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WHITE PAPER

Sovereign sustainability:

What are the risk implications?

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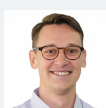

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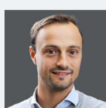

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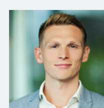

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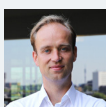

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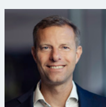

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Introduction

Robeco has two lenses for incorporating sustainability analysis into its investment decisions for sovereign bonds: risk and impact. Since 2010, the Robeco Country ESG Framework has been the main tool that helps us find environmental, social, and governance risks and opportunities in sovereign investments. In 2021, we introduced the Robeco Country SDG Framework as a complementary analysis tool. This framework measures countries' contributions to sustainable development, as defined by the UN Sustainable Development Goals (SDGs). Thus, these frameworks enable us to integrate ESG risks and steer toward SDG impact. This paper examines the financial implications of using either framework in sovereign investments.

The Country ESG and SDG Frameworks are two complementary tools that measure different aspects of sovereign sustainability. The Country ESG rating is focused on identifying countries' exposure to, and ability to deal with, ESG risks that can have material financial implications. This score focuses on a country's current performance on various ESG factors. It serves as an early warning signal in the investment process – countries with a deteriorating ESG performance may be vulnerable to related financial risks.

On the other hand, the Country SDG Framework[1] does not take into account financial materiality, but instead gauges whether a country is taking steps to attain the SDGs in the future. This is done by evaluating governments' policies toward each of the 17 goals, along with whether the country faces a financing gap, and whether it is involved in any controversies. Country SDG scores help us align portfolios with the goals from an impact angle.

Table 1 – The main characteristics for the two frameworks for sovereign sustainability analysis

	Country ESG Framework	**Country SDG Framework**
Purpose	Identifying sustainability risks and opportunities for sovereign bonds, in order to make better-informed investment decisions.	Identifying which countries should be included/excluded in government bond portfolios, in order to support sustainable development.
Model	The model consists of three pillars, environmental (30%), social (30%) and governance (40%).	The framework consists of three steps that gauge whether: (1) countries have good policies for the SDGs; (2) there is potential for investors to support a country in gaining better access to capital; and (3) a country is involved in controversies that deteriorate the SDGs.
Output	Score on a 1-10 scale (two decimals, 1 being the lowest).	Score on a -3 to +3 scale (integers).
Similarities	Countries that have high levels of corruption and are involved in environmental, social, or governance controversies will receive poor scores in both assessments.	

Source: Robeco

1. Van Zanten, J. A., Swinkels, L., Scholten, R., & Schieler, M. (2023). Integrating the Sustainable Development Goals in Government Bond Investment Strategies. Available at SSRN 4365013.

The Country SDG Framework is applied to portfolios aiming to align with the SDGs. The scores are used at the beginning of the investment process to define the eligible universe. This can, for instance, consist of only countries with a neutral or positive score. Such a universe would exclude (among others) Turkey or Guatemala, but include India and Indonesia. Additionally, the scores can influence the portfolio composition by assigning greater weight to countries with positive or neutral scores, or by ensuring that the portfolio weight in countries with positive SDG scores is higher than that in the benchmark.

The Country ESG Framework is used for a broader set of portfolios and at a later stage in the investment process. After the investment universe has been identified, the ESG rating is used in the fundamental analysis process to identify risks and pursue opportunities stemming from ESG issues. It is also utilized in Robeco's quant government bond and aggregate strategies, where our portfolio construction ensures that the Country ESG rating of the resulting portfolio is better than the benchmark.

Given that we use both tools in the investment process, albeit for different and complementary reasons, we want to explore how this relates to financial performance. Therefore, this paper will examine how using the frameworks can affect the financial risk of government bond investments.[2]

We approach this question by investigating whether there is a relationship between Country ESG/Country SDG scores and sovereign credit default swap (CDS) spreads. To do so, we employ panel regressions that allow for relevant macroeconomic and financial factors. Specifically, we:

- Take data from 83 countries for the period 2003-2023
- Use 5-year CDS spreads as an indicator of default risk
- Control for various macroeconomic and financial variables to ