

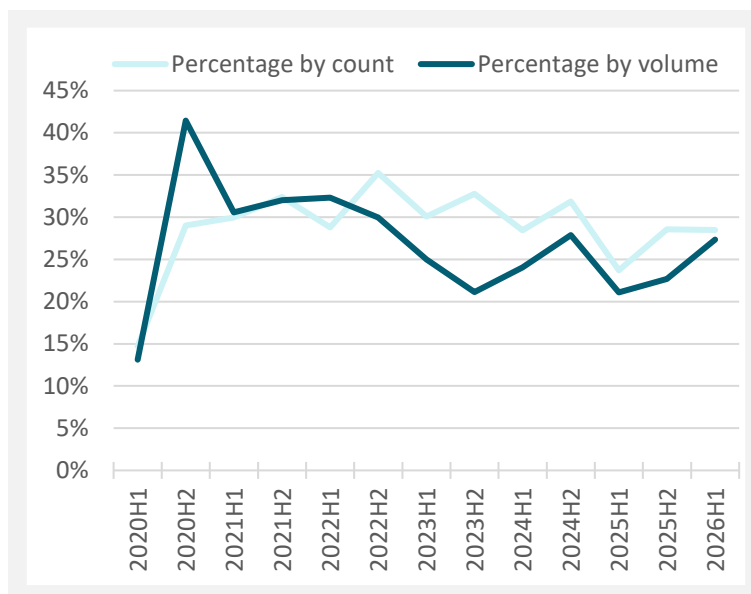
Sustainable labelling and EUR-denominated primary book cover

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SUMMARY

- Our analysis confirms a positive association between sustainable debt label and investor demand. Labelled bonds achieve a 16% increase in median book cover, compared to non-labelled securities, since 2020.
- The relationship is statistically significant across our investigation, evident within subsectors and over annual periods.
- For a given issuer, this effect seems strongest for early usage of bond labels, shown through analysis of outstanding debt at time of pricing.

Figure 1. Debt split by sustainable label. Source: Bloomberg Finance L.P., AFII.



Much is written on how ESG-labelled bonds may offer pricing benefits for issuers, the 'greenium'.^{1,2} However, other qualitative benefits are often discussed, including higher investor demand feeding into more committed

investors and perhaps lower pricing volatility.³ These factors can be hard to measure quantitatively. **Our objective is to investigate additional market factors associated with labelled debt issuance.**

This paper constructs a regression analysis to examine the relationship between book cover and sustainable label usage; an analysis we believe will offer new insights for investors and issuers. Book cover, the ratio of total investor demand divided by issued size, gives a measure of investor demand, which may offer ancillary benefits such as lower volatility or more committed investors. We want to analyse both whether the label on a security level is relevant, and also whether the percentage of the issuer's outstanding debt that is labelled impacts book cover, the so-called 'halo' effect.

Sustainable labelled bonds are a communication tool for issuers to raise capital for transition investments and for investors to improve the transparency and dialogue around capital allocation for transition. Our analysis aims to investigate the degree to which there is higher market demand for investment committed to transition, as evidenced by use of bond labels.

¹ For a recent systematic literature review on greenium studies please see "[Green Bond Pricing: A Comprehensive Review of the Empirical Literature](#)", Journal of Risk and Financial Management, Dec 2025.

² For example our analysis showed that banks and utilities potentially achieved positive greenium in recent issuance, as shown in "[Different shades of greenium: banks, utilities, and the price of transition](#)", AFII, 13 Aug 2026.

³ Our analysis showed green bonds recovered more quickly after market volatility in early 2025, "[Green bond comeback: one month after 'Liberation Day'](#)", AFII, 20 May 2025.

Introduction

The universe for this analysis is EUR-denominated investment grade bonds priced between 1 January 2020 and 30 June 2026, with a minimum deal size of €300mn, creating a universe of size 4,651 after cleaning. The six-and-a-half-year window provides both statistical relevance and the opportunity to investigate historical trends over a volatile market period.

Regression analysis is reliant on there being relatively complete data sets available. Book cover, which is the ratio of total demand to issue size for a given security, shows reasonable coverage in Bloomberg for the purpose of this analysis.

This data set is not a singular measure of market demand. Data coverage is not perfect (86.6% of our starting universe), and there may be bias in coverage, i.e. deals where demand is low decide not to report. There is also a relationship with pricing, given that theoretically as long as the book cover is greater than 1, the deal will print. While on a given deal bankers could tighten the pricing and likely lower the book cover, doing so could have reputational consequences for the bookrunners. Moreover, there is a degree of pride to having a high book cover which perhaps some issuers are happy to pay for by raising issuance spread.⁴ Issuance spread is explored as an explanatory variable in the model, but these market dynamics are hard to expose directly.

We also acknowledge the potential model complication by using a ratio as our dependent variable (book cover = total demand / issue size), and including the denominator as a control variable (issue size). Including a variable on both sides of the equation like this can produce a mechanical relationship between them, so the significance of issue size as a control should be read with that in mind rather than as a purely independent finding. We have also included the regression with issue size log transformed in Appendix 1: Robustness checks.

We wanted to keep book cover as the dependent variable primarily for practical reasons. This is the figure discussed and reported within the fixed income market, which participants have a numerical intuition for.

Regression dataset

The sample comprises EUR-denominated investment grade corporate, financial and government bonds priced between 1 January 2020 and 30 June 2026, with a minimum deal size of €300mn and a Bloomberg Composite rating of BBB- or higher, sourced via Bloomberg BQL. This results in an uncleaned deal universe of 5,508 securities from 728 unique issuing tickers.

The regression was run on 1 Sep 2026.

Table 2 (overleaf) gives a summary of data points used in the regressions. This set of variables was selected after regressions were run on many different combinations of variables, to provide the power instructive set of results. A discussion of the un-used variables is included later.

⁴ This greenium study includes oversubscription rate as an explanatory variable and concludes that a 1% increase in oversubscription is associated with a 0.058bp increase in greenium as detailed in "[The Green Corporate Bond Issuance Premium](#)", Federal Reserve, Jun 2022.

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Dependent variable

Bloomberg field “COVER_RATIO_FOR_INITIAL_ISSUANCE” is used where available. Missing for 738 bonds (13.4%), reducing universe size to 4,770.

The distribution of this data set (albeit after further cleaning later reduces it to 4,651 points), is shown in Table 1. As the mean is higher than the median we see the distribution is somewhat skewed, with a very high max of 40. To improve the model, we have transformed this to a log variable for the analysis, but this is tested later for robustness.

