The Credit Line

Bonds go green: Benefits for issuers, no harm for investors (Karoui/Lynam/Rogers/Puempel)

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ESG fixed income investing: Demand will keep creating its own supply

From $29 billion just five years ago, we estimate that the total outstanding of green sovereign, quasi-sovereign and corporate bonds has grown to a combined $365 billion in the USD and EUR markets. While the EUR market has been a forerunner in green bond investing, the USD market has been catching up recently, with issuance surpassing $80 billion in 2019, almost double 2018's volume. The lack of a consistent classification framework remains a challenge for investors. But as the policy environment continues to fuel stronger demand for green bonds, and ESG assets more generally, standards and taxonomies will continue to improve, in our view. Put another way, demand will keep creating and developing its own supply.

Green vs. non-green: A discount for issuers, no harm for investors

The prospects for continued growth of the green bond market beg two questions: 1. Does the primary market reward corporations for issuing green bonds? 2. How do green bonds perform in the secondary market? Using the entire universe of USD and EUR-denominated bonds issued since 2016, we show that green bonds contain a statistically significant new issue premium; i.e.: all else equal, green bonds are issued at a tighter spread vs. their non-green peers. Notably, this discount available to borrowers likely helps absorb the costs associated with additional reporting and disclosure requirements for green bonds, which are initially borne by issuers before being passed on to investors. On the secondary market side, we find no evidence that green bonds underperform their non-green peers, despite the premium at which green bonds are issued. All in all, this suggests green bonds provide benefits to issuers without harming investors. One important caveat for the analysis is that it ignores potential tax considerations as well as signaling effects related to the firms' ESG priorities.

ESG fixed income investing: Demand will continue to create its own supply

Over the past few years, the landscape for ESG investing – an approach that considers some combination of an environmental, social or governance factor in portfolio management – has experienced significant growth. To put things in context, the Global Sustainable Investment Alliance estimates that sustainable investing assets in Europe, the US, Canada, Japan and Australia/New Zealand reached $30.7 trillion as of January 2018 – a 34% increase from January 2016 (Exhibits 1 and 2).

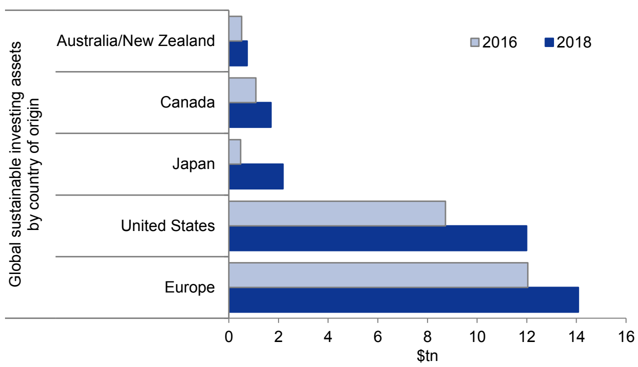
Policymakers have been a key force behind the growth in ESG investing. Recent initiatives from the United Nations and the European Commission have outlined specific targets and frameworks for accountability on climate change progress. For example, the United Nations launched its Principles for Responsible Banking at the UN General Assembly on September 23, 2019. 130 banks across 49 countries – with a combined $47 trillion in assets, or one-third of the global banking sector – committed to the Principles at launch.

Central banks, including the Bank of England and the Federal Reserve, have also recently cautioned against the economic risks (including emerging threats to economic stability) posed by climate change. ECB President Christine Lagarde has said that once the European Commission creates a "harmonized definition of green assets" the ECB will "need to assess whether and how it can apply it to its APP [Asset Purchase Program]." Despite the existing limitations and the absence of an explicit environmental target in the APP, the ECB has purchased green bonds under both the CSPP and the PSPP…" For context, we estimate that, of the 415 EUR-denominated green bond ISINs currently outstanding, the ECB already owns 104 bonds, equivalent to 25%, in count. Within the CSPP portfolio (which includes corporate bonds only), the ECB holds 73 green corporate bonds, equivalent to 6% of the overall portfolio (again, in count).

