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The Global Blue Bond Market: Governance Challenges and Sustainable Development Goals Disclosure

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ABSTRACT

Blue bonds are increasingly used to close conservation financing gaps, yet their effectiveness depends on governance that links capital to credible outcomes. This study provides the first market-wide characterization of all 139 live blue bonds outstanding as of November 2025, representing over USD 30 billion in aggregate financing. We examine how sustainability objectives are communicated through Sustainable Development Goal (SDG) alignment and test whether disclosure varies systematically with credit quality, using descriptive evidence and multivariate models. The results reveal a highly heterogeneous market with strong environmental dominance centred on SDGs 6 and 14, while social and governance-related goals are comparatively underrepresented and decline over time. SDG disclosure increases sharply after 2021, but the breadth of SDG mapping narrows, indicating growing adoption alongside increasing selectivity. The relationship between credit quality and SDG breadth is nonmonotonic: Intermediate investment-grade bonds tend to disclose more SDGs than the highest-rated issuances, although this pattern weakens when controlling for issuance year and bond characteristics. Issuance timing emerges as a stronger predictor of disclosure than credit quality. These findings indicate that the blue label currently functions as an incomplete, nonstandardized signal of sustainability commitment. Strengthening market integrity requires clearer taxonomies, harmonized disclosure frameworks and robust verification mechanisms to reduce risks of definitional dilution and bluewashing. A coherent governance architecture is essential for translating blue finance into measurable and equitable outcomes for aquatic ecosystems.

1 | Introduction

The ocean and freshwater systems support global biodiversity, food security and climate regulation. Coastal ecosystems such as salt marshes, mangroves and seagrass meadows provide nature-based mitigation solutions by sequestering blue carbon, thereby linking ocean health directly to climate action (Cinar et al. 2024). These ecosystems also buffer storm impacts and sustain fisheries and tourism. However, climate change, pollution, habitat loss and overexploitation continue to degrade ecological integrity, threatening both aquatic ecosystems and the coastal communities that depend on them.

The ocean produces approximately 50% of Earth's oxygen and absorbs around 30% of anthropogenic CO_2 emissions (Sumaila 2025). Ocean degradation therefore increases climate risk while also undermining biodiversity and livelihoods. Yet ocean conservation remains chronically underfunded. SDG 14 is among the most underresourced global goals, and financing needs also extend to SDG 6, which covers water, sanitation and water-resource protection (Bosmans and de Mariz 2023; Johansen and Vestvik 2020; Nefzi et al. 2025; Climate Bonds Initiative 2022). Underinvestment weakens the operational capacity of marine protected areas and related management systems, while poorly designed financing can reproduce inequities

by increasing debt burdens or displacing local priorities. This combination of ecological urgency and distributional risk has intensified interest in blue finance and sharpened attention to the governance quality of the instruments through which capital is mobilized (Gill et al. 2017; Perry 2023; Kiliç 2024).

Against this background, this paper examines the global blue bond market through three governance priorities that recur across the literature: definitional clarity, credible disclosure and verification and institutional capacity. Definitions of what qualifies as 'blue' remain heterogeneous, which weakens comparability across issuances and heightens risks of label dilution or bluewashing (Bosmans and de Mariz 2023; Rogge 2025; Kiliç 2024). Market credibility also depends on transparent use-of-proceeds frameworks, impact reporting and review mechanisms (Thompson 2022; ICMA 2023), while access depends on fiscal credibility, technical expertise and administrative capacity, especially in small-island and other credit-constrained settings (March et al. 2023; Christiansen 2024).

A central issue is how issuers communicate sustainability objectives. Blue bonds often use the Sustainable Development Goals as a classification and signalling device, but SDG mapping is not equivalent to verified impact. A bond may reference several SDGs while offering limited evidence on materiality or outcomes (ICMA 2023). We therefore focus on SDG breadth, defined as the number of SDGs explicitly mapped to a bond. Breadth captures the scope of the stated agenda, not the depth of impact achieved, and is therefore a transparency indicator rather than a substitute for validation and postissuance reporting (García-Meca et al. 2021; Beretta et al. 2025; Thompson 2022).

A second issue, still underexplored, is whether sustainability disclosure varies systematically with credit quality. Blue bonds remain conventional debt instruments: Market access and pricing are shaped by creditworthiness, and lower-rated issuers may depend on guarantees, multilateral intermediation or other credit-enhanced structures rather than on the blue label alone (March et al. 2023; Fontana-Raina and Grund 2024). Higher-rated issuers may have stronger reporting capacity, but strong ratings or guarantees may also reduce the incentive to provide broader thematic disclosure. Evidence on how disclosure varies across rating tiers remains limited, especially across the full live blue bond universe (Kiliç 2024; Thompson 2022).

We address this gap using a comprehensive dataset of 139 live blue bonds classified by Bloomberg as of November 2025, representing more than USD 30 billion in aggregate financing. The analysis combines descriptive evidence with multivariate models to examine what blue bonds finance, how issuers communicate sustainability objectives through SDG alignment, how these patterns evolve over time, and whether disclosure varies with credit quality. We study two outcomes: SDG breadth and the incidence of SDG disclosure. The econometric analysis does not identify causal effects, but it allows us to test whether the descriptive patterns remain statistically robust after controlling for observable bond characteristics.

The results reveal three broad patterns. First, the market is highly heterogeneous but strongly concentrated on environmental goals, especially SDGs 6 and 14, while social and governance-oriented goals are comparatively underrepresented. Second, the relationship between credit quality and SDG breadth is inverted U-shaped. Intermediate investment-grade bonds tend to disclose more SDGs than the highest-rated issuances, but this pattern weakens once issuance year and bond characteristics are taken into account. Third, issuance year is a stronger predictor of disclosure incidence than credit quality. Since 2021, bonds have become much more likely to disclose at least one SDG, yet the average number of SDGs per disclosing bond has declined.

The market is therefore expanding SDG adoption while narrowing the scope of the claims it makes. However, SDG communication remains contested because the goals are broad, weakly regulated and often used to relabel existing activities without clear prioritization. SDG breadth, therefore, provides a transparent first-step indicator of how issuers frame blue bond objectives and highlights the importance of verification and outcome-based reporting (Beretta et al. 2025).

These findings contribute in three ways. First, we provide the first market-wide characterization of all live blue bonds outstanding as of November 2025. Second, we test whether SDG breadth and SDG disclosure incidence vary with credit quality and issuance timing. Third, we draw governance implications for regulators, standard setters, investors and conservation actors. The evidence suggests that the blue label remains an incomplete and nonstandardized signal of sustainability commitment, which reinforces calls for clearer taxonomies, harmonized disclosure, stronger verification and capacity support for issuers facing technical and financial constraints (IFC et al. 2023; Proczek and Garbarczyk 2023).

The remainder of the paper proceeds as follows. Section 2 develops the conceptual framework. Section 3 describes the Bloomberg blue bond universe and the empirical strategy. Section 4 reports the descriptive and econometric results. Section 5 discusses governance implications. Section 6 concludes.

2 | Conceptual Framework: Blue Finance, Integrity and Governance

2.1 | The Ocean Finance Gap: Urgency and the Imperative for Innovative Finance

The ocean finance gap represents a structural constraint that weakens conservation and management capacity across aquatic systems. In marine protected areas, chronic shortages of staff and financial resources undermine governance effectiveness and limit conservation outcomes, a pattern widely reported across sites and contexts (Gill et al. 2017). A global survey of 433 marine protected areas revealed that 65% lack adequate funding, and 91% report insufficient staffing capacity (Cozarenco and Ongena 2025; Kiliç 2024). Comparable dynamics characterize high seas governance, where underinvestment in monitoring, data infrastructure and risk-mitigation mechanisms restricts the mobilization of private capital (Thiele and Gerber 2017). These institutional and financial deficits also extend to freshwater systems, where underinvestment in water quality, sanitation and

watershed protection continues to shape biodiversity outcomes and human health (Climate Bonds Initiative 2022).

At the same time, scholars question whether market-based instruments can deliver conservation outcomes without reproducing the dynamics that generate ecological pressure. Critics of the financialization of nature warn that debt-based solutions can prioritize investor expectations over ecological and social objectives (Spash 2022). In island and postcolonial contexts, blue economy agendas may normalize new debt relations and reshape governance in ways that extend historical dependencies (Perry 2023). Recent debates over labelling in debt-for-marine conservation swaps further highlight that credibility and climate justice concerns can accompany blue-labelled debt instruments (Kiliç 2024). These debates point to a central implication: The design and governance of blue bonds can shape both conservation effectiveness and social equity.

2.2 | Emergence and Conceptual Confusion of Blue Finance and Blue Bonds

Blue bonds have emerged as a niche within the sustainable debt market, alongside green and sustainability bonds. The concept of Blue Finance evolved with the Blue Economy discourse and broadly refers to mobilizing capital for ocean- and water-related sustainability projects (Climate Bonds Initiative 2022; Jellouli 2025). However, definitions remain nonstandardized and reflect the persistent conceptual divide between environmental and social finance approaches (Cozarenco and Ongena 2025). Some definitions emphasize climate mitigation and ecosystem benefits, whereas others frame blue bonds as broader sustainability instruments targeting water and marine sectors (Bosmans and de Mariz 2023). United Nations Environment Programme Finance Initiative (n.d.) and Wang et al. (2024) instead treat ecosystem health, livelihoods, inclusion and social risk management as joint conditions for credible blue finance.

