged green bond index now trails its conventional counterpart, with significantly higher downside volatility.

Exhibit 21 Green Bonds Lag the Global Bond Market Over Five Years



Source: Morningstar Direct. Data as of April 20, 2023.

The story behind that reversal of fortunes is largely one of duration. Pre-2022 green bond issuances have tended to have longer maturities than their nongreen counterparts, particularly those issued by sovereign and supranational issuers who sought to lock in low-cost financing for long-term projects while interest rates were low. As a result, the MSCI Bloomberg Global Green Bond Index's duration is now roughly a year longer than that of the Bloomberg Global Aggregate Bond Index. That allowed the

green bond cohort to benefit more from central banks' easing measures before 2022 but made them vulnerable to price depreciation once central banks began hiking rates last year.

At the same time, green bonds within the corporate bond space were less protected from spread-widening in 2022 than their nongreen peers thanks to the green bond universe's structural industry biases. Corporate green bond issuance tends to be tilted toward the real estate sector, which is relatively sensitive to interest-rate increases. This added an additional layer of rate vulnerability to green bond portfolios. Meanwhile, green bonds are underrepresented within the energy and basic materials sectors. That structural underweight detracted in 2022, as rising energy and commodities prices provided some ballast against rising borrowing costs, leading especially the energy sector to outperform.

Prior to 2022, green bonds also benefited from favorable supply-demand dynamics. The demand for green issues outpaced the supply of those bonds for much of the past decade, creating a "greenium"—a difference in the spreads enjoyed by green bonds relative to nongreen bonds from the same issuer. That helped buoy prices for green bonds through recent weak markets better than equivalent issues without the green label. (One notable exception was the rapid selloff in corporate debt in February and March 2020 driven by the breakout of the coronavirus. The global green bond index underperformed the standard global aggregate bond index because of its greater tilt toward corporate debt. Still, the green bond index was able to benefit from the ensuing rally and ended the year ahead of its nongreen counterpart.)

However, there are signs that the technical tailwind may be disappearing for green bonds. According to data from Barclays, the share of green bonds within European investment-grade corporate bond issuance reached 30% in 2022, more than triple its level just two years earlier. Fund managers constrained by prospectus guidelines to buying green bonds are no longer forced to compete over a relatively tiny share of the overall bond supply. It is reasonable to speculate that green bonds and nongreen bonds could trade at the same levels going forward.

What's Next for GSS+ Bonds?

Once the sole province of supranational institutions like the World Bank (which issued the world's first green bond in 2008), GSS+ bonds represent a growing presence across many fixed-income asset classes, from corporate debt to asset-backed securities. The following section highlights the growing role of GSS+ instruments across several newer market segments including emerging-markets debt, securitized instruments, municipal bonds, and leveraged loans.

GSS+ Emerging-Markets Sovereign Debt: China Leads the Way

Issuance of GSS+ bonds, which originally focused on developed markets, has continued to expand in emerging markets. In 2021, emerging markets represented roughly 14% of global GSS+ issuance, and by the end of 2022, that share had risen to 16%. Notably, Saudi Arabia's sovereign Public Investment Fund issued two jumbo-size green bonds in the final quarter of 2022 and the first quarter of 2023. These deals haven't been exempt from criticism, though, with some investors questioning the green credentials of

the underlying projects, while others argued bonds issued by countries classified as "not free" according to leading governance standards should not be considered investable for sustainable funds, regardless of whether the green bond principles are being respected.

Overall, China continues to drive more than 50% of the total GSS+ issuance in the emerging-markets space, given its size and diversified economy. The country has continued to update its Green Bond Endorsed Project Catalogue, unifying what had previously been disparate local green bond standards. The latest version of the catalogue, updated in mid-2022, further aligned it with ICMA's Green Bond Principles by requiring issuers to use 100% of proceeds on environment-protection projects, up from 70% previously. (State-owned enterprises, however, remain exempted as they are only required to earmark 50% of proceeds for these purposes.) This explains why a large portion of self-labeled Chinese green debt is considered "nonaligned" with ICMA's published green bond standards by external evaluators like the Climate Bonds Initiative. In 2022, for example, Chinese issuers emitted USD 56.5 billion in nonaligned debt according to data from Climate Bonds Initiative, compared with USD 76.25 billion in bonds aligned with ICMA's Green Bond Principles.

Much like in the developed-markets space, social, sustainability and sustainability-linked bonds are making a timid debut within emerging markets and are still far from challenging green bonds' hegemony. As of March 2023, Morningstar data only showed one diversified strategy in the space (Amundi Funds EM Green Bond, which was launched in 2020) and a handful of options focused on the Chinese green bond market, suggesting that the space is not yet ripe for product proliferation.

GSS+ Municipal Bonds: Still a Work in Progress

Many U.S. municipal-bond issuers have been offering debt that supports socially and environmentally responsible projects for decades, making the U.S. muni market seem like a natural fit for GSS+ bonds. Debt issued by states and local authorities largely finance construction of capital infrastructure projects—such as improvements to water mains, water and sewer treatment plants, electric utilities, transportation systems, schools and universities, and healthcare facilities—and would likely fulfill requirements of a green mandate, for example.

According to the Climate Bonds Initiative, the Commonwealth of Massachusetts became the first U.S. state to issue a green muni bond in 2013 when it sold USD 100 million in general-obligation bonds to finance clean water and drinking water projects, energy efficiency and conservation projects in state buildings, and river revitalization projects, among others. Since 2013, the muni green bond market has grown but still lags green bond issuance in the U.S. corporate bond market and the bond markets across Europe. Some issuers report that the cost of garnering a third-party certified green label is still relatively high and cumbersome to maintain.