In such a rapidly-growing market, one challenge for investors and issuers has been a consistent classification framework. The European Union is perhaps the most advanced region in this regard. In July 2018, the European Commission established a Technical Expert Group (TEG) on sustainable finance, which was tasked with establishing an EU classification system for sustainable activities (i.e., an EU taxonomy)[1]. As investors' demand for ESG assets continues to grow and reshape financial markets, standards and taxonomies will continue to improve. Put another way, demand will keep creating and developing its own supply.

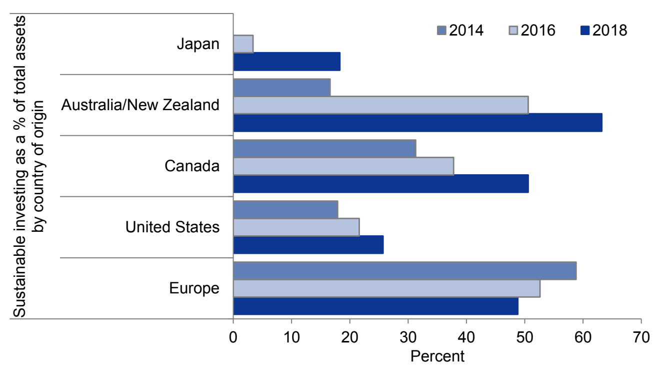
1 In its June 2019 Technical Report on EU taxonomy, the TEG set out the basis for future EU Taxonomy in legislation. And more recently, on December 5, 2019, co-legislators reached a common understanding on the taxonomy for green economic activities. The deal, which is subject to approval by the European Parliament and the Council, involves a two-stage timeline. Stage 1 involves a full set of technical screening criteria for climate change mitigation and adaptation. The criteria will be released by December 2020, with application enforced by December 2021. Stage 2 involves additional technical screening criteria for the remaining four environmental objectives (circular economy, pollution, water, and ecosystems). These criteria will be released in December 2021, with application enforced by December 2022.

Exhibit 1: Sustainable investing assets increased by 34% from 2016 to 2018, across the five largest markets
Global sustainable investing assets, 2016 vs. 2018 ($ trillions)



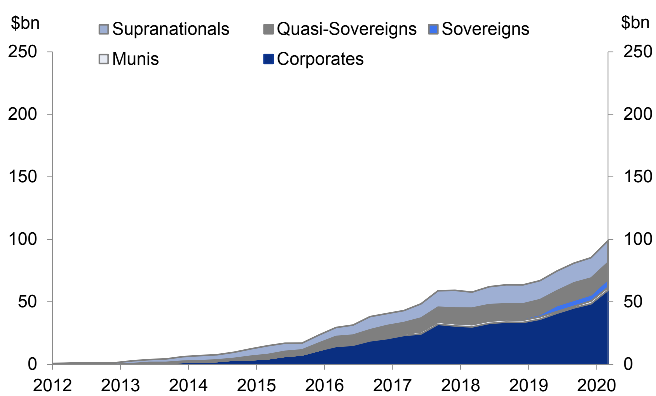
Source: Global Sustainable Investment Alliance, Goldman Sachs Global Investment Research

Exhibit 2: In most regions, the share of sustainable investments has also been increasing
Proportion of sustainable investing relative to total managed assets, 2014 to 2018



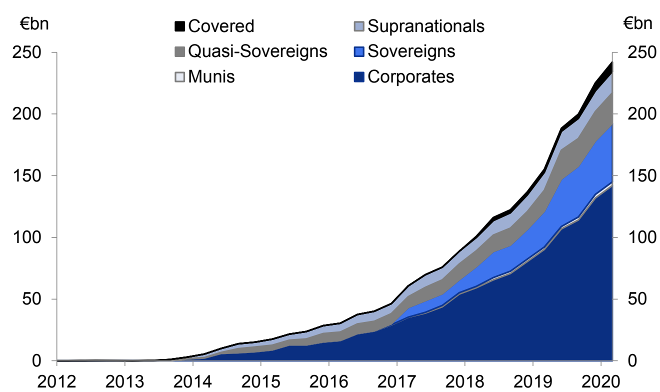
Source: Global Sustainable Investment Alliance, Goldman Sachs Global Investment Research