Control variables

A number of variables are introduced to the regression to explain its book cover.

Table 1. Book cover distribution of data set. Source: Bloomberg Finance L.P., AFII

Statistic	Value
count	4,651
mean	3.3
std	2.3
min	0.3
25%	1.9
50%	2.7
75%	3.9
max	40.0

Table 2. Data fields used in regression. Source: AFII.

Variable	Used	Bloomberg code used	Comment
Book Cover	Dependent	COVER_RATIO_FOR_INITIAL_ISSUANCE	log transformed
Amount issued	Control	AMT_ISSUED	
Length of bond	Control	MATURITY	Calculated
Rating	Control	BB_COMPOSITE	Converted to numeric scale
Sector	Control	INDUSTRY_SECTOR	
Pricing Year	Control	SECURITY_PRICING_DATE	
Pricing Month	Control	SECURITY_PRICING_DATE	
Region	Control	CNTRY_OF_RISK	Mapped to region
Is FRN	Control	FLOATER	
Sustainable debt label	Explanatory	SUSTNBL_DEBT_INSTRMNT_INDICATOR	
Sustainable debt debut	Explanatory	SUSTAIN_INSTRMNT_DEBUT_INDCTR	
Percentage of sustainable debt	Explanatory		Calculated

‘Amount issued’ is used unadjusted.

‘Length of bond’ is calculated as the difference between maturity date and security pricing date / 365.25. Bonds with missing maturity date are excluded (assume to be perpetuals) removing 104 bonds. The data is further cleaned to remove bonds with maturity greater than 55 years, which removes an additional 15. **This creates our final universe of 4,651 securities.**

‘Is Floating Rate Note (FRN)’ is included as a Boolean variable as it was shown to have statistical significance.

‘Rating’ is used unadjusted, but converted to a numeric scale.

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‘Sector’ is used unadjusted, and later is mapped into Corporate/Financials/Government categories for additional investigations.⁵

Issue year and issue month are created from ‘Security Pricing Date’, and are used as dummy variables.

‘Region’ is mapped from Country of Risk using a mapping included in the Appendix in Table 16.

Explanatory variables

We introduce two variables for investigation. The first, ‘sustainable label indicator’ (SustLabel), is sourced directly from Bloomberg, and includes all Green, Sustainable, Social, Transition, and Sustainability-linked instruments. 28.3% of the 4,651 securities for analysis are labelled as sustainable.

The second, ‘percentage of outstanding sustainable debt at the issuer level’ (PercSustDebt), needs to be calculated.

For each of 728 unique issuer tickers represented in the sample, we calculate the percentage of total outstanding EUR-equivalent debt classified as a sustainable instrument at 26 quarterly snapshot dates from 31 December 2019 to 30 June 2026. At each snapshot date, the existing debt for each issuer is analysed, and the percentage of outstanding which is labelled is calculated. Note, this includes all currencies and all maturity points, but uses the Bloomberg credit ticker lookup.

Each bond in the regression sample is then matched to the nearest snapshot at or before its own pricing date, to understand the market environment at the time of pricing. Where no valid (non-null) preceding snapshot exists for an issuer (typically because the issuer had no active debt outstanding at that early date) a figure of zero is used, and these bonds are returned for investigation. Forty-three bonds from the sample met these criteria, and are included in the Appendix Table 23 for reference.

Our initial investigation, which showed negative regression coefficients on percentage of sustainable debt in preliminary results, suggested the inclusion of a Boolean data set to check whether an issuance was an issuer’s debut sustainable instrument (SustDebut). This data set is included as a third potential explanatory variable. This is a subset of SustLabel, but of very small size (see Table 3). As this is a subset, we cannot investigate collinearity, but do investigate excluding the data set in the section on variable selection.

Table 3. Data split of Sustainable Debut issuance. Source: AFII.

	Not Sust-labelled	Sust-labelled
Not Debut	3,334	1,291
Debut	0	26
Total	3,334	1,317

⁵ Corporate includes the sectors Consumer, Cyclical, Consumer, Non-cyclical, Energy, Industrial, Technology, Utilities, Communications.

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Descriptive details

The breakdown of 4,651 bonds is mainly from European issuers (>72%), with 45% financials, 16% governments, and the remaining 39% split across corporate sectors. The rating distribution is balanced; 35.8% are BBB, 34.6% A, and 29.6% higher rated.

28.3% have a sustainable label across the cleaned sample, which has been increasing recently (see Figure 1 on the front page for split by count and volume).

The distribution of deal size, however, does show some skew with a few very large deals (full details in Table 22). The 25/50/75 percentile figures are EUR0.5/0.8/1.0bn respectively, while the mean is EUR1.2bn. Sensitivity to this distribution is tested by calculating a Weighted Least Squares (WLS) regression detailed in Appendix 1: Robustness checks.

Table 4. Summary of VIF tests. Source: AFII.

Variable	VIF
sustain_instrmnt_debut_indctr	1.05
floatier	1.07
length_of_bond	1.17
Rating_numeric	1.42
sustnble_debt_instrmnt_indicator_int	1.44
amt_issued_bn	1.44
pct_sustainable_debt_issuer	1.58
Pricing Month Max	1.64
Pricing Year Max	2.70
Region Max	3.59
Sector Average	4.93
Sector Max	12.86

Table 4 gives a summary of the VIF test (a test on collinearity described later) for the variables. For dummy variables (Pricing Month, Year, Region and Sector) the max figures are given, and for Sector the average and max are shown.⁶ This shows a reasonably robust, un-related dataset. For a full breakdown please see Universe descriptive statistics in the appendix.

Regression results

Full universe results

We include all variables as described in Table 2 in the final model, the results of which are given in Table 5 and Table 7. R^2 is 0.225 with sustainable debt indicator, percentage of sustainable debt, size, maturity, and rating all highly significant.

This R^2 figure might seem low, and indicate a noisy data set, however the high level of significance of factors analysed suggests the results are of interest.

Variable selection

In creating the model, and in considering whether R^2 could be improved and whether additional variables would be of interest, a number of investigations were performed. Here we describe the combinations of variables that were tried before selecting the final model. We acknowledge that our ex-ante experience of the market was an influence in variable selection.

Table 5. Regression summary. Source: AFII.

Model summary	
Dependent variable	cover_ratio_log
Model	OLS
N (observations)	4,651
Df Model	37
R-squared	0.225
Adj. R-squared	0.219
F-statistic	36.04
Prob (F-statistic)	1.07e-222
Covariance Type	HC3

⁶ Conventional rules of thumb flag a VIF above 5 as worth investigating and above 10 as a genuine concern. For dummy variables where there is an inherent relationship (if it's one sector, it can't be in another sector), higher values can be accepted.

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Control variable selection

- To investigate whether overall saturation of the market was a factor, we calculated a lookback period on cumulative issuance (within this data set) over the past 20 business days. R^2 was unchanged but the p-value for this variable was 0.27.
- As book cover on an individual deal basis could be considered to be related to issue spread (on an individual deal tightening the spread may lower the book cover), we created a field on issuance spread. Coverage was not complete. This field was sourced from SPREAD_TO_MID_SWAPS_AT_ISSUE for non-FRNs and FLT_SPREAD for FRNs. Inclusion of this data source increased R^2 slightly to 0.231 but reduced the data sample size to 4,423 due to data gaps. Results for the variable itself were mildly significant (p-value = 0.076) but with a very low coefficient (0.0003).
- We wanted to explore a macro variable to account for the market state at time of pricing. As all deals are EUR-denominated, we considered both a 5y EUR rates figure (EUSA5 Curncy) and a 6M figure (EUR006M Index). Including either variable adjusted the R^2 to 0.226, and p-values were high for 5y (0.137) and low for 6m (0.023). For both regressions however the VIF figures were high for the new data, 13.33 for 6m and 13.19 for 5y rates, suggesting collinearity.⁷
- Deal size was converted to a log scale (to account for its skew). R^2 reduced to 0.194 but the p-value for PercSustDebt rose to 0.062.

Explanatory variable selection

The final model was run with all combinations of explanatory variables. SustDebut is a subset of SustLabel and so it was important to look for the impact of introducing both factors. Results are shown in Table 6.

Table 6. Regression results using combinations of explanatory variables. Source: AFII.

Variable	3 Variables			1 Variables		
	R^2	Coefficient	P-value	R^2	Coefficient	P-value
SustLabel	0.225	0.150	0.000	0.223	0.133	0.000
PercSustDebt	0.225	-0.126	0.010	0.213	0.019	0.673
SustDebut	0.225	0.220	0.030	0.214	0.328	0.001

Variable	2 Variables			2 Variables			2 Variables		
	R^2	Coefficient	P-value	R^2	Coefficient	P-value	R^2	Coefficient	P-value
SustLabel				0.224	0.128	0.000	0.224	0.156	0.000
PercSustDebt	0.215	0.023	0.607				0.224	-0.135	0.006
SustDebut	0.215	0.329	0.001	0.224	0.244	0.017			

R^2 is not meaningfully changed in any of the variations, however the p-value for PercSustDebt does vary between. When it is the sole explanatory variable, p-value rises to 0.673 and coefficient is small but positive. When this is combined only with SustDebut, p-value also rises to 0.607 with a small but positive coefficient. It seems only to be significant when combined with SustLabel; p-value is 0.010 when all three variables are included or 0.006 when 2 variables are used with similar negative coefficients in each, -0.126 and -0.135

⁷ VIF as a test for collinearity is discussed more in *Appendix 1: Robustness checks.

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respectively. This leads us to suggest the conclusion for this variable is less strong than with the other variables. The results for all variables are shown overleaf in Table 7.

Model selection – estimation and inference

An Ordinary Least Square (OLS) regression was used for the calculation. A Weighted Least Squares (WLS) is included in the Robustness checks. The regressions are estimated with heteroskedasticity-robust standard errors: HC3 for full-sample regressions, sub-sector regressions, and annual analysis. A test versus a clustered error is also included in Appendix 1: Robustness checks.

Summary

Sustainable debt labelling has a significant impact on book cover, with results below the p-value level of significance in all regressions. The coefficient is reliably positive, at a figure of 0.1503 in the full model on a log regression. This corresponds to a 16.2% expected increase in the typical median book cover attributable to the label.^{8,9}

Percentage of outstanding debt is significant in the full model and significant when combined with SustLabel with a negative coefficient, implying that a higher outstanding portion of debt will result in poorer book cover. The factor is not significant either when regressed alone, or when combined with SustDebut. This suggests that when labelled debt has been used, the highest benefit is seen on the debut issuance, and this benefit decreases as more labelled debt is used. This could be because the benefits are associated with the increased transparency and communication that comes with the initial issuance. This result however is the weakest in our analysis.

However, sustainable debut as a standalone variable also seems significant in all regressions, and with a coefficient that is generally higher than that for the standalone label. The coefficient is 0.220 in the full model, or 0.244 when combined only with SustLabel. When regressed without that variable it increases to 0.328 (alone) or 0.329 (combined with PercSustDebt), as this data is a subset of SustLabel. The coefficient of 0.220 would suggest a total increase of 44.8% for a debut labelled bond versus no label, although the sample of SustDebut bonds is small, only 26 securities.¹⁰

⁸ As our dependent variable was a log variable, to turn the 0.1503 coefficient into a percentage change requires calculating $e^{0.1503}=1.1622 \Rightarrow 16.2\%$ increase.

⁹ This coefficient is estimated when controlling for PercSustDebt. When this is excluded, the SustLabel coefficient is 0.128 implying slightly lower increase, reflecting the fact that these variables are correlated.

¹⁰ Combining the two impacts are additive so calculating $e^{(0.1503+0.2197)}=1.4477 \Rightarrow 44.8\%$ increase. This combined figure is stable whether or not PercSustDebt is included in the specification.

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Table 7. Results for Full Regression. Source: AFII.

Coefficients						
Variable	Coef	Std Err	z	P> z	CI Low	CI High
const	0.935	0.071	13.132	0.000	0.796	1.075
sustnble_debt_instrmnt_indicator_int	0.150	0.019	7.731	0.000	0.112	0.188
pct_sustainable_debt_issuer	-0.126	0.049	-2.586	0.010	-0.222	-0.031
sustain_instrmnt_debut_indctr	0.220	0.101	2.171	0.030	0.021	0.418
Rating_numeric	0.031	0.003	10.629	0.000	0.026	0.037
length_of_bond	0.009	0.002	4.592	0.000	0.005	0.012
amt_issued_bn	0.068	0.007	9.742	0.000	0.054	0.082
floater	-0.298	0.039	-7.661	0.000	-0.374	-0.222
Sector_Communications	-0.139	0.059	-2.352	0.019	-0.254	-0.023
Sector_Consumer, Cyclical	-0.021	0.055	-0.376	0.707	-0.129	0.088
Sector_Consumer, Non-cyclical	0.056	0.054	1.033	0.302	-0.05	0.163
Sector_Energy	-0.190	0.075	-2.519	0.012	-0.338	-0.042
Sector_Financial	-0.232	0.052	-4.475	0.000	-0.333	-0.13
Sector_Government	-0.030	0.058	-0.525	0.600	-0.144	0.083
Sector_Industrial	0.091	0.058	1.575	0.115	-0.022	0.203
Sector_Technology	-0.072	0.103	-0.699	0.485	-0.274	0.13
Sector_Utilities	-0.087	0.057	-1.533	0.125	-0.199	0.024
Region_EM	0.017	0.085	0.197	0.844	-0.15	0.184
Region_Europe_DM	-0.035	0.032	-1.086	0.277	-0.098	0.028
Region_NA_DM	-0.081	0.035	-2.318	0.020	-0.149	-0.012
Region_Supranational	0.147	0.07	2.104	0.035	0.01	0.284
Pricing_month_2	-0.022	0.029	-0.767	0.443	-0.08	0.035
Pricing_month_3	0.022	0.031	0.722	0.470	-0.038	0.082
Pricing_month_4	0.013	0.033	0.399	0.690	-0.051	0.077
Pricing_month_5	-0.091	0.027	-3.391	0.001	-0.144	-0.038
Pricing_month_6	-0.104	0.029	-3.527	0.000	-0.161	-0.046
Pricing_month_7	-0.040	0.044	-0.915	0.360	-0.126	0.046
Pricing_month_8	-0.148	0.034	-4.327	0.000	-0.215	-0.081
Pricing_month_9	-0.046	0.031	-1.493	0.135	-0.106	0.014
Pricing_month_10	-0.056	0.035	-1.604	0.109	-0.124	0.012
Pricing_month_11	-0.065	0.03	-2.158	0.031	-0.123	-0.006
Pricing_month_12	0.192	0.07	2.729	0.006	0.054	0.33
Pricing_year_2021	-0.192	0.033	-5.857	0.000	-0.256	-0.128
Pricing_year_2022	-0.243	0.034	-7.059	0.000	-0.311	-0.176
Pricing_year_2023	-0.194	0.033	-5.976	0.000	-0.258	-0.131
Pricing_year_2024	-0.017	0.032	-0.542	0.588	-0.08	0.045
Pricing_year_2025	0.059	0.032	1.876	0.061	-0.003	0.121
Pricing_year_2026	0.049	0.035	1.399	0.162	-0.02	0.117

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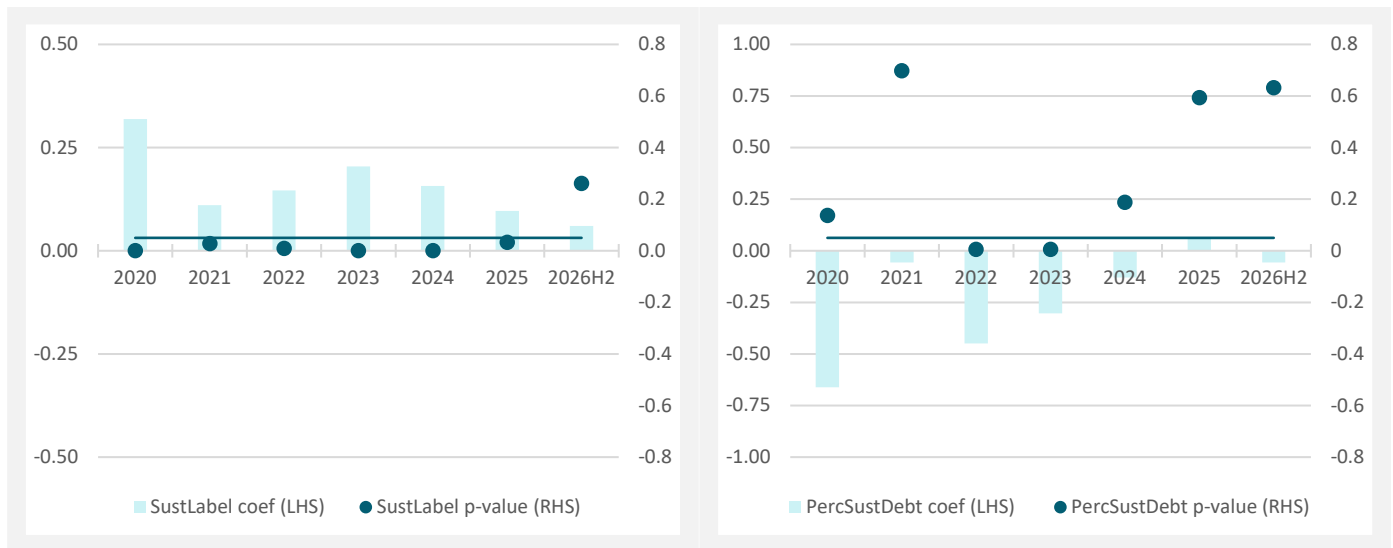
Time series analysis

The next analysis is to investigate whether these relationships hold constant throughout the period of investigation. The regression was re-run on annual interim periods. Regression coefficients and p-values for SustLabel and PercSustDebt are shown in Figure 2.

The LHS shows results for SustLabel. The coefficients are consistently positive with average 0.156 in both. The result is significant for all full annual periods (not the half year in 2026). Coefficients have also been decreasing since 2023, which may indicate a degree of market maturation, or that flows to labelled bond funds are being met.

The RHS shows results for sustainable debt ratio of the issuer. Coefficients are still consistently negative but more varied, and with less frequent significance. The period of highest significant is 2022 and 2023.

Figure 2. Regression coefficients and p-values for historic time periods. Source: AFII.



Subsector analysis

Table 8 gives the results on each of the same regression run on Financials, Corporate, and Government bonds only.

Table 8. Regression results when run on sub sectors individually. Source: AFII.

Variable			SustLabel		PercSustDebt		SustDebt	
SubSector	R ²	n	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Corporates	0.170	1,796	0.161	0.000	-0.218	0.000	-0.120	0.332
Financials	0.170	2,095	0.142	0.000	0.069	0.354	0.011	0.942
Governments	0.280	760	0.146	0.019	-0.302	0.005	0.547	0.008

Sustainable bond label remains highly significant for each sub sector, with the highest coefficient in Corporates.