Following the World Bank framing summarized by Bosmans and de Mariz (2023), blue bonds are debt instruments that raise capital for marine and ocean-based projects with positive environmental, economic and climate benefits. Most issuances follow a use-of-proceeds model, placing eligibility criteria, tracking and reporting at the centre of credibility. However, as Bosmans and de Mariz (2023) document, structured reporting on target achievement remains limited, and issuers often adapt existing green bond frameworks to marine contexts. As a result, what qualifies as 'blue' varies, complicating the evaluation of environmental integrity and increasing concerns about dilution (Proczek and Garbarczyk 2023; Rogge 2025). This definitional variation makes integrity mechanisms central to governance.

2.3 | Integrity in Blue Bonds

Integrity in the blue bond context refers to the credibility of the blue label as a signal of real aquatic sustainability commitments. It captures whether a labelled instrument links finance to measurable and additional outcomes under transparent governance. Integrity requires a clear theory of change, explicit eligibility rules and disclosure that enable external stakeholders to verify the financed activities and their resulting impacts. Thompson (2022) argues that blue bonds require stronger disclosure because weak reporting enables selective communication and weakens accountability.

Integrity also depends on standardization and verification mechanisms. Early evidence shows that issuers rely on heterogeneous impact metrics and often provide limited structured reporting relative to initial targets, motivating calls for greater transparency and independent review. Integrity concerns extend to financial governance: In conservation-linked debt operations, Ortega-Pacheco (2023) frames financial integrity as clean, transparent and accountable decision-making supported by fiscal transparency and open contracting. Kiliç (2024) shows how credibility can weaken when instruments are self-labelled without external validation.

Integrity further carries a distributional dimension. Blue economy strategies can shift costs and benefits across stakeholders, linking integrity to participation and accountability consistent with blue justice debates. In this paper, blue bond integrity denotes alignment between (i) clearly defined eligibility criteria, (ii) transparent governance for project selection and proceeds management and (iii) postissuance evidence that financed activities deliver measurable aquatic outcomes. Instruments deliver ecological and development benefits only when clear standards, monitoring and verification support them (Angelopoulou 2025; Thompson 2022). These integrity debates connect directly to disclosure practices and equity concerns.

2.4 | The Social-Environmental Tension and the Role of SDG Disclosure

Equity and access shape the blue bond landscape. Although Small Island Developing States promote blue economy narratives, many face high barriers to issuing bonds due to limited creditworthiness and technical capacity, leaving the market dominated by high-capacity actors. March et al. (2023) show that the Seychelles blue bond relied on concessional finance and guarantees to achieve pricing acceptable to international investors, while Christiansen (2024) highlights how state capacity, legal design and institutional arrangements mediate investment flows. These asymmetries have intensified calls for blue justice in ocean finance (Penca et al. 2025) and for stronger regulatory frameworks that address fragmented oversight, which limits accountability (Endarto et al. 2024). In this context, global justice concerns arise not only from environmental protection goals but also from the uneven allocation of financial opportunities, debt burdens and governance influence across countries and communities.

At the same time, market participants increasingly use the SDGs as a classification and communication framework. SDG reporting often functions as a signalling device in sustainable debt markets and is associated with improved sustainability performance. However, SDG alignment may remain symbolic when issuers label existing activities without specifying metrics, priorities or

accountability mechanisms (Ben Slimane et al. 2023). In fixed-income markets, SDG breadth can also function as a pricing-relevant signal: evidence from thematic bond markets suggests that investors value credibility mechanisms such as certification and external review but may penalize overly broad SDG claims when they appear nonmaterial (Apergis et al. 2025). Evidence of a *bluenium* (a lower yield for blue bonds relative to otherwise comparable conventional bonds, attributable solely to the blue label and investors' pro-environmental preferences) remains limited, as Erixon and Sidstedt (2024) find no significant yield advantage for blue bonds relative to conventional bonds.

Recent methodological advances offer tools to detect greenwashing by comparing the SDGs declared in bond documentation with those substantiated in sustainability reporting. Large mismatches can indicate potential greenwashing risks, suggesting that SDG breadth reflects stated scope rather than verified impact and should be interpreted alongside validation and post-issuance reporting (Paterlini et al. 2025).

2.5 | Credit Quality, Derisking and Disclosure Incentives

Credit quality is a central structuring force since blue bonds remain conventional debt claims. Even when proceeds are earmarked for marine or water outcomes, investor demand and pricing are primarily mediated by (i) the issuer's credit risk or (ii) the risk profile of any credit-enhanced structure. This matters for market scalability as many institutional investors require investment-grade ratings, limiting access for lower-rated issuers (Lindner et al. 2025). Credit quality, therefore, operates as a market-access constraint, particularly for sovereigns and firms facing high ocean-related vulnerabilities, precisely those contexts where conservation finance needs are often most acute.

Credit enhancement has shaped several flagship transactions. As explained by Fontana-Raina and Grund (2024) the Belize debt conversion illustrates how political risk insurance and other enhancements provided by The Nature Conservation (TNC) and the United States' Development Finance Corporation (DFC) supported the issuance of highly rated Blue Bonds (Moody's Aa2), which helped refinance Belize's commercial debt at better terms and channel long-term funding to conservation commitments. Importantly, the case also highlights a scalability boundary: transaction replication depends on the availability and affordability of credit enhancement. While such arrangements expand the investor base, they may also shift attention toward financial structuring rather than environmental verification systems.

These dynamics highlight an important relationship between credit quality and disclosure that is often overlooked in analysis. One explanation for this relationship is capacity-based: higher-rated issuers may have stronger institutions and better reporting systems in place. On the other hand, there is a competing explanation known as substitution: strong ratings or guarantees might decrease the incentive for detailed post-issuance disclosure, as credibility may stem from financial strength rather than verified impact (Kiliç 2024). The IMF likewise notes that complex credit-enhanced structures can raise governance risks and that transparency and accountability mechanisms are relevant for mobilizing private finance at scale (Lindner et al. 2025).

This paper examines credit quality not only as a financial indicator but also as a governance-related factor that can influence (i) access to the blue bond market and (ii) the strength and content of sustainability disclosure practices among issuers. As a result, the expected direction of this influence is theoretically uncertain.

2.6 | Empirical Gap and Justification of Contribution

Taken together, this literature highlights three key priorities for the governance of blue finance: definitional clarity, credible reporting and verification and institutional capacity. While early studies have examined the market's initial phase (Bosmans and de Mariz 2023; Thompson 2022), there is still limited systematic evidence across the full universe of issuances. Specifically, it has not yet been tested whether disclosure practices differ based on credit quality, a gap this study addresses by linking financial ratings and SDG disclosure across the live blue bond market.

3 | Data and Empirical Strategy: The Bloomberg Blue Bond Universe

We compile the bond sample from Bloomberg (Bloomberg also returned nine pre-2018 water-related bonds. Because they predate the formal emergence of the blue bond label on 29 October 2018 and appear to have been retrospectively classified by Bloomberg, we exclude them from the sample.) by selecting all active securities classified under the Sustainable Marketing Theme 'Blue Bond' as of November 2025. This classification follows Bloomberg's taxonomy and does not imply that all instruments were self-labelled as blue bonds at issuance. The market's modern reference point is the Republic of Seychelles' sovereign blue bond issued in October 2018 (World Bank 2018).

For each bond, the dataset includes the full issuer name, issue and maturity dates, SDG alignment (we focus on SDG rather than ESG tags because SDGs 6 and 14 map directly onto aquatic sustainability objectives and operate at the issue level, matching our focus on disclosure breadth.), and credit ratings from S&P, Fitch and Moody's. Given its broader coverage, S&P serves as the primary reference agency, with Moody's and Fitch used to complement missing assessments. The final sample contains 139 live bonds issued between 2018 and 2025 by 74 issuers, with aggregate proceeds above USD 30 billion. The Appendix reports the top issuers by number of issuances (Figure A1), together with issuance volumes (Figure A2) and complementary bond-level information (Table A1).

The analysis combines descriptive evidence with multivariate estimation. We map market growth, bond characteristics and disclosure patterns across the sample and then test whether those patterns persist after controlling for observable bond characteristics. The dependent variables are SDG breadth, measured as the number of SDGs mapped to each bond, and SDG

disclosure incidence, equal to one when a bond reports at least one SDG. We estimate OLS models with HC3 robust standard errors for breadth and LPMs for disclosure incidence. These models identify associations rather than causal effects.

3.1 | Sample Description

Issuance rises sharply after 2021, with years 2024 and 2025 accounting for 54% of all bonds and 42% of total issuance volume. Blue bonds are issued in a broad set of currencies, with issuance value concentrated in USD (45% of total issuance) and EUR (18% of total issuance) denominated bonds. The maturity structure ranges from 2 to 29 years, with 80% of bonds issued at terms between 3 and 10 years. Rating coverage remains incomplete: Only 49% of bonds carry a rating from at least one of the three agencies. Among rated bonds, 80.9% are investment grade and 19.1% speculative grade. When mapped to the full sample, investment-grade bonds represent 39.6% of all issuances, speculative-grade bonds 9.4% and unrated bonds 51.1%.

The descriptive analysis proceeds in three steps. First, the issuance time profile and rating distribution are documented in Table 1. Second, Table 2 and Figure 1 trace the adoption of SDG reporting over time and the dispersion in SDG breadth. Third, Table 3, Appendix Tables A4 and A5 and Figure A3 show the goals that are disclosed and how disclosure varies across rating groups. This step establishes the main empirical regularities before any controls are introduced: rapid post-2021 market growth, a strong environmental core centred on SDGs 6 and 14 and a nonmonotonic relationship between ratings and disclosure breadth.

Coupon rates range from 0% to 14.85% (Tables A1 and A2 in the Appendix).