Exhibit 3: We estimate the total outstanding of USD-denominated green bonds stands at $99 billion



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 4: With roughly €242 billion of green bonds outstanding, growth in the EUR market has been stronger than in the USD market



Source: Bloomberg, Goldman Sachs Global Investment Research

Bonds go green (more so in Europe than in the US)

The growing interest towards ESG investing has also been visible in fixed income markets. Within the broader ESG fixed income universe, "green" financing, or bonds issued for a specific environmentally-friendly project or purpose, represents the largest category. The proceeds from green bond financings are typically ring-fenced and often necessitate separate disclosures and reporting requirements. The Green Bond Principles (GBP) – guidelines crafted by the International Capital Markets Association – are the norm when it comes to evaluating these instruments. These are, however, voluntary. The issuers and underwriters have discretion as to whether a bond is considered green or not, though many issuers choose to obtain an independent review[2]. On our estimates, a combined $365 billion of green sovereign, quasi-sovereign and corporate bonds (in USD equivalent) are currently outstanding in the USD and EUR markets vs.

[2] Sustainalytics, Cicero, DNV GL, and accounting firms typically provide the independent review. Moody's and S&P have also developed tools to assess the issuers' credentials on governance, transparency, and environmental impact.

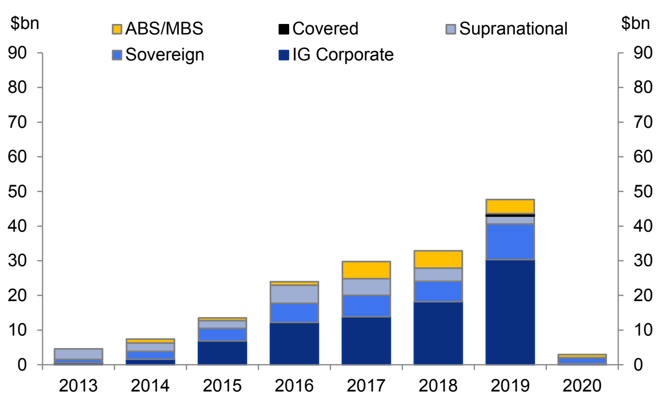
$29 billion just five years ago (Exhibits 3 and 4)[3].

The green bond market technically took off in 2007, when the European Investment Bank (EIB) issued its Climate Awareness Bond. This was followed a year later by the World Bank's issue of its first green bond. Most of the growth in the market has come in the past few years, with corporate issuers becoming more active. Vasakronan, Sweden's largest real estate company, issued the first green corporate bond deal in 2013 (and also issued the first green commercial paper deal in 2018). 2013 also launched the first green muni bond (issued by the state of Massachusetts) and the first solar ABS issue (Tesla Energy).

As shown in Exhibits 5 and 6, green issuance, in particular, from IG-rated corporates reached new record levels in the USD and EUR fixed income markets in 2019: $30.3 billion and €51.6 billion, respectively[4]. In the USD market, 84% of the IG-rated green issuance was generated by three sectors: Finance ($8.7 billion), Utility & Energy ($11.4 billion) and Real Estate/Property ($5.3 billion). These three sectors also rank among the most prominent in the EUR market, combining to generate 77% of 2019's IG-rated green supply. Other sectors in the EUR market which generated €2 billion or more in green bond issuance in 2019 include Transportation, Insurance and Technology.