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Sustainable share of debt is more significant in Corporate and Government sub-sectors, both with negative coefficients. This is not significant for the Financials. Government also offers a higher R^2 explanatory power of the model, albeit on a reduced sample of 760 bonds.

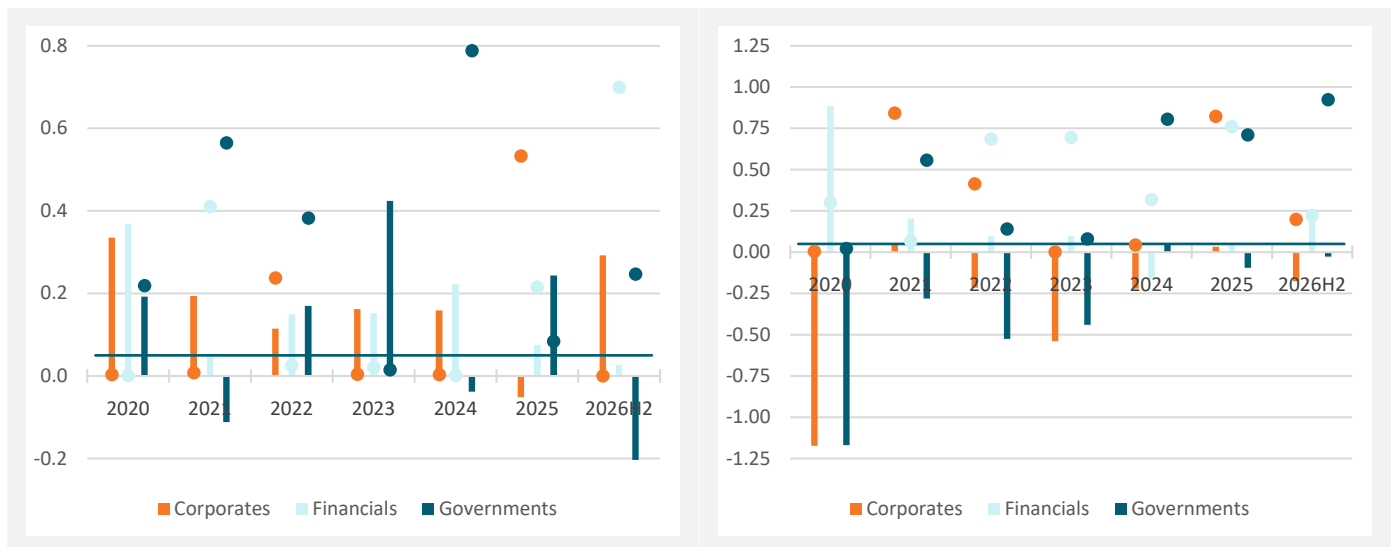
Perhaps most interestingly, SustDebt is only significant for Governments, and not significant for any other sub-sector, despite showing a strong result for the full universe. Table 9 gives the split of the 26 debut bonds by sector, and we see a higher percentage within Governments, 11 bonds from 760, which may explain the increased significance. This is still a very small sample size, and worth discussion only combined with the analysis on PercSustDebt.

Table 9. Debut issuance split by sector. Source: AFII.

Category	Corporate	Financial	Government	Total
Not Debut	1,770	2,088	749	4,625
Debut	8	7	11	26
Percentage Debut	0.5%	0.3%	1.5%	

Figure 3 gives the historical regression details for each sub-sector. In both the picture is volatile, with the majority of periods offering insignificant results. Corporates (orange) show the most significance with SustDebt significant in 2020/2021/2023/2024 and 2026H2, and PercSustDebt significant in 2020/2023/2024.

Figure 3. Figures for regression in historical periods for sub sectors, LHS SustLabel, RHS PercSustDebt. Source: AFII.



Model limitations

This regression looks at one measure of market demand, against sustainable debt features. The lower R^2 indicates how noisy such a metric is, and should be recognised as a limitation in this model.

We note that this analysis involved a large number of specifications: 13 main model variants, 13 semi-annual and 7 annual sub-period cuts, 21 sector-year cells, and 6 robustness checks. When many tests are run, some results can appear statistically significant by chance alone, even if no real effect exists. This concern applies most to results that are only marginally significant or that appear in a single cut (for example, individual

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period or sector-year effects). It applies much less to the SustLabel result, which is significant and consistent in direction and magnitude across nearly all specifications and robustness checks.

The universe is also only EUR-denominated bonds, and that market is more receptive to sustainable debt, so an extension to other markets would be needed to investigate the results more fully.

Ultimately analysing pricing alongside investor demand and book cover would help expand these results into the full potential benefits of the label for issuers.

It also needs mentioning that this analysis investigates correlations and not causality. The relationship we've identified is an association, it does not suggest an implied direction, apart from the observation that decisions around issuing sustainable debt come before observing the book cover for a live transaction.

Conclusion

The central finding of this paper is that the sustainable label premium is associated with higher book cover, which can suggest increased investor demand and reduced ongoing price volatility. The analysis covers 6.5 years of data, and the effect remains when looking at interim annual time periods, and within sub-sectors.

This is reassuring that the label can offer benefits for issuers, when the pricing benefit can sometimes be harder to identify.

A secondary finding that this benefit may decline with increased use of labelled debt is perhaps counterintuitive. This was concluded by the significance of the outstanding percentage of debt that is sustainable offering a negative coefficient, although the significance of this factor did not extend as widely. It was also shown by the significance of debut sustainable issuance, which was persistent, although only applicable to a small number of bonds.

It might indicate that sustainable investors, as a portion of investors, can be saturated with more bonds. It may suggest that the benefit to use of the label is met on debut issuance, when overall transparency and investor messaging is new.

Time-series analysis of this result is less robust with significance only in 2022 and 2023, and only within Corporate sectors.

Appendix 1: Robustness checks

Variance Inflation Factors (VIF)

In regression models it is important to understand where variables are collinear, i.e. they are correlated to each other and therefore may distort a regression model result and make it hard to interpret. There is a clear relationship between a bond's label and the issuer's overall sustainable-debt ratio, given the label feeds the calculation, and so these two factors specifically were investigated.

We have performed a Variance Inflation Factor (VIF) calculation, a standard diagnostic for multicollinearity. VIF is calculated for each variable by regressing it on all the other explanatory variables and seeing how much of its variation they explain (R^2); the VIF calculation itself is $1/(1-R^2)$, so a VIF of 1 means no collinearity at all, and the value rises as a variable becomes more predictable from the others. Conventional rules of thumb flag a VIF above 5 as worth investigating and above 10 as a genuine concern.

Table 10 shows the results. The only figure above 10 is Sector_Financials, a byproduct of Financial being the single largest sector category rather than a structural collinearity problem. No other variable exceeds 10. The three explanatory variables in focus carry figures of 1.05, 1.44 and 1.58, all comfortably below the threshold suggesting no collinearity issues.

Joint F-Tests

Our regression carries four variable that we have split into dummy inputs: region, sector, issue year, and issue month. Rather than look at the significance of each dummy value, we also want to investigate the significance of the entire block of variables, and for this we have used a joint F-test.

A joint (or 'block') F-test asks a different question than the individual t-statistics already reported next to each coefficient. The joint F-test challenges the null hypothesis that all the coefficients in a given block are simultaneously zero, i.e. whether dropping the entire block (sector, region, month, or year) would leave the model no worse off.

Table 10. VIF results. Source: AFII.

Variable	VIF
sustain_instrmnt_debut_indctr	1.05
Pricing_month_12	1.06
floatier	1.07
Region_EM	1.16
length_of_bond	1.17
Pricing_month_7	1.19
Sector_Technology	1.25
Pricing_month_8	1.30
Pricing_month_10	1.33
Rating_numeric	1.42
sustnble_debt_instrmnt_indicator_int	1.44
amt_issued_bn	1.44
Pricing_month_4	1.44
Pricing_month_11	1.47
Pricing_month_3	1.47
Pricing_month_6	1.50
Pricing_month_2	1.50
Pricing_month_9	1.54
pct_sustainable_debt_issuer	1.58
Pricing_month_5	1.64
Sector_Energy	1.64
Pricing_year_2021	2.02
Pricing_year_2022	2.08
Pricing_year_2026	2.26
Pricing_year_2023	2.28
Region_Supranational	2.43
Pricing_year_2024	2.51
Pricing_year_2025	2.70
Sector_Communications	2.99
Region_NA_DM	3.05
Region_Europe_DM	3.59
Sector_Industrial	3.63
Sector_Consumer, Cyclical	3.85
Sector_Utillities	4.54
Sector_Consumer, Non-cyclical	5.41
Sector_Government	8.23
Sector_Financial	12.86

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We ran this because the full-sample specification carries four such fixed-effects blocks purely as controls, and it's worth confirming each one earns its place in the model — both to justify the model's structure, and to rule out the possibility that an entire control block is unnecessary and so may be masking or distorting the sustainability coefficients we are focused on.

Joint F-tests confirm that each block of fixed effects in the full-sample regression contributes genuine explanatory power rather than being retained on the strength of a handful of individually significant dummies.

Results are shown in Table 11, and they confirm all variables are relevant for the regression. Sector ($F=29.67$), region ($F=4.23$), issue month ($F=5.36$), issue year ($F=42.92$) are all jointly significant at $p<0.01$ ($df_denom=4,613$).¹¹ This supports retaining the full fixed-effects structure in the headline specification rather than a more parsimonious model.

Table 11. Joint Significance F-test results. Source: AFII.

Test	F-statistic	p-value	df_num	df_denom
Sector (9 dummies)	29.67	0.000	9	4,613
Region (4 dummies)	4.23	0.002	4	4,613
Pricing month (11 dummies)	5.36	0.000	11	4,613
Pricing year (6 dummies)	42.92	0.000	6	4,613

¹¹ df_denom isn't the sample size, it's the residual degrees of freedom left over after the regression uses up some of the sample to estimate parameters. It's calculated as $N-k-1$ where N = sample size (4,651), k is number of variables and dummies ($37 = 9$ sectors, 4 regions, 11 months, 6 years, plus SustLabel, PercSustDebt, SustDebt, length of bond, amount, rating) and 1 for intercept.

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Log analysis

Analysis of the book cover shows a right-skewed distribution (a small number of deals attract very high multiples), which is the logic for using a natural log transformation in the model. To test this adjustment we have recalculated the main regression using the untransformed data as the dependent variable.

A summary of results is shown in Table 12. The significance of the SustLabel remains, although the P-value for both PercSustDebt and SustDebut rise to 0.0710 suggesting lower relevance but keeps the direction of coefficient.

Table 12. Regression results for non-transformed cover ratio as dependent variable. Source: AFIL.

Model summary						
Dependent variable	cover_ratio					
Model	OLS					
N (observations)	4,651					
Df Model	37					
R-squared	0.212					
Adj. R-squared	0.206					
F-statistic	24.53					
Prob (F-statistic)	1.15e-150					
Covariance Type	HC3					

Coefficients						
Variable	Coef	Std Err	z	P> z	CI Low	CI High
const	3.2098	0.346	9.289	0.000	2.533	3.887
sustnble_debt_instrmnt_indicator_int	0.4945	0.08	6.151	0.000	0.337	0.652
pct_sustainable_debt_issuer	-0.4236	0.235	-1.803	0.071	-0.884	0.037
sustain_instrmnt_debut_indctr	0.9138	0.506	1.805	0.071	-0.078	1.906
Rating_numeric	0.0875	0.012	7.51	0.000	0.065	0.11
length_of_bond	0.0422	0.01	4.392	0.000	0.023	0.061
amt_issued_bn	0.3436	0.037	9.263	0.000	0.271	0.416
floater	-0.8354	0.112	-7.438	0.000	-1.056	-0.615

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Outlier in book cover

As shown in Table 1, there are some very high values for book cover. Here we have re-run the regression removing any cover ratio higher than 10. The results are shown in Table 13. Note this reduces the universe to 4,559 bonds.

The results are still robust, and all factors remain significant.

Table 13. Regression results removing book cover >10. Source: AFII.