3.2 | Econometric Analysis

We complement the previous analysis by assessing the robustness of the descriptive results using OLS regressions with heteroscedasticity-robust standard errors (HC3), which provide reliable inference in the presence of heteroscedasticity and small-sample bias. The baseline specification is:

$$SDG\ Breadth_i = \alpha + \beta Credit\ Quality_i + \gamma X_i + \lambda_t + \varepsilon_i \quad (1)$$

Model (2) replaces the dependent variable with $SDG\ Disclosure_i$, a binary indicator of disclosure incidence, and is estimated as a linear probability model (LPM).

In both specifications, Credit Quality$_i$ is a vector of dummies for lower investment grade (IG), speculative and unrated bonds, with high IG as the omitted category. X_i denotes a vector of control variables: term to maturity in years, log issue size, a dummy for DM currency issuance, and a government issuer dummy. λ_t captures year fixed effects when included, and ε_i is the error term. In the continuous-rating specifications, the grouped credit-quality indicators are replaced by a notch score coded from 1 = AAA/Aaa to 18 = Caa2, and Model (6) adds the squared score to test for nonlinearity.

Table 4 reports six OLS specifications: a baseline model and five robustness checks. Model (1) is the full-sample baseline. Model (2) restricts the sample to 2021–2025 (disclosure years) and adds year fixed effects. Model (3) considers only bonds disclosing at least one SDG, isolating the decision to disclose from the decision about how broadly to disclose. Model (4) focuses on rated bonds. Models (5) and (6) use the continuous notch score, with Model (6) adding a quadratic term to capture the nonlinearities in the relationship between credit quality and SDG disclosure breadth observed in the descriptive analysis. The sample decreases from 139 to 137 observations, as two perpetuity bonds lack finite maturity.

Table 5 reports LPM results for SDG disclosure incidence. The sample is restricted to 2021–2025 as no pre-2021 bond reports SDG alignment, leading to perfect separation in Logit and Probit models with year indicators. Even within the 2021–2025 window, grouped-category Logit specifications do not converge because all speculative-grade bonds in the estimation sample disclose at least one SDG. The LPM is therefore preferred for the extensive-margin decision, and its coefficients can be read directly as percentage-point differences.

Variance inflation factors indicate no material multicollinearity in the reported specifications (Table A6 in the Appendix).

4 | Results

This section reports descriptive and multivariate evidence on two governance tensions: environmental dominance versus social integration and credit quality as market access versus disclosure governance. Tables 2 and 3 summarize disclosure patterns across time and goals, while Tables 4 and 5 test whether these patterns persist after controlling for bond characteristics.

4.1 | Thematic Dispersion: SDG Breadth and Environmental Dominance

SDG disclosure is heterogeneous across the market. In the full sample, 39 bonds (28.1%) report no explicit SDG alignment. Among the 100 bonds that do disclose SDGs, only 7 map to a single goal, while 93 adopt a multi-SDG framing. Across all 139 bonds, the median SDG breadth is 4, and the mean is 4.8. Figure 1 shows a wide distribution from nondisclosure to very broad multigoal claims, indicating that SDG reporting functions as a flexible disclosure device rather than as a standardized governance practice.

Table 2 shows that adoption and breadth move in opposite directions over time. No bond issued before 2021 reports SDG alignment. From 2021 onwards, disclosure becomes widespread: the share of bonds with at least one SDG rises from 50.0% in 2021 to 88.6% in 2025. Meanwhile, mean SDG breadth among disclosing bonds falls from 9.3 (2021–2022) to 4.7 (2025). The gap between the average breadth of disclosing bonds and that of all

TABLE 1 | Description of bonds issued by year. All issuance amounts are reported in USD equivalents for comparability. Moody's and Fitch ratings are used only to complement S&P ratings when unavailable. Noninvestment-grade ratings are shown in italics.

Year	2018	2019	2020	2021	2022	2023	2024	2025	Total
# Bonds Issued	2 (1.44%)	1 (0.72%)	2 (1.44%)	20 (14.39%)	15 (10.79%)	24 (17.27%)	31 (22.30%)	44 (31.65%)	139
Total million USD issued	26.8 (0.09%)	547.1 (1.78%)	2171.7 (7.08%)	7363.8 (23.99%)	1320 (4.30%)	6317.4 (20.58%)	6114.3 (19.92%)	6828.8 (22.25%)	30,689.9
Average term (years)	12.5	7	11	8.3	8.4	10.1	9.1	5.5	8
AAA	—	1	2	2	—	1	2	1	9
AA+	—	—	—	3	2	—	—	1	6
AA	—	—	—	—	—	1	—	1	2
AA—	—	—	—	—	—	—	—	1	1
A+	—	—	—	—	—	—	1	2	3
A	—	—	—	1	—	—	—	1	2
A—	—	—	—	1	—	—	—	3	4
BBB+	—	—	—	1	—	1	—	—	2
BBB	—	—	—	1	—	2	3	1	7
BBB—	—	—	—	—	—	1	—	—	1
BB+	—	—	—	—	—	—	*1*	*2*	*3*
BB	—	—	—	—	—	—	—	*2*	*2*
BB—	—	—	—	*2*	—	—	—	*2*	*4*
Moody's				2 Aa3; *2 Caa2*	1 Aaa; 1 Aa2; *1 Ba2*	4 Aa3; 1 A2; *1 Ba2*	1 A1	1 Aa2; 1 Baa1; 1 Baa2	
Fitch				2 AAA	1 AAA			1 AA-; 1 A—	

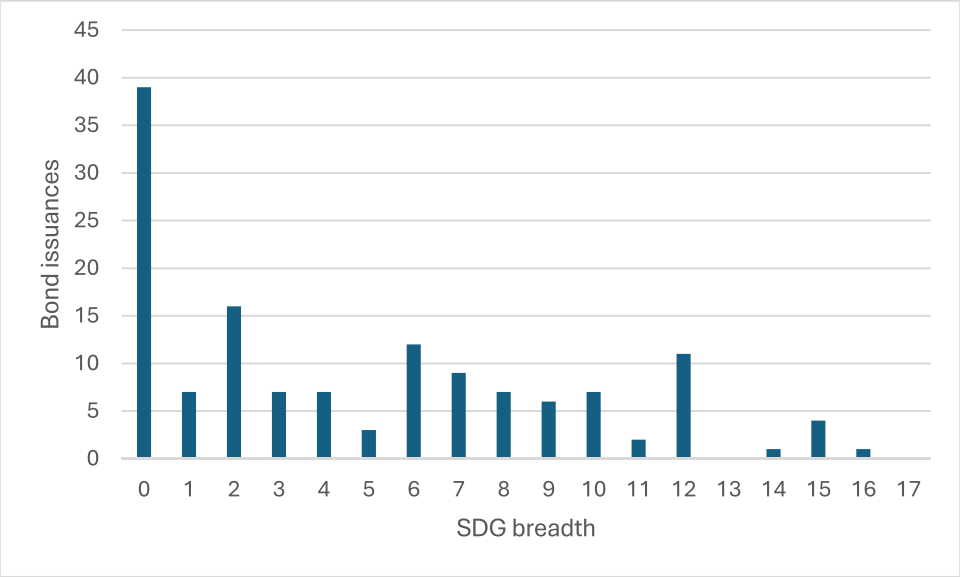

FIGURE 1 | Distribution of SDG breadth across blue bond issuances ($n = 139$). Breadth equals the number of distinct SDGs explicitly mapped to each bond; breadth = 0 denotes no SDG mapping.

TABLE 2 | Adoption and breadth of SDG mapping over time. For each year, the table reports the share of newly issued bonds that disclose at least one SDG and mean SDG breadth (among disclosing bonds and among all bonds issued that year). Years 2018–2020 have no SDG disclosure.

Year	Number of bonds issued	Percentage of issued bonds with SDG disclosure	Mean SDG breadth of disclosing bonds	Mean SDG breadth of all bonds	Gap (disclosing bonds – all bonds)
2018	2	—			
2019	1	—			
2020	2	—			
2021	20	50	9.3	4.7	4.7
2022	15	60	9.3	5.6	3.7
2023	24	66.7	7.2	4.8	2.4
2024	31	83.9	7.1	6	1.1
2025	44	88.6	4.7	4.2	0.5

bonds issued in a year narrows as nondisclosure declines. The descriptive evidence therefore points to diffusion of SDG reporting together with increasing selectivity in the number of goals claimed.

To interpret the thematic profile of the market, we group the 17 SDGs into the three pillars of sustainability proposed by Barbier and Burgess (2017), environmental, economic and social (see Table A3 in Appendix). Table 3 shows that disclosure concentrates on environmental goals. SDG 6 and SDG 14 dominate, followed by SDGs 13 and 15. Economic goals linked to energy, infrastructure and cities often accompany this environmental core. Social and governance-oriented goals are less frequent and lose ground over time, while SDG 16 is nearly absent. Overall, the main descriptive result is not only that blue bonds increasingly adopt SDG language, but also that they do so more selectively and with a stronger environmental emphasis.

4.2 | Credit Quality and Multivariate Evidence

The descriptive rating profiles reported in Appendix Tables A4 and A5 and in Figure A3 suggest that disclosure breadth does not follow a linear progression across rating tiers. Nondisclosure is not limited to unrated issuers. Intermediate investment-grade categories, especially BBB+/Baa1 and BBB/Baa2, often display broader SDG mappings than the highest-rated bonds. At the same time, the highest-rated and lower speculative-grade categories show narrower disclosure profiles. These raw differences are informative, but they may also reflect differences in timing, issue size, currency and issuer type. We test whether these patterns persist under multivariate controls and show the results in Tables 4 and 5.

Table 4 reports the OLS estimates for SDG breadth. The results do not support a monotonic relationship with credit quality. In the full-sample baseline, Lower IG bonds disclose about

TABLE 3 | Number of bonds disclosing SDG by issue year; darker shading indicates higher disclosure frequency. Years 2018–2020 are omitted because no bonds disclose SDGs.