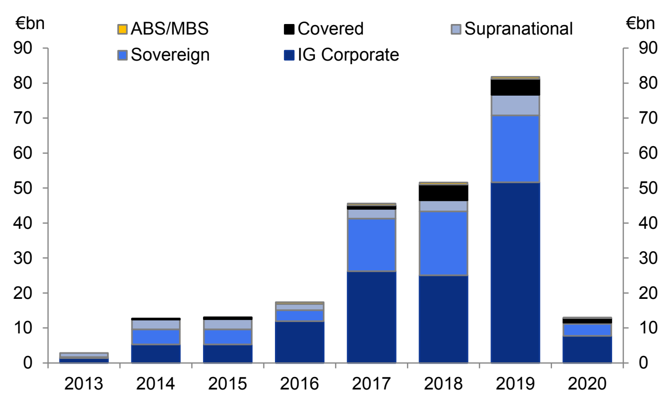
Away from the USD and EUR markets, there has also been an increase in demand for ESG fixed income products in the Asia Pacific region. According to data compiled by Dealogic, Asia Pacific bond issuers raised $55.3 billion in the first nine months of 2019, to fund sustainable projects (green and/or social). While the region still trails EMEA ($92.9 billion), it nonetheless reported the highest year-on-year growth rate, at 64%.

Exhibit 5: ESG-related bond issuance in the USD market reached new record levels in 2019
Gross ESG-related issuance in the USD fixed income markets



Source: Dealogic, Goldman Sachs Global Investment Research

Exhibit 6: Issuance has been even higher in the EUR market
Gross ESG-related issuance in the EUR fixed income markets



Source: Dealogic, Goldman Sachs Global Investment Research

Sustainability-linked bonds: The latest addition to the ESG fixed income family

Most recently, "sustainability-linked" bonds and loans have also experienced notable growth. These financing structures provide issuers with more flexibility on the use of

[3] Note that we only include green bonds in our calculations. Other forms of ESG structures are excluded.

[4] We use Dealogic's classification of green bonds, which differs slightly from the estimates on the total outstanding shown in Exhibits 3 and 4.

proceeds (i.e., the funds do not need to be used for specific projects), but the rate they pay to lenders fluctuates according to progress on company-wide sustainability targets[5]. We expect continued growth of similar structures, as they allow issuers to attract sustainability-minded investors, highlight firm-wide sustainable efforts (instead of project-based ones), and preserve some flexibility in terms of "general corporate purposes" borrowing[6].

While the sustainability-linked bond market is quite new, a similar structure has existed in the corporate leveraged loan market for a few years[7]. In a typical sustainability-linked loan, the interest rate can either rise or fall based on whether a certain key performance indicator (such as the issuer's ESG score) improves or weakens.

Green vs. non-green bonds: A discount for issuers, no harm for investors

The prospects for continued growth of the green bond market beg two questions: 1. Does the primary market reward corporations for issuing green bonds? 2. How do green bonds perform in the secondary market? As we discuss in more detail below, the evidence suggests that green bonds contain a statistically significant new issue premium – i.e., all else equal, green bonds are issued at a tighter spread vs. their non-green peers. But despite this statistically significant new issue premium, we find no evidence that green bonds underperform their non-green peers in the secondary market.

The issuer's perspective: Green is cheaper than non-green

Issuing a green bond involves additional costs for the borrower, stemming mainly from due diligence and the monitoring of the use of proceeds. From an economic standpoint, the decision to issue a green bond therefore makes sense only if the savings over a non-green bond exceed the extra costs associated with the green bond. The potential positive signaling effect from issuing a green bond and, more generally, the issuer's ESG priorities could be important considerations. But for the green bond economics to be attractive in aggregate, one would expect the green issuance costs to be passed on to investors at issuance, after being initially absorbed by the issuer.

Quantifying the extra costs associated with green bond issuance is a challenging task. But estimating the pass-through to investors is somewhat easier, though still challenging. Ideally, one would do so by examining primary market deals from the same issuers that contain both green and non-green tranches with similar maturities. But in practice, this approach cannot be implemented given the scarcity of multi-tranche deals

[5] One example of this is ENEL S.p.A.'s €2.5 billion multi-tranche "General Purpose Sustainable Development Goal (SDG)-Linked Bond" in October 2019 – the first "sustainability-linked" bond. This bond can be used to fund general corporate purposes, but also includes a 25bp coupon step-up if the company does not achieve certain sustainability targets in year-end 2021 and year-end 2030 (the achievement of such will be confirmed by an independent third party.

[6] Indeed, ENEL has commented that it will discontinue its traditional green bond program, which it used prior to the October 2019 issuance, to focus instead on sustainability-linked debt.