Model summary						
Dependent variable	cover_ratio_log					
Model	OLS					
N (observations)	4,559					
Df Model	37					
R-squared	0.196					
Adj. R-squared	0.189					
F-statistic	31.58					
Prob (F-statistic)	7.60e-195					
Covariance Type	HC3					

Coefficients						
Variable	Coef	Std Err	z	P> z	CI Low	CI High
const	0.9087	0.067	13.644	0.000	0.778	1.039
sustnble_debt_instrmnt_indicator_int	0.1427	0.019	7.657	0.000	0.106	0.179
pct_sustainable_debt_issuer	-0.1164	0.044	-2.656	0.008	-0.202	-0.031
sustain_instrmnt_debut_indctr	0.2103	0.099	2.115	0.034	0.015	0.405
Rating_numeric	0.0306	0.003	10.708	0.000	0.025	0.036
length_of_bond	0.0057	0.002	3.343	0.001	0.002	0.009
amt_issued_bn	0.0591	0.009	6.687	0.000	0.042	0.076
floater	-0.2938	0.038	-7.689	0.000	-0.369	-0.219

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WLS using deal size

As mentioned earlier, the distribution of deal size is right-skewed, and so to investigate sensitivity to this distribution we have run Regression 1 on Weighted Least Squares using deal size. Results are shown in Table 14.

The results do not seem to be sensitive to this. R^2 increases to 0.452, however the WLS model overweights larger deals which may dominate the weighted fit. Given all factors are significant with same direction, coefficients offer a good robustness check.

Table 14. Regression results using weighted least squares by volume. Source: AFII.

Model summary						
Dependent variable	cover_ratio_log					
Model	WLS					
N (observations)	4,651					
Df Model	37					
R-squared	0.452					
Adj. R-squared	0.448					
F-statistic	33.07					
Prob (F-statistic)	1.60e-204					
Covariance Type	HC3					

Coefficients						
Variable	Coef	Std Err	z	P> z	CI Low	CI High
const	1.0022	0.089	11.24	0.000	0.827	1.177
sustnble_debt_instrmnt_indicator_int	0.1131	0.043	2.632	0.008	0.029	0.197
pct_sustainable_debt_issuer	-0.2927	0.081	-3.608	0.000	-0.452	-0.134
sustain_instrmnt_debut_indctr	0.3207	0.128	2.496	0.013	0.069	0.572
Rating_numeric	0.0198	0.004	4.642	0.000	0.011	0.028
length_of_bond	0.0098	0.004	2.629	0.009	0.002	0.017
amt_issued_bn	0.0593	0.009	6.904	0.000	0.042	0.076
floater	-0.3391	0.045	-7.519	0.000	-0.428	-0.251

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Cluster covariance

Our main results use standard errors that adjust for the fact that some bonds are noisier than others, but they still assume each bond's error is independent. In our data set, issuers are repeated, so there may be issuer-specific factors that are not included in the model. To check this, we re-ran the main regression using a cluster covariance (which is a cluster covariance estimator, which allows errors to be correlated by ticker) with results shown in Table 15.

The result held up well for SustLabel and SustDebut where results are significant and coefficients are unchanged by construction as this only changed the errors. However, PercSustDebt became insignificant, showing this variable has a weaker relationship across the full data set, and may be focused on certain issuers.

Table 15. Regression results using cluster covariance. Source: AFII.

Model summary						
Dependent variable	cover_ratio_log					
Model	OLS					
N (observations)	4,651					
Df Model	37					
R-squared	0.225					
Adj. R-squared	0.219					
F-statistic	26.54					
Prob (F-statistic)	4.75e-108					
Covariance Type	cluster					

Coefficients						
Variable	Coef	Std Err	z	P> z	CI Low	CI High
const	0.935	0.105	8.921	0.000	0.73	1.141
sustnble_debt_instrmnt_indicator_int	0.150	0.022	6.73	0.000	0.107	0.194
pct_sustainable_debt_issuer	-0.126	0.082	-1.536	0.124	-0.287	0.035
sustain_instrmnt_debut_indctr	0.220	0.097	2.255	0.024	0.029	0.411
Rating_numeric	0.031	0.005	5.737	0.000	0.021	0.042
length_of_bond	0.009	0.002	3.97	0.000	0.004	0.013
amt_issued_bn	0.068	0.012	5.781	0.000	0.045	0.091
floater	-0.298	0.043	-6.891	0.000	-0.382	-0.213

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Appendix 2: Data

Table 16. Region mapping. Source: AFIL.

COUNTRY	CODE	REGION
Andorra	AD	Europe_DM
Australia	AU	APAC
Austria	AT	Europe_DM
Belgium	BE	Europe_DM
Bulgaria	BG	Europe_DM
Canada	CA	NA_DM
Chile	CL	EM
China	CN	EM
Croatia	HR	Europe_DM
Cyprus	CY	Europe_DM
Czech Republic	CZ	Europe_DM
Denmark	DK	Europe_DM
Estonia	EE	Europe_DM
Finland	FI	Europe_DM
France	FR	Europe_DM
Germany	DE	Europe_DM
Greece	GR	Europe_DM
Hong Kong	HK	APAC
Hungary	HU	Europe_DM
Iceland	IS	Europe_DM
India	IN	EM
Indonesia	ID	EM
Ireland	IE	Europe_DM
Israel	IL	EM
Italy	IT	Europe_DM
Japan	JP	APAC
Latvia	LV	Europe_DM
Lithuania	LT	Europe_DM
Luxembourg	LU	Europe_DM
Malta	MT	Europe_DM
Mexico	MX	EM
Netherlands	NL	Europe_DM

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COUNTRY	CODE	REGION
New Zealand	NZ	APAC
Norway	NO	Europe_DM
Peru	PE	EM
Philippines	PH	EM
Poland	PL	Europe_DM
Portugal	PT	Europe_DM
Qatar	QA	EM
Romania	RO	Europe_DM
San Marino	SM	Europe_DM
Saudi Arabia	SA	EM
Singapore	SG	APAC
Slovakia	SK	Europe_DM
Slovenia	SI	Europe_DM
South Africa	ZA	EM
South Korea	KR	APAC
Spain	ES	Europe_DM
Supranational	SNAT	Supranational
Sweden	SE	Europe_DM
Switzerland	CH	Europe_DM
United Arab Emirates	AE	EM
United Kingdom	GB	Europe_DM
United States	US	NA_DM

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Universe descriptive statistics

Table 17. Rating distribution of data set. Source: Bloomberg Finance L.P., AFII.

Rating numeric	Rating alphabetic	Count	Percentage
1	AAA	757	16.3%
2	AA+	241	5.2%
3	AA	106	2.3%
4	AA-	274	5.9%
5	A+	408	8.8%
6	A	518	11.1%
7	A-	682	14.7%
8	BBB+	763	16.4%
9	BBB	567	12.2%
10	BBB-	335	7.2%
TOTAL		4,651	

Table 18. Sector distribution of data set. Source: Bloomberg Finance L.P., AFII.