Year	2021	2022	2023	2024	2025	Total
# Bonds issued	20	15	24	31	44	134
# Bonds with SDG	10	9	16	26	39	100
SDG						
1. No Poverty	3	2	3	4	1	13
2. Zero Hunger	2	3	1	3	2	11
3. Good Health and Well-Being	4	4	9	14	11	42
4. Quality Education	3	2	3	4	1	13
5. Gender Equality	6	2	2	3	1	14
6. Clean Water and Sanitation	7	9	14	25	31	86
7. Affordable and Clean Energy	7	7	9	14	23	60
8. Decent Work and Economic Growth	6	6	9	14	6	41
9. Industry, Innovation and Infrastructure	9	8	11	18	10	56
10. Reduced Inequalities	6	5	7	3	3	24
11. Sustainable Cities and Communities	8	7	11	16	15	57
12. Responsible Consumption and Production	7	7	7	14	16	51
13. Climate Action	6	5	9	20	27	67
14. Life Below Water	8	8	11	21	26	74
15. Life on Land	6	7	7	12	10	42
16. Peace, Justice, and Strong Institutions	0	0	1	0	0	1
17. Partnerships for the Goals	5	2	1	0	2	10

three more SDGs than high IG bonds, but the coefficient is only marginally significant and becomes statistically insignificant with year fixed effects. The same holds in the rated-only sample. The continuous-score specification also yields no significant linear effect. Model (6) is directionally consistent with a hump-shaped pattern (positive linear score and negative squared term), but estimates are imprecise. Thus, the multivariate evidence supports the descriptive claim of a non-monotonic relationship, rather than a systematic disclosure premium for stronger credit quality.

Control variables are notably more stable and statistically significant than the rating coefficients across both OLS and LPM specifications (Table 5). Log issue size is consistently negative, indicating that larger issues are not only less likely to disclose any SDG but also tend to map a narrower set of goals. This pattern provides empirical support for the 'substitution effect' identified by Kiliç (2024), where large issuers with established financial reputations may perceive extensive sustainability mapping as less necessary to attract capital. Furthermore, this finding is consistent with Apergis et al. (2025), who suggest that sophisticated investors—the primary target for large benchmark deals—may penalize overly broad SDG claims when they appear nonmaterial.

By contrast, the DM currency dummy is positive and significant in most models, suggesting that issuance in major developed-market currencies is associated with both higher disclosure incidence and broader SDG mapping. This aligns with Thompson (2022), who argues that instruments targeting international capital markets face superior pressure for comprehensive disclosure to ensure accountability and mitigate selective communication risks. Conversely, the government issuer dummy is negative and statistically significant in both the OLS and LPM rated models. This result is in line with Christiansen (2024), who highlights how complex state-mediated institutional arrangements and varying levels of administrative capacity can hinder standardized reporting for sovereign issuers. Collectively, these patterns reinforce that disclosure practices are shaped by issuance context and strategic signalling devices tailored to specific market expectations (Ben Slimane et al. 2023).

Regarding temporal dynamics, year effects are strong in the full sample. Relative to 2021, bonds issued in 2024 and 2025 are significantly more likely to disclose at least one SDG, reflecting rapid post-2020 adoption. However, among disclosing bonds, those issued in 2025 map about four fewer SDGs than those in 2021. This suggests that the blue bond market has moved toward wider SDG adoption, but not toward broader SDG agendas. These findings highlight that as the market matures, issuers routinely adopt SDG reporting frameworks but favour increasingly selective and focused thematic positioning.

TABLE 4 | OLS models. SDG breadth (dependent variable). Robust standard errors (HC3) in parentheses.

Variable	(1) Full baseline	(2) 2021–25 + Yr FE	(3) Disclosers only	(4) Rated only	(5) Rtg score	(6) Score + Score$_2$
Lower IG	**3.279*** (1.920)	2.736 (1.854)	1.103 (1.849)	2.927 (1.971)	—	—
Speculative	0.433 (1.367)	0.492 (1.441)	−0.942 (1.861)	1.708 (1.746)	—	—
Unrated	0.999 (1.061)	0.434 (1.168)	−1.335 (1.104)	—	—	—
Year 2022	—	1.212 (1.885)	0.413 (1.955)	−1.545 (3.045)	−1.872 (2.949)	−1.331 (3.262)
Year 2023	—	0.399 (1.765)	−1.528 (2.138)	−1.579 (2.117)	−1.076 (1.982)	−2.300 (2.272)
Year 2024	—	2.207 (1.694)	−0.787 (1.996)	1.874 (2.498)	2.434 (2.587)	1.512 (2.674)
Year 2025	—	−0.478 (1.497)	**−4.007**** (1.853)	−1.375 (1.551)	−1.557 (1.515)	−2.505 (1.826)
Rating score	—	—	—	—	0.192 (0.159)	**0.963*** (0.529)
Rating score^2	—	—	—	—	—	−0.051 (0.031)
Term (years)	0.068 (0.072)	0.058 (0.081)	0.036 (0.078)	0.139 (0.144)	0.178 (0.153)	0.134 (0.168)
Log issue size	**−0.457*** (0.277)	**−0.538*** (0.289)	−0.334 (0.238)	**−1.736**** (0.676)	**−1.886***** (0.589)	**−1.654***** (0.618)
DM currency	**2.500***** (0.970)	**2.917***** (1.007)	1.811 (1.152)	**3.907**** (1.982)	**4.056**** (1.993)	**4.528**** (2.293)
Gov issuer dummy	−0.749 (1.022)	−1.045 (1.061)	0.374 (1.266)	**−2.798*** (1.693)	**−3.190*** (1.754)	−2.766 (1.901)
N	137	132	100	66	66	66
R^2	0.120	0.171	0.304	0.317	0.287	0.322

Note: High IG is the omitted credit category. Year 2021 is the omitted year. Models (5) and (6) use a continuous notch score coded 1 = AAA to 18 = Caa2.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.10$.

TABLE 5 | LPM estimates of SDG disclosure incidence. Dependent variable equals 1 if the bond discloses at least one SDG, 0 otherwise. OLS with robust standard errors (HC3) in parentheses.

Variable	(LPM1) Full 2021–25	(LPM2) Rated only	(LPM3) Rating score
Lower IG	0.019 (0.186)	0.174 (0.168)	—
Speculative	**0.255*** (0.137)	0.196 (0.162)	—
Unrated	−0.078 (0.114)		
Notch score (continuous)	—	—	0.024 (0.018)
Year 2022	0.107 (0.182)	−0.114 (0.256)	−0.114 (0.243)
Year 2023	0.208 (0.162)	−0.012 (0.224)	0.035 (0.206)
Year 2024	**0.381**** (0.150)	0.023 (0.248)	0.077 (0.238)
Year 2025	**0.343**** (0.131)	0.231 (0.142)	0.215 (0.147)
Term (years)	0.009 (0.006)	0.002 (0.014)	0.006 (0.015)
Log issue size	**−0.061*** (0.030)	**−0.107*** (0.058)	**−0.119**** (0.052)
DM currency	0.097 (0.092)	**0.426*** (0.255)	**0.426*** (0.224)
Gov issuer dummy	−0.079 (0.094)	**−0.345*** (0.188)	**−0.400**** (0.194)
Constant	**1.541***** (0.595)	**2.261**** (1.119)	**2.391**** (0.968)
n	132	63	63
R^2	0.192	0.379	0.366
Dep. var. mean	0.758	0.698	0.698

Note: Sample restricted to 2021–2025. High IG is the omitted credit category in models (LPM1) and (LPM2). Year 2021 is the omitted year in all models. Credit ratings are assigned following a priority order that considers S&P first, Fitch second and Moody's third. Unrated bonds are excluded from LPM2 and LPM3. Model (LPM3) uses a continuous notch score coded 1 = AAA/Aaa, 2 = AA+/Aa1, ..., 18 = Caa2. Two perpetual Ba2 bonds are excluded from the estimation.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.10$.

Taken together, the market has expanded SDG adoption but narrowed SDG breadth.

5 | Discussion and Policy Implications

This section discusses the results through three governance priorities: definitional clarity, credible disclosure and institutional capacity. These priorities organize the interpretation of the market-wide evidence.

5.1 | Environmental Dominance and the Marginalization of the Social Pillar

The results confirm that the market is clearly environmentally oriented (Climate Bonds Initiative 2022; Bosmans and de Mariz 2023), reflecting a strategic focus on use-of-proceeds instruments, where eligibility frameworks are primarily designed to signal environmental credibility (Thompson 2022). However, a significant governance implication of the thematic concentration is the marginalization of the social pillar. The data reveal a progressive retreat from social mapping, representing a growing disconnect from normative frameworks that define credible blue finance as the joint integration of environmental objectives and social safeguards (Wang et al. 2024; United Nations Environment Programme Finance Initiative, n.d.). This asymmetry poses a significant risk to blue justice and equity safeguards. As scholars have warned, conservation-linked finance can redistribute costs, risks and decision-making authority if participation and social protections are treated as secondary to environmental outcomes (Spash 2022; Perry 2023; Kiliç 2024; Penca et al. 2025).

The findings suggest that as the market matures, the 'blue' label is increasingly used to signal narrow ecological commitment rather than the comprehensive and equitable socio-ecological approach required for long-term market integrity and climate justice.

5.2 | Theoretical Implications: Decoupling and the Substitution Effect

A central finding is the decoupling of credit quality and SDG disclosure, as the evidence does not support a monotonic relationship between ratings and disclosure breadth. Our data reveal a substitution effect among top-tier issuers (AAA/Aaa) who exhibit the highest incidence of nondisclosure, suggesting that these issuers perceive their financial reputation as sufficient to attract capital without the need for detailed sustainability mapping (Kiliç 2024). Conversely, intermediate investment-grade issuers seem to have stronger incentives to provide broader SDG mappings.