[7] According to Moody's, issuance of global sustainability-linked loans reached $44 billion in 2018 and $57 billion through the first three quarters of 2019, from just $5 billion in 2017.

with both green and non-green bonds.

As an alternative, we rely on a regression model that relates the yield-at-issuance for all bonds issued from 2016 to 2019 to a "green issue" dummy variable and a host of other explanatory variables that capture the bond characteristics such as ratings, maturities, seniority, and sectors. To further control for the timing of issuance and thus the impact of the broader funding environment, we also use monthly fixed effects. Technicalities aside, this regression model allows us to estimate the yield differential between a green and a non-green bond, that are otherwise identical in terms of their rating, seniority, sector, maturity, and timing of issuance.

As shown in Exhibit 7, the regression model suggests that, on average, green bond savings for issuers amount to 29bp in the USD market and 14bp in the EUR market. Of course these estimates are subject to statistical uncertainty and ignore the costs associated with additional reporting and disclosure requirements, in addition to potential tax consequences. Still, we think they are consistent with the intuition that the additional green bond costs are eventually passed on to investors at issuance, after being initially absorbed by the issuer. Further, the higher funding discount offered to issuers in the USD market likely reflects the more limited supply of green issues in the USD market compared to its EUR counterpart. As the green bond market in the USD market grows and becomes more mature, we expect this differential to compress (as it has in the EUR market).

Exhibit 7: Green bonds offer issuers lower yields in both the USD and EUR IG market

Currency	Parameter	Estimate	Pr > |t|
USD	Intercept	3.78	<.0001
	Green yield premium (bp)	-29	<.0001
EUR	Intercept	1.55	<.0001
	Green yield premium (bp)	-14	0.0004

Source: Dealogic, Goldman Sachs Global Investment Research

The investor's perspective: No harm despite the new issue premium

One would expect the positive benefits for green bond issuers in the primary market to translate mechanically into lower returns for investors in the secondary market. But the empirical evidence suggests green bonds perform in-line with their non-green peers in the secondary market.

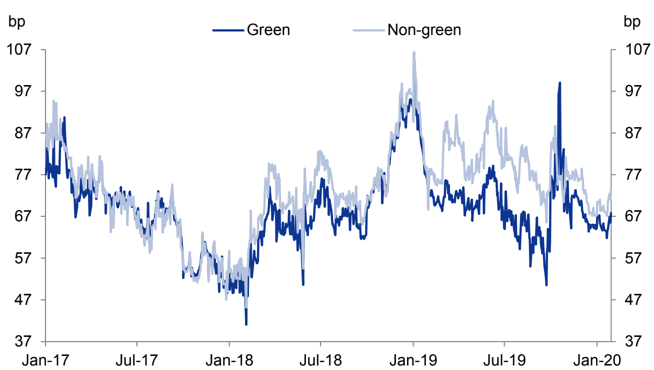
To assess the relative performance of green vs. non-green bonds, we construct a universe of pairs of green and non-green bonds that are issuer and maturity-matched. Unlike the primary market, where the sample size for issuer and maturity-matched pairs is very thin, the secondary market offers a much larger information set. For context, and as of the most recent data point, there are 14 and 56 bond pairs in the USD and EUR markets, respectively.

With these pairs in hand, we first examine the average spread level on green vs. non-green bonds in the USD and EUR markets (Exhibits 8 and 9). Unsurprisingly, the green and non-green spreads co-move strongly, especially in the more mature EUR market. What does the strong co-movement shown in Exhibits 8 and 9 imply in terms of excess returns of green vs. non-green bonds? Exhibits 10 and 11 plot the cumulative excess returns since 2017 of the same issuer- and duration-matched green and non-green bonds from Exhibits 8 and 9. While it appears that EUR green bonds have slightly outperformed their non-green peers, the magnitude of the outperformance is negligible (Exhibit 11). Similarly, the performance gap between green and non-green bonds in the USD market is also minor (Exhibit 10). As an additional robustness check, we also conducted hypothesis tests in both the EUR and USD markets. The conclusion of these statistical tests echoed that of Exhibits 10 and 11, suggesting there is no statistical difference in monthly excess returns between green and non-green bonds over the sample.