Sector	Category	Count	Percentage
Financial	Financial	2,095	45.0%
Government	Government	760	16.3%
Consumer, Non-cyclical	Corporate	487	10.5%
Utilities	Corporate	351	7.5%
Consumer, Cyclical	Corporate	297	6.4%
Industrial	Corporate	274	5.9%
Communications	Corporate	204	4.4%
Basic Materials	Corporate	98	2.1%
Energy	Corporate	62	1.3%
Technology	Corporate	23	0.5%
TOTAL		4,651	

Table 20. Sustainable debt indicator. Source: Bloomberg Finance L.P., AFII.

Indicator	Count	Percentage
0	3,334	71.7%
1	1,317	28.3%
TOTAL	4,651	

Table 19. Region distribution of data set. Source: Bloomberg Finance L.P., AFII.

Region	Count	Percentage
Europe_DM	3,353	72.1%
NA_DM	727	15.6%
APAC	298	6.4%
Supranational	235	5.1%
EM	38	0.8%
TOTAL	4,651	

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Table 21. Maturity distribution (yr) of data set. Source: Bloomberg Finance L.P., AFII.

Statistic	Value
count	4,651
mean	8.6
std	4.9
min	1.5
25%	5.4
50%	7.3
75%	10.0
max	50.0

Table 22. Size (EURbn) distribution of data set. Source: Bloomberg Finance L.P., AFII.

Statistic	Value
count	4,651
mean	1.2
std	1.8
min	0.3
25%	0.5
50%	0.8
75%	1.0
max	21.9

Bonds from first time issuers

Table 23. Bonds with no preceding issuer level percentage of sustainable debt. Source: Bloomberg Finance L.P., AFII.

ID	Ticker	Issuer Name	Pricing Date	Sustainable debt indicator
BJ218868 Corp	LIGHT	Signify NV	30-Apr-20	FALSE
BK410152 Corp	CZGRID	Czech Gas Networks Investments Sarl	09-Jul-20	FALSE
BM447308 Corp	UPMFH	UPM-Kymmene Oyj	12-Nov-20	TRUE
BN647058 Corp	CBRPEC	CBRE Open-Ended Funds SCA SICAV-SIF	20-Jan-21	TRUE
BO632928 Corp	TRAGR	Traton Finance Luxembourg SA	17-Mar-21	FALSE
BO632930 Corp	TRAGR	Traton Finance Luxembourg SA	17-Mar-21	FALSE
BP677954 Corp	NOVOB	Novo Nordisk Finance Netherlands BV	27-May-21	FALSE
BP985268 Corp	JDEPNA	JDE Peet's NV	09-Jun-21	FALSE
BP985270 Corp	JDEPNA	JDE Peet's NV	09-Jun-21	FALSE
BR416659 Corp	AMPRIO	Amprion GmbH	15-Sep-21	FALSE
BR579188 Corp	CPUAU	Computershare US Inc	28-Sep-21	FALSE
BR582971 Corp	AGCO	AGCO International Holdings BV	29-Sep-21	FALSE
BR950035 Corp	WERFEN	Werfen SA/Spain	21-Oct-21	FALSE
BS075233 Corp	HOWOGE	HOWOGE Wohnungsbaugesellschaft mbH	25-Oct-21	FALSE
BS075259 Corp	HOWOGE	HOWOGE Wohnungsbaugesellschaft mbH	25-Oct-21	FALSE
BT565742 Corp	DVIVER	DVI Deutsche Vermoegens- & Immobilienverwaltun...	18-Jan-22	FALSE
BV443759 Corp	HLNLN	Haleon Netherlands Capital BV	22-Mar-22	FALSE
BV443760 Corp	HLNLN	Haleon Netherlands Capital BV	22-Mar-22	FALSE
BV716154 Corp	LAMART	Nerval SAS	08-Apr-22	TRUE
BW925432 Corp	HERAEU	Heraeus Finance GmbH	01-Jun-22	FALSE
BX304590 Corp	UNIMUS	Universal Music Group NV	23-Jun-22	FALSE
BX304589 Corp	UNIMUS	Universal Music Group NV	23-Jun-22	FALSE
BZ178720 Corp	CIFDFR	Credit Immobilier de France Developpement SA	21-Sep-22	FALSE
ZL345766 Corp	PNDORA	Pandora A/S	03-Mar-23	TRUE
ZI799448 Corp	VLTO	Veralto Corp	12-Sep-23	FALSE

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ID	Ticker	Issuer Name	Pricing Date	Sustainable debt indicator
ZH243866 Corp	AENASM	Aena SME SA	06-Oct-23	FALSE
ZH909542 Corp	SDZSW	Sandoz Finance BV	08-Nov-23	FALSE
ZH909533 Corp	SDZSW	Sandoz Finance BV	08-Nov-23	FALSE
ZH909529 Corp	SDZSW	Sandoz Finance BV	08-Nov-23	FALSE
ZF212643 Corp	ARBBNK	Arab Bank for Economic Development in Africa	18-Jan-24	TRUE
ZB493769 Corp	FLTR	Flutter Treasury DAC	17-Apr-24	FALSE
YX771480 Corp	DCCLN	DCC Group Finance Ireland DAC	20-Jun-24	FALSE
YU624921 Corp	KSPID	Kingspan Securities Ireland DAC	23-Oct-24	FALSE
YL179675 Corp	BSCHAA	Bsch A LLC	13-Jun-25	FALSE
YL259397 Corp	BSCHBB	Bsch Global LLC	13-Jun-25	FALSE
DA259057 Corp	SENSK	Slovenske Elektrarne AS	13-Nov-25	TRUE
DA459049 Corp	MICCNL	Magnum Icc Finance BV	19-Nov-25	FALSE
DA459048 Corp	MICCNL	Magnum Icc Finance BV	19-Nov-25	FALSE
DA459046 Corp	MICCNL	Magnum Icc Finance BV	19-Nov-25	FALSE
DA459047 Corp	MICCNL	Magnum Icc Finance BV	19-Nov-25	FALSE
DI053975 Corp	RFFP	Eurazeo SE	10-Apr-26	FALSE
DL484411 Corp	COVEAC	Covea Cooperations SACA	03-Jun-26	FALSE
DL908221 Corp	AIAGA	Athens International Airport SA	17-Jun-26	FALSE

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