The evidence also aligns with the integrity literature, which warns that credit strength and complex credit enhancement may facilitate market access (Lindner et al. 2025),

but is no substitute for harmonized and credible disclosure (March et al. 2023; Christiansen 2024; Fontana-Raina and Grund 2024). While high ratings may expand the investor base, they do not automatically proxy for reporting quality. The econometric evidence is suggestive rather than definitive, as coefficients weaken when accounting for year fixed effects and sample composition.

Control variables also point to an issuance-context effect. In our sample, issuance value is concentrated in USD and EUR, and DM-currency issuance is positively associated with SDG breadth, with a weaker positive association for disclosure incidence in the rated subsample. This pattern is consistent with prior work showing that blue bonds placed in international capital markets face stronger demands for disclosure, impact articulation and credibility beyond the label itself (Thompson 2022; March et al. 2023; Kiliç 2024). By contrast, larger issues disclose narrower SDG agendas and, in the rated subsample, are also less likely to disclose any SDG. A cautious interpretation is that larger benchmark-style transactions may rely on more standardized and selective sustainability framing rather than on broad SDG packaging. This interpretation should remain tentative, however, because our models identify associations, not investor motives.

5.3 | SDG Mapping as an Opportunistic Marketing Signal

The temporal pattern adds an important qualification. Since 2021, bonds are more likely to disclose at least one SDG, while the average number of SDGs has declined. The market is therefore adopting and narrowing at the same time. This combination suggests increasing selectivity: Issuers now adopt SDG reporting more routinely, concentrating their claims on a smaller number of goals. In the absence of standardized taxonomies, this may reflect stronger prioritization, but also strategic framing around the most recognizable environmental goals (Ben Slimane et al. 2023; Kiliç 2024; Rogge 2025). Evidence suggests that investors may penalize overly broad claims when they appear nonmaterial (Apergis et al. 2025), consistent with the lack of a systematic 'bluenium' or yield advantage (Erixon and Sidstedt 2024).

These results reinforce the view that the blue label still remains an incomplete and nonstandardized signal. Broader or more frequent SDG disclosure does not by itself verify impact. This aligns with research treating SDG mapping as a signalling device whose credibility depends on external validation, postissuance reporting and claim materiality (Apergis et al. 2025; Paterlini et al. 2025).

Overall, the econometric results strengthen the descriptive interpretation. They support the decoupling of financial creditworthiness from SDG breadth and show that time effects matter more than rating effects for disclosure incidence.

5.4 | Policy Recommendations for Governance Architecture

These patterns have direct policy implications. First, regulators and standard setters should define blue activities through clearer functional taxonomies that specify eligible uses, exclusions and minimum safeguards (IFC et al. 2023; Proczek and Garbarczyk 2023). Second, disclosure rules should move beyond voluntary narrative mapping toward harmonized templates and outcome-based indicators enabling postissuance comparison (Thompson 2022; Bosmans and de Mariz 2023).

Third, independent verification should become routine, especially when strong financial credentials (e.g., credit enhancement, high rating or sovereign status), may lead investors to rely on these signals instead of closely assessing the bond's environmental credibility (Kiliç 2024; Rogge 2025). Stronger disclosure rules should apply equally to large benchmark issues and those issued in major developed-market currencies, as these segments appear to shape disclosure incentives.

Fourth, capacity support remains necessary if lower-capacity issuers are to access the market without weakening transparency standards (March et al. 2023; Christiansen 2024; Lindner et al. 2025). At the same time, social safeguards should become more visible in blue bond reporting. Without clearer disclosure on participation, benefit-sharing and social risk management, blue finance will continue to fall short of the blue justice concerns raised in the literature (Perry 2023; Kiliç 2024; Penca et al. 2025).

6 | Conclusions

This study provides a comprehensive assessment of the global blue bond market and addresses two central gaps in the literature: how issuers frame sustainability claims and how those claims interact with credit quality. Using the universe of 139 live blue bonds classified by Bloomberg as of November 2025, we combine descriptive evidence with multivariate models of SDG breadth and disclosure incidence.

Three conclusions stand out. First, SDG disclosure is heterogeneous but strongly environmentally oriented, exhibiting a marginalization of social and governance objectives. This thematic concentration suggests that the 'blue' label does not currently function as the comprehensive socio-ecological framework required by international standards. Second, the evidence does not support a monotonic relationship between credit quality and disclosure breadth. Financial standing does not serve as a proxy for sustainability disclosure, as intermediate-grade issuers often provide broader mappings than their higher-rated counterparts. This reinforces the presence of a substitution effect, where established financial reputations may reduce the incentives for detailed thematic mapping. Third, issuance year is a stronger predictor of disclosure incidence than credit quality. SDG reporting is becoming an increasingly frequent feature of new issuances, and the scope of these claims is becoming increasingly selective, focusing on a smaller number of recognizable goals.

These findings imply that the blue label remains an incomplete and nonstandardized signal of sustainability commitment. Strengthening market integrity requires clearer taxonomies, harmonized reporting and stronger independent verification.

Several limitations remain. The Bloomberg classification may omit or misclassify some instruments. SDG mappings capture

stated objectives rather than verified environmental or social outcomes. Partial rating coverage also limits precision in the rated subsamples.

Future research should focus on linking bond documentation to project-level outcomes and long-term distributive effects to ensure that blue finance delivers measurable benefits for aquatic ecosystems and affected communities.

Author Contributions

Teresa Corzo: conceptualization, writing – original draft, project administration, formal analysis, writing – review and editing. **Karin Martin-Bujack:** conceptualization, methodology, formal analysis, writing – review and editing. **Laura Gismera:** conceptualization, writing – original draft, writing – review and editing. **María Cuadrado Sobrini:** conceptualization, data curation, writing – review and editing.

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Disclosure

During the preparation of this work, the authors used ChatGPT to polish the English wording and to suggest alternative phrasing for clarity and readability. After using this tool, the authors critically reviewed, edited and revised the content as needed and take full responsibility for the final manuscript.

During the preparation of this manuscript, the authors used artificial intelligence (AI) tools, specifically ChatGPT and Claude Code, to support language editing, including improving clarity, readability, consistency, and wording. These tools were also used to assist in debugging Python code related to the econometric estimations.

All AI-assisted outputs were critically reviewed, validated, edited, and revised by the authors, who retained full control over the content and take full responsibility for the accuracy, integrity, and originality of the work. No AI tools were used to generate scientific content, interpretations, or conclusions.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The bonds data have been collected from Bloomberg in November 2025.

[1] *Bluenium* refers to the yield premium associated with blue bonds, understood as a lower yield f or blue bonds relative to otherwise comparable conventional bonds, attributable solely to the blue label and investors' pro-environmental preferences.

[2] Bloomberg also returned nine pre-2018 water-related bonds. Because they predate the formal emergence of the blue bond label on 29 October 2018 and appear to have been retrospectively classified by Bloomberg, we exclude them from the sample.

[3] We focus on SDG rather than ESG tags because SDGs 6 and 14 map directly onto aquatic sustainability objectives and operate at the issue level, matching our focus on disclosure breadth.

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Appendix A

Supplementary Descriptive Data

TABLE A1 | Bonds Under Study.

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
Seychelles International Bond	11/10/2018;11/10/2028	6.50	USD				
Standard Bank of South Africa Ltd./The	08/11/2018;07/12/2033	3.45	ZAR				
Nordic Investment Bank	25/09/2019;25/09/2026	0.00	EUR		AAA		Aaa
International Finance Corp	15/04/2020;15/04/2035	1.50	AUD		AAA		Aaa
Nordic Investment Bank	30/04/2020;30/04/2027	0.00	EUR		AAA		Aaa
Inter-American Investment Corp	10/02/2021;10/02/2026	0.63	USD	1;2;3;4;5;6;7;8;9;10;11;12;13;14;15;17	AA+	AAA	Aa1
Maldives Sukuk Issuance Ltd	08/04/2021;08/04/2026	9.88	USD				Caa2
Maldives Sukuk Issuance Ltd	08/04/2021;08/04/2026	9.88	USD				Caa2
Bank of China Ltd./Macau	28/04/2021;28/04/2026	3.08	CNY		A	A	A1
Haitong International Securities Group Ltd	20/05/2021;20/05/2026	2.13	USD		BBB		WR
Inter-American Investment Corp	11/06/2021;11/06/2031	1.69	USD	5;6;7;8;9;10;11;12;13;14;15;17		AAA	
Inter-American Development Bank	29/06/2021;29/06/2026	1.00	CAD	3;11;13	AAA	AAAu	Aaa
Inter-American Investment Corp	30/06/2021;30/06/2026	1.10	AUD	1;2;3;4;5;6;7;8;9;10;11;12;13;17	AA+	AAA	Aa1
Seaspan Corp	14/07/2021;01/08/2029	5.50	USD	9;14	BB—	BB	
Seaspan Corp	14/07/2021;01/08/2029	5.50	USD	9;14	BB—	BB	
Asian Development Bank	10/09/2021;10/09/2036	1.80	AUD				
Asian Development Bank	10/09/2021;10/09/2031	2.15	NZD				
GD Power Development Co Ltd	16/09/2021;16/09/2026	3.40	CNY				
Inter-American Investment Corp	29/09/2021;29/09/2031	1.75	AUD	5;6;7;8;9;10;11;12;13;14;15;17		AAA	
Nordic Investment Bank	20/10/2021;20/10/2026	0.38	SEK		AAA		Aaa
Inter-American Investment Corp	04/11/2021;04/11/2031	2.20	AUD	5;6;7;8;9;10;11;12;13;14;15;17	AA+	AAA	Aa1
Platinum for Belize Blue Investment Co LLC	04/11/2021;20/10/2040	4.47	USD				Aa3
Platinum for Belize Blue Investment Co LLC	04/11/2021;20/10/2040	4.47	USD				Aa3
Standard Chartered PLC	17/11/2021;17/11/2029	0.80	EUR	1;3;4;6;7;8;9;10;11;12;14;15	BBB+	A	A3
Landsbankinn HF	25/11/2021;25/05/2026	0.75	EUR	5;6;7;9;11;12;14;15	A—		
Standard Chartered Bank	15/02/2022;15/02/2027	12.00	USD	1;3;4;6;7;8;9;10;11;12;14;15			NR