While green municipal bonds comprised the largest portion of the muni GSS+ market in 2022 and that sector continues to expand, issuance of both social and sustainable muni bonds has grown precipitously in the past several years. In fact, according to S&P Global Ratings, green bond issuance represented just under half of the total approximately USD 46 billion GSS+ muni market issuance for the first time in

2021. Social-labeled muni bonds, funding projects such as affordable housing projects and access to essential services for underserved communities, have grown to represent roughly 37% of that total muni GSS+ issuance at the end of that year. Sustainability bonds held steady at 16%.

In recognition of the growing popularity of the GSS+ muni segment, in December 2021, Bloomberg launched the Bloomberg U.S. Municipal Impact Index, the first standard measure of the U.S. tax-exempt investment-grade bond market designed to track municipal bonds categorized as green, social, and sustainable. At its inception, the index tracked 2,800 securities using Bloomberg's data and its municipal data analysts' research to vet and categorize munis for inclusion. A bond must either be self-labeled as green, social, or sustainable directly from an initial offering, reviewed by independent group, or use 100% of proceeds for a project aligned with the ICMA Green Bond Principles to be considered. Investors focused specifically on green municipal bonds may find tracking the S&P U.S. Municipal Green Bond Index more appropriate, as it includes muni bonds with a certification from CBI. That index included nearly 4,100 constituents with a total market value outstanding of over USD 71.0 billion in March 2023.

While still relatively limited compared with the broader muni market, the growth of GSS+ muni-bond offerings has spurred an increase in the number of municipal strategies focused on green, sustainable, and impact investing. As of March 2023, Morningstar data shows 17 U.S.-domiciled strategies including 14 open-end mutual funds and three exchange-traded funds available focused on the GSS+ muni market. Several were repurposed strategies, while at least five were incepted in 2021 or 2022. All are actively managed. The only funds available to U.S. investors focusing exclusively on green muni bonds are Franklin Municipal Green Bond ETF FLMB, incepted in August 2017 but rebranded in May 2022, and Green California Tax-Free Income CFNTX, incepted in December 1985 but rebranded in 2019. Franklin Municipal Green Bond ETF, the sibling of the now liquidated mutual fund Franklin Green Bond, defines green bonds as those funding projects that promote environmental sustainability. The fund's prospectus recognizes that, while the portfolio managers consider external reports (such as those provided by CBI certification or another independent party), they ultimately determine which ones meet their internal requirements for the green label. The strategy has a limited track record given its relatively recent conversation date and remains small with roughly USD 108.5 million in assets as of March 2023. Green California Tax-Free Income is even smaller with just USD 46 million in assets; while the strategy seeks to be a "green-bond fund" according to its prospectus, it can invest in any issues it judges as meeting its proprietary ESG screens.

GSS+ Securitized Debt: Entering Its Adolescence

At first glance, the securitized market doesn't lend itself to building a significant GSS+ bond stake as the sovereign or the corporate bond market could. Structured products usually consist of hundreds to thousands of underlying loans; those loans include a variety of structures from residential and commercial mortgages to auto and credit card loans to more-varied payments like equipment leases and leveraged loans. Most mortgage-backed securities in the United States carry an agency backing, with either the federal government or a government-sponsored enterprise securing the loans in the case of a default. Nonagency mortgages and asset-backed securities, which don't benefit from this backing, can therefore come with more risk. With that, a significant portion or entire pool of loans included in an

offering would need to support the same type of environmental projects for an entire securitization to be considered a GSS+ bond.

Yet securitized issuers continue to evolve their offerings as more investors seek out sustainable bonds in this marketplace, with green bonds accounting for the lion's share of these issues. According to the Climate Bonds Initiative, the largest issuer of U.S. green bonds in 2020 and in 2021 was the U.S. Federal National Mortgage Association (commonly known as Fannie Mae), with total annual financings of USD 13 billion and USD 12.7 billion, respectively. In fact, in December 2021, the agency announced that it had issued over USD 100 billion in green bonds since its first issuance a decade prior. The agency also added over USD 9 billion in green bonds throughout 2022's challenging bond market. Fannie Mae issued its first green bond in 2011 as part of its multifamily Delegated Underwriting and Servicing business; since then, this program has grown from USD 55 million at the end of 2012 to over USD 100 billion (consisting both of traditional pass-through securities and "repackaged" conduit securities). Fannie Mae expanded its green mortgage-backed security program to include single-family mortgages in 2020, and at the end of 2022, Fannie Mae had issued nearly 100 transactions pooling loans for newly built single-family homes totaling USD 2.0 billion. For both securities, Fannie Mae requires that the green bonds eligible for its program be targeted toward improving the energy and water efficiency of residential homes. Managers have speculated that the agency green mortgage market in the United States is growing enough to potentially justify a "green mortgage index," yet the market remains relatively small and too dominated by a few issuers to form its own distinct asset class.

Fannie Mae multifamily mortgage securities have featured notably in Calvert Green Bond CGBIX, which stands out among its green bond peers with its significant investments in securitized fare. Its managers have noted that this agency program is attractive both from an impact perspective and from a traditional valuation perspective.

Apart from mortgage securities issued by Fannie Mae, two other notable green bond structures within the asset-backed securities include asset-backed securities linked to solar power projects and U.S. property assessed clean energy, or PACE, bonds. The latter are secured by loans made to property owners to finance residential renewable energy improvements. These markets, however, were still small relative to the size of Fannie Mae multifamily market at the end of 2022. M

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