All in all, the empirical evidence appear to suggest green bonds provide benefits to issuers without harming investors. Again, one important caveat for the analysis is that it ignores potential tax considerations as well as signaling effects related to the firms' ESG priorities.

Exhibit 8: Green vs non-green issuer- and duration-matched USD IG spreads

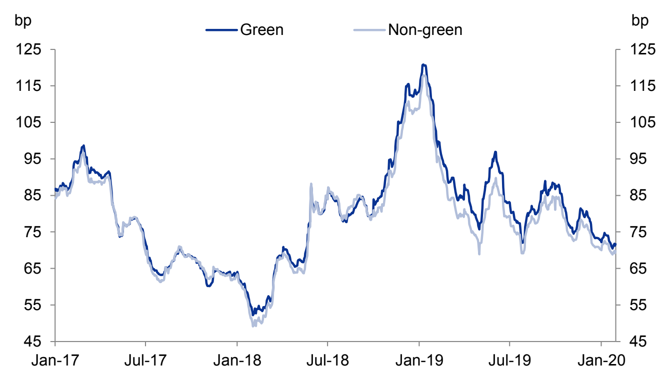
Senior Unsecured IG bonds are matched at the issuer level, only keeping bonds with less than a 1 year difference in time to maturity



Source: Bloomberg, iBoxx, Goldman Sachs Global Investment Research

Exhibit 9: Green vs non-green issuer- and duration-matched EUR IG spreads

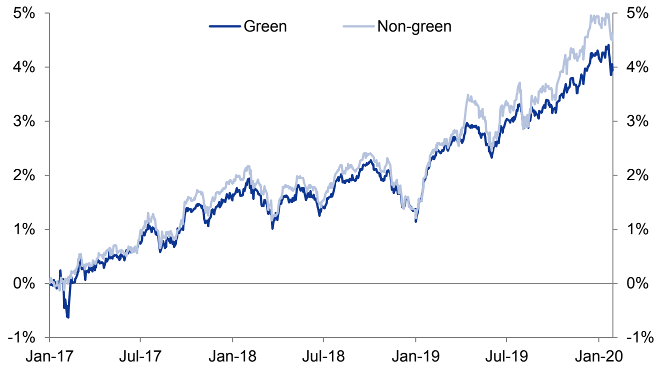
Senior Unsecured IG bonds are matched at the issuer level, only keeping bonds with less than a 1 year difference in time to maturity



Source: Bloomberg, iBoxx, Goldman Sachs Global Investment Research

Exhibit 10: Green vs non-green issuer- and duration-matched USD IG cumulative excess returns

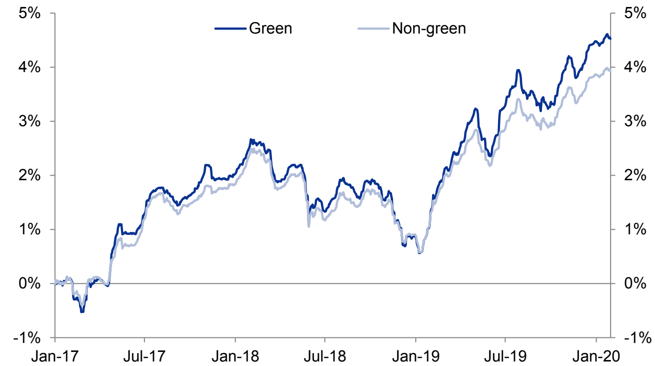
Senior Unsecured IG bonds are matched at the issuer level, only keeping bonds with less than a one-year difference in time to maturity



Source: Bloomberg, iBoxx, Goldman Sachs Global Investment Research

Exhibit 11: Green vs non-green issuer- and duration-matched EUR IG cumulative excess returns

Senior Unsecured IG bonds are matched at the issuer level, only keeping bonds with less than a 1 year difference in time to maturity



Source: Bloomberg, iBoxx, Goldman Sachs Global Investment Research

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Disclosure Appendix

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