(Continues)

TABLE A1 | (Continued)

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
CGN Wind Energy Ltd	07/03/2022;07/03/2032	3.79	CNY				
GD Power Development Co Ltd	21/04/2022;21/04/2027	3.25	CNY				
Nanyang Commercial Bank Ltd	28/04/2022; PERPETUITY	6.50	USD				Ba2
China Merchants Financial Leasing Co Ltd	22/08/2022;22/08/2027	3.43	CNY				
Standard Chartered Bank	15/09/2022;15/09/2032	5.15	USD	1;3;4;6;7;8;9;10;11;12;14;15			
BB Blue Financing DAC	20/09/2022;20/09/2037	4.40	USD				Aaa
BB Blue Financing DAC	20/09/2022;20/09/2029	4.40	USD				Aa2
Inter-American Investment Corp	29/09/2022;29/09/2037	4.56	AUD	5;6;7;8;9;10;11;12;13;14;15;17	AA+	AAA	
Maruha Nichiro Corp	02/11/2022;02/11/2027	0.55	JPY	2;3;6;7;8;9;12;13;14;15			
Municipality of Shenzhen China	07/11/2022;07/11/2027	2.83	CNY	6;14			
Inter-American Investment Corp	17/11/2022;17/11/2042	4.90	AUD	5;6;7;8;9;10;11;12;13;14;15;17		AAA	
Zetrix Ai Bhd	28/11/2022;26/11/2027	5.70	MYR	3;6;8;9;10;11			
Central American Bank for Economic Integration	27/12/2022;27/12/2027	0.56	JPY	2;6;7;9;11;12;13;14;15	AA+		
Central American Bank for Economic Integration	29/12/2022;29/12/2027	4.40	AUD	2;6;7;9;11;12;13;14;15			
Export–Import Bank of Korea	11/01/2023;11/01/2033	5.13	USD	11;14	AA	AA—	Aa2
Zetrix Ai Bhd	17/01/2023;17/01/2028	5.75	MYR	3;6;8;9;10;11;13			
Central American Bank for Economic Integration	31/01/2023;31/01/2033	1.27	JPY	6;7;9;12;14;15;16			
Nanyang Commercial Bank Ltd	07/03/2023; PERPETUITY	7.35	USD				Ba2
Standard Chartered Bank	17/04/2023;17/04/2026	4.45	USD	1;3;4;6;7;8;9;10;11;12;14;15			
Standard Chartered Bank	18/04/2023;18/04/2026	4.50	USD	1;3;4;6;7;8;9;10;11;12;14;15			
GPS Blue Financing DAC	09/05/2023;09/11/2041	5.65	USD				Aa3
GPS Blue Financing DAC	09/05/2023;09/11/2041	5.65	USD				Aa3
Igua Rio de Janeiro SA	15/05/2023;15/05/2052	7.97	BRL	3;6;8;9;13;14			
Indonesia Government International Bond	26/05/2023;26/05/2033	1.43	JPY	3;6;7;8;9;11;12;13;14;15	BBB	BBB	Baa2
Indonesia Government International Bond	26/05/2023;24/05/2030	1.20	JPY	3;6;7;8;9;11;12;13;14;15	BBB	BBB	Baa2
Orsted AS	08/06/2023;08/06/2028	3.63	EUR	7;13	BBB—	BBB	Baa2
China Merchants Bank Co Ltd./London	13/06/2023;13/06/2026	4.80	USD	6;7;11;12;13;14;15			A2
CGN Wind Energy Ltd	14/06/2023;14/06/2026	2.83	CNY				

(Continues)

TABLE A1 | (Continued)

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
Asian Development Bank	16/06/2023;16/06/2028	3.25	SEK		AAA	AAA	Aaa
CSI MTN Ltd	13/07/2023;13/07/2026	3.10	CNY		BBB+		
Zetrix Ai Bhd	11/08/2023;11/08/2026	5.40	MYR	3;6;8;9;10;11;13			
Gabon Blue Bond Master Trust Series 2	14/08/2023;01/08/2038	6.10	USD				Aa3
Gabon Blue Bond Master Trust Series 2	14/08/2023;01/08/2038	6.10	USD				Aa3
Aguas Do Rio 1 Spe SA	15/09/2023;15/10/2051	6.71	BRL	3;5;6;7;9;10;14			
Egypt Government International Bond	17/10/2023;17/10/2026	3.51	CNY	1;2;3;4;5;6;7;8;9;10;11;12;13;14;15			
Rio & Saneamento BL3 SA	15/11/2023;15/11/2043	7.33	BRL	6;11			
METAWATER Co Ltd	07/12/2023;07/12/2028	0.73	JPY	6;8;9;10;11;13;14;17			
City of Chiba	26/12/2023;20/09/2033	0.88	JPY	6			
Asian Development Bank	10/01/2024;10/01/2031	2.55	EUR		AAA	AAA	Aaa
Aguas do Sertao SA	01/02/2024;15/12/2043	8.41	BRL	1;3;6;8;9;11;13;14;15			
Cia de Saneamento Basico do Estado de Sao Paulo SABESP	20/02/2024;20/02/2034	14.85	BRL	3;6;7;8;9;11;12;13;14;15			
Cia de Saneamento Basico do Estado de Sao Paulo SABESP	20/02/2024;20/02/2031	14.85	BRL	3;6;7;8;9;11;12;13;14;15			
Cia de Saneamento Basico do Estado de Sao Paulo SABESP	20/02/2024;20/02/2029	14.85	BRL	3;6;7;8;9;11;12;13;14;15			
Igua Rio de Janeiro SA	15/03/2024;15/02/2044	7.13	BRL	3;6;8;9;13;14			
SPE Saneamento Rio 4 SA	15/03/2024;15/09/2042	7.69	BRL	3;6;8;9;13;14			
SPE Saneamento Rio 4 SA	15/03/2024;15/09/2034	7.36	BRL	3;6;8;9;13;14			
Maoming Port Group Co Ltd	21/03/2024;21/03/2027	4.50	CNY	6;11;13;14			
Qingdao Water Group Co Ltd	12/04/2024;12/04/2027	2.88	CNY				
Qingdao Water Group Co Ltd	19/04/2024;19/04/2027	2.71	CNY				
Indonesia Government International Bond	27/05/2024;27/05/2044	2.55	JPY	1;2;3;4;5;6;7;8;9;10;11;12;13;14;15	BBB	BBB	Baa2
Indonesia Government International Bond	27/05/2024;26/05/2034	1.91	JPY	1;2;3;4;5;6;7;8;9;10;11;12;13;14;15	BBB	BBB	Baa2
Indonesia Government International Bond	27/05/2024;27/05/2031	1.57	JPY	1;2;3;4;5;6;7;8;9;10;11;12;13;14;15	BBB	BBB	Baa2
Export Import Bank of Thailand	27/06/2024;27/06/2027	2.78	THB	6;7;9;12;14			
Maynilad Water Services Inc	12/07/2024;12/07/2034	7.09	PHP	6			

(Continues)

TABLE A1 | (Continued)

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
Maynilad Water Services Inc	12/07/2024;12/07/2029	6.71	PHP	6			
Rio & Saneamento BL3 SA	15/07/2024;15/12/2052	7.15	BRL	6;11			
China Construction Bank Corp/London	16/07/2024;16/07/2027	2.83	CNY				A1
Iwate Prefecture	25/07/2024;25/07/2029	0.63	JPY	3;4;6;7;8;9;11;12;13;14;15			
City of Chiba	27/08/2024;20/06/2034	0.91	JPY	6;7;11;12;13;14;15			
Cia Riograndense de Saneamento-Corsan	15/09/2024;15/09/2039	7.42	BRL	3;6;8;9;13;14			
Cia Riograndense de Saneamento-Corsan	15/09/2024;15/09/2034	6.99	BRL	3;6;8;9;13;14			
Asian Development Bank	18/09/2024;18/09/2029	2.20	SEK		AAA	AAA	Aaa
Yankuang Group Cayman Ltd	03/10/2024;03/10/2029	3.50	USD	7			
Tokyo Metropolitan Government	22/10/2024;20/09/2029	0.64	JPY	6;7;9;11;12;13;14;15	A+		
Holding d'Infrastructures des Metiers de l'Environnement SAS	24/10/2024;24/10/2029	4.88	EUR	3;6;7;8;9;11;12;13;14	BB+	BB+	
Province of Hainan China	24/10/2024;24/10/2034	2.45	CNY	6;12;13;14			
Tokyo Metropolitan Government	19/12/2024;20/12/2029	3.88	AUD	6;7;9;11;12;13;14;15			
DP World Ltd./United Arab Emirates	24/12/2024;24/12/2029	5.25	USD	6;7;9;11;12;13;14;15			
City of Chiba	25/12/2024;20/09/2034	1.16	JPY	6;11			
China Water Affairs Group Ltd	27/01/2025;27/01/2030	3.45	CNY	6;9	AA		
Qingdao Water Group Co Ltd	27/02/2025;27/02/2028	2.43	CNY				
METAWATER Co Ltd	28/02/2025;28/02/2030	1.41	JPY	6;8;9;11;13;14;17			
Korea Ocean Business Corp	09/05/2025;09/05/2030	4.63	USD	7;13;14		AA—	Aa2
Banco del Estado de Chile	29/05/2025;01/06/2029	2.80	CLP	6;7;9;12;13;14			
BNP Paribas SA	29/05/2025;29/05/2030	5.06	USD	6;7;12;13;14	A—		
BNP Paribas SA	29/05/2025;29/05/2028	4.79	USD	6;7;12;13;14	A—		
Indonesia Government International Bond	02/06/2025;02/06/2045	3.26	JPY	3;6;7;8;9;11;12;13;14;15	BBB	BBB	Baa2
Corp Andina de Fomento	11/06/2025;11/06/2030	2.98	EUR	2;6;7;9;11;12;13;14;15	AA+	AA—	NR
Credit Agricole CIB Finance Luxembourg SA	24/06/2025;24/06/2030	0.00	EUR	7;13			
Credit Agricole CIB Finance Luxembourg SA	27/06/2025;27/06/2028	0.00	USD	7;13			
BNP Paribas SA	30/06/2025;30/06/2031	4.83	USD	6;7;11;12;13;14	A—		Baa1

(Continues)

TABLE A1 | (Continued)

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
Bazalgette Finance Plc	02/07/2025;02/07/2033	5.50	GBP	6;11		BBB+	Baa1
Iwate Prefecture	25/07/2025;25/07/2030	1.15	JPY	3;4;6;7;8;9;11;12;13;14;15			
Sabesp Lux Sarl	31/07/2025;20/08/2030	5.63	USD	3;6;7;11;12;13;14;15	BB	BB+	
Sabesp Lux Sarl	31/07/2025;20/08/2030	5.63	USD	3;6;7;11;12;13;14;15	BB	BB+	
Eastern Water Resources Development and Management PCL	18/08/2025;18/08/2033	4.20	THB	6			
Eastern Water Resources Development and Management PCL	18/08/2025;18/08/2030	3.80	THB	6			
Eastern Water Resources Development and Management PCL	18/08/2025;18/02/2028	0.00	THB	6			
Henan Water Conservancy Investment Group Co Ltd	20/08/2025;20/08/2028	4.30	USD	1;3;6;8;13;14		A—	
Credit Agricole Corporate & Investment Bank SA	25/08/2025;25/08/2030	4.57	USD	7;13	A+		A1
First Abu Dhabi Bank PJSC	27/08/2025;27/08/2030	3.51	HKD	3;6;7;10;13;14;15	AA—		
City of Jonkoping	27/08/2025;27/08/2030	2.54	SEK	3;6;7;11;12;13			
Province of Guangdong China	02/09/2025;02/09/2027	1.63	CNY	6;11;14			
Kurita Water Industries Ltd	04/09/2025;04/09/2030	1.47	JPY				
Thai Union Group PCL	12/09/2025;12/09/2029	1.70	THB	2;6;12;14			
Yangtze Three Gorges Investment Management Co Ltd	15/09/2025;15/09/2027	1.72	CNY				
Province of Hainan China	19/09/2025;19/09/2030	1.83	CNY	6;12;13;14			
China Power International Development Ltd	23/09/2025;23/09/2028	2.00	CNY				
Holding d'Infrastructures des Metiers de l'Environnement SAS	01/10/2025;31/01/2031	3.88	EUR	3;6;7;8;9;11;12;13;14	BB+	BB+	
Aegea Finance Sarl	06/10/2025;20/01/2036	7.63	USD	3;6;13;14	BB—	BB	
Aegea Finance Sarl	06/10/2025;20/01/2036	7.63	USD	3;6;13;14	BB—	BB	
First Abu Dhabi Bank PJSC	08/10/2025;08/10/2028	4.79	USD	3;6;7;10;13;14;15		AA—	
Asian Development Bank	15/10/2025;15/10/2030	2.57	SEK		AAA	AAA	Aaa
Tokyo Metropolitan Government	21/10/2025;20/09/2030	1.33	JPY	7;11;13;15	A+		
China Water Affairs Group Ltd	22/10/2025;22/10/2030	5.88	USD	6;7;9	BB+		Ba1

(Continues)

TABLE A1 | (Continued)

Issuer name	Issue date; maturity date	Coupon %	Currency	SDG number disclosed	S&P rating	Fitch rating	Moody Rtg
A2A SpA	23/10/2025;23/10/2030	2.88	EUR	6;12			Baa2
Province of Guangdong China	24/10/2025;24/10/2035	2.09	CNY	6;11;14			
Banco del Estado de Chile	29/10/2025;29/10/2030	1.04	CHF	6;7;9;12;13;14	A		A2
Turkiye Garanti Bankasi AS	03/11/2025;07/11/2028	4.05	USD	14;15			
B Grimm Power PCL	13/11/2025;13/11/2029	2.72	THB	7;13;14			
B Grimm Power PCL	13/11/2025;13/11/2028	0.00	THB	7;13;14			
Inter-American Investment Corp	17/11/2025;17/11/2037	4.91	AUD	5;6;7;8;9;10;11;12;13;14;15;17			
City of Chiba	28/11/2025;20/09/2035	1.80	JPY	6;11			

Appendix B

Supplementary Descriptive Data

TABLE A2 | Distribution of Bonds by Maturity Term.

	Number of bond issuances
2.00–2.5	3
3.00–3.01	20
4.00–4.92	6
5.00–5.34	49
6.00	1
7.00–7.01	7
8.01–8.05	5
9.74–9.82	4
10.00–10.51	19
12.01	1
14.98–15.09	8
18.52–18.97	5
19.88–19.93	2
20.01	4
28.1–29.02	3
#N/A field not applicable	2
Total	139

Note: This table shows that the majority of bonds are medium-term instruments, with 78% of the sample having a term between 3 and 10.01 years.

TABLE A3 | Classification of SDG According to the Pillars as of Barbier and Burgess (2017).

SDG	SDG name	Pillar
1	No Poverty	Economic
2	Zero Hunger	Economic
3	Good Health and Well-Being	Economic
4	Quality Education	Social
5	Gender Equality	Social
6	Clean Water and Sanitation	Economic
7	Affordable and Clean Energy	Economic
8	Decent Work and Economic Growth	Economic
9	Industry, Innovation and Infrastructure	Economic
10	Reduced Inequalities	Social
11	Sustainable Cities and Communities	Environmental
12	Responsible Consumption and Production	Environmental
13	Climate Action	Environmental
14	Life Below Water	Environmental
15	Life on Land	Environmental
16	Peace, Justice and Strong Institutions	Social
17	Partnerships for the Goals	Social

TABLE A4 | Distribution of SDGs Disclosures Among Rated, Investment-Grade (IG), Noninvestment-Grade (NIG) and Unrated Blue Bonds.

SDG diclosed	Rated ($n = 68$)	IG	NIG	Diff (IG-HY)	Unrated ($n = 71$)	Diff (rated-unrated)
1. No Poverty	10.3	12.7	0	12.7	8.5	1.8
2. Zero Hunger	10.3	12.7	0	12.7	5.6	4.7
3. Good Health and Well-Being	27.9	23.6	46.2	−22.5	32.4	−4.5
4. Quality Education	8.8	10.9	0	10.9	9.9	−1.0
5. Gender Equality	16.2	20	0	20.0	4.2	12.0
6. Clean Water and Sanitation	52.9	52.7	53.8	−1.1	70.4	−17.5
7. Affordable and Clean Energy	50	52.7	38.5	14.3	36.6	13.4
8. Decent Work and Economic Growth	25	27.3	15.4	11.9	33.8	−8.8
9. Industry, Innovation and Infrastructure	36.8	36.4	38.5	−2.1	43.7	−6.9
10. Reduced Inequalities	19.1	23.6	0	23.6	15.5	3.6
11. Sustainable Cities and Communities	41.2	43.6	30.8	12.9	40.8	0.3
12. Responsible Consumption and Production	41.2	43.6	30.8	12.9	32.4	8.8
13. Climate Action	51.5	52.7	46.2	6.6	45.1	6.4
14. Life Below Water	51.5	49.1	61.5	−12.4	54.9	−3.5
15. Life on Land	33.8	38.2	15.4	22.8	26.8	7.1
16. Peace, Justice and Strong Institutions	0	0	0	0.0	1.4	−1.4
17. Partnerships for the Goals	10.3	12.7	0	12.7	4.2	6.1
No SDG	35.3	36.4	30.8	5.6	21.1	14.2

Note: The entries report the percentage of bonds in each group that disclose each SDG. The associated pillar for each SDG is specified (economic, social and environmental). Ratings are based on S&P, with Moody's and Fitch being used in case of missing S&P rating. Difference columns report IG minus NIG and rated minus unrated percentages, where SDGs more associated with NIG and unrated bonds are highlighted. "No SDG" reports the share of bonds with no SDG disclosure. Darker shading indicates higher disclosure frequency.

TABLE A5 | SDG Disclosure by Detailed Rating Category.

SDG	AAA/ Aaa	AA+/ Aa1	AA/ Aa2	AA−/ Aa3	A+/ A1	A/A2	BBB+/ Baa1	BBB/ Baa2	BB+/ Ba1	BB/ Ba2	CCC/ Caa2
1. No Poverty	0	33.3	0	0	0	0	33.3	37.5	0	0	0
2. Zero Hunger	0	66.7	0	0	0	0	0	37.5	0	0	0
3. Good Health and Well-Being	7.7	33.3	0	25	0	0	33.3	75	66.7	50	0
4. Quality Education	0	33.3	0	0	0	0	33.3	37.5	0	0	0
5. Gender Equality	23.1	66.7	0	0	0	0	0	37.5	0	0	0
6. Clean Water and Sanitation	23.1	100	25	25	25	66.7	66.7	87.5	100	50	0
7. Affordable and Clean Energy	23.1	100	25	25	75	66.7	33.3	75	100	50	0
8. Decent Work and Economic Growth	23.1	66.7	0	0	0	0	33.3	75	66.7	0	0
9. Industry. Innovation and Infrastructure	23.1	100	25	0	25	33.3	33.3	75	100	0	0
10. Reduced Inequalities	23.1	66.7	0	25	0	0	33.3	37.5	0	0	0
11. Sustainable Cities and Communities	30.8	100	25	0	50	33.3	66.7	75	66.7	50	0
12. Responsible Consumption and Production	23.1	100	0	0	25	66.7	33.3	87.5	66.7	50	0
13. Climate Action	30.8	100	25	25	75	66.7	0	75	66.7	50	0
14. Life Below Water	23.1	83.3	50	25	25	66.7	33.3	75	66.7	50	0
15. Life on Land	23.1	83.3	0	25	50	33.3	33.3	75	0	50	0
16. Peace, Justice and Strong Institutions	0	0	0	0	0	0	0	0	0	0	0
17. Partnerships for the Goals	23.1	66.7	0	0	0	0	0	0	0	0	0
No SDG disclosure bonds	69.2	0	25	75	25	33.3	33.3	12.5	0	50	100

Note: Entries are percentages of bonds within each rating bucket that disclose each SDG. Buckets use a combined notation across agencies (e.g., AAA/Aaa). No disclosing bond falls in the CCC/Caa2 category. The pillar associated with each SDG is indicated (economic, social and environmental).

TABLE A6 | VIFs on the Exact Estimation Samples for Table 4 and Table 5 Models.

Model	*n*	Max VIF	Mean VIF	Comment
Table 4 (Model 1) full baseline	137	1.99	1.37	No issue
Table 4 (Model 2) 2021–25 + year FE	132	2.44	1.69	No issue
Table 4 (Model 3) disclosers only	100	3.76	2.10	Still acceptable
Table 4 (Model 4) rated only	66	1.85	1.54	No issue
Table 4 (Model 5) rating score	66	1.98	1.52	No issue
Table 4 (Model 6) score + score^2	66	14.37	4.18	High only because score and score squared enter together
Table 5 (LPM1) full 2021–25	132	2.51	1.68	No issue
Table 5 (LPM 2) rated only, all agencies	63	1.82	1.55	No issue
Table 5 (LPM 3) rating score, rated only	63	1.97	1.53	No issue

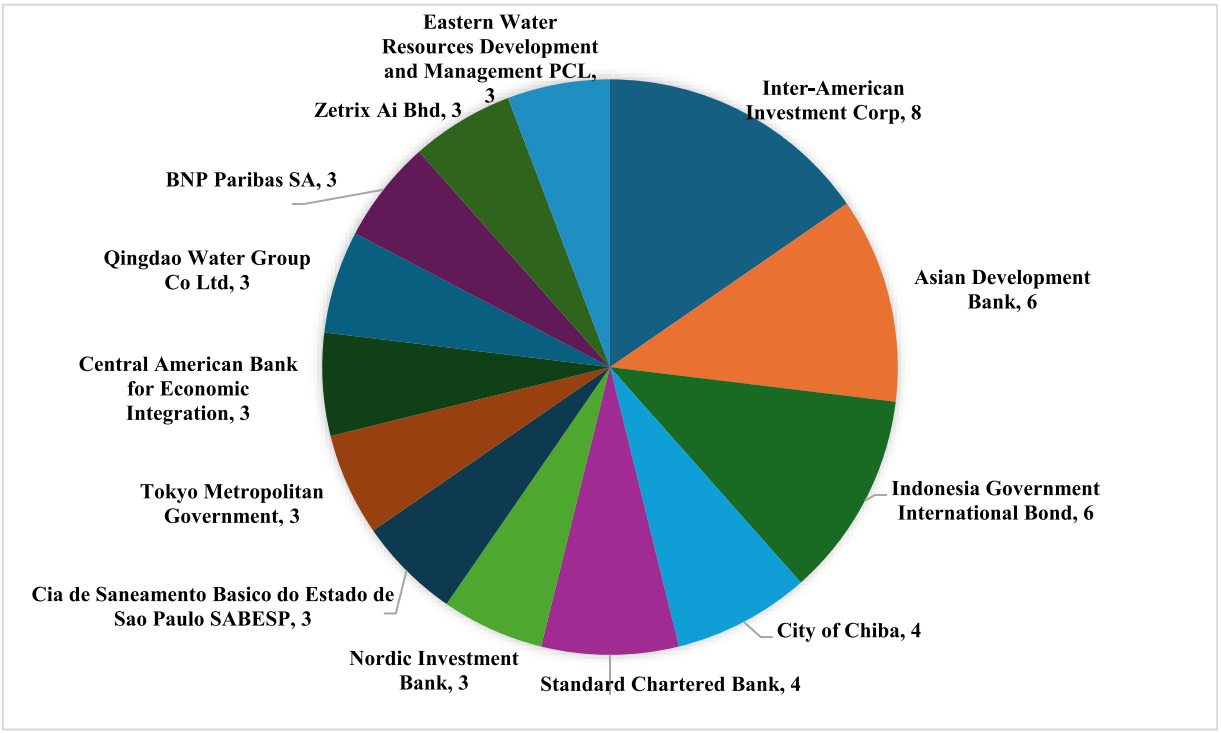

FIGURE A1 | Top 13 Issuers by Number of Bonds Issued.

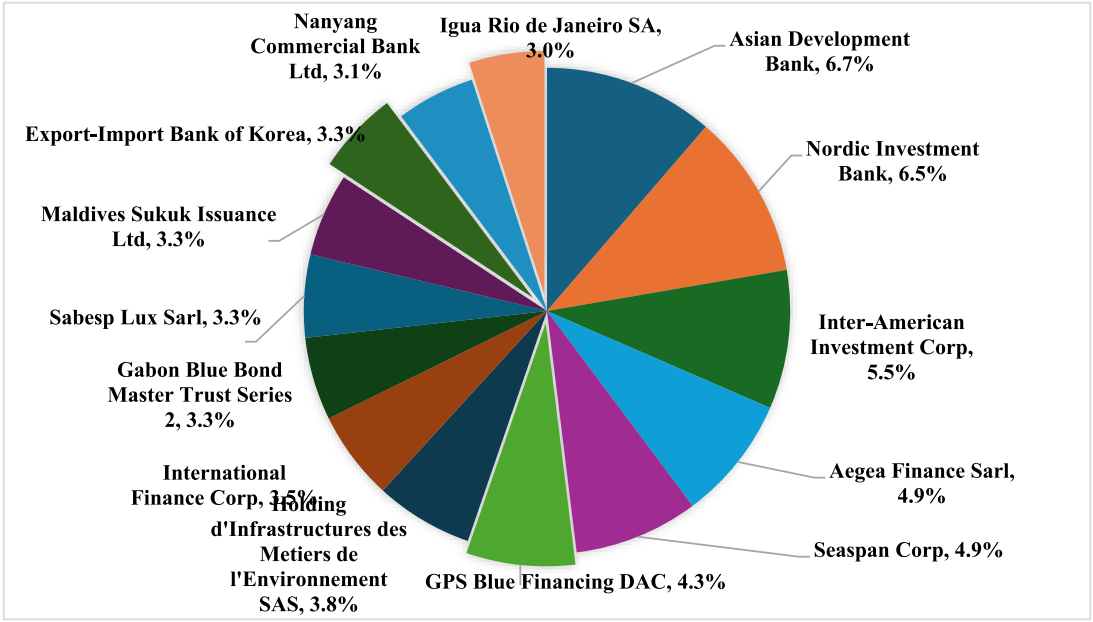

FIGURE A2 | Top 14 Issuers by Share of Total Issuance Volume.

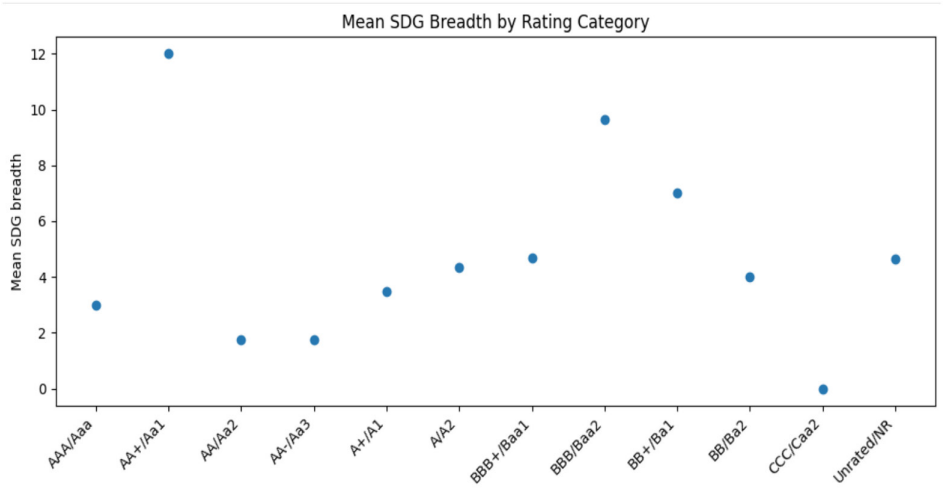

FIGURE A3 | Mean SDG Breadth by Rating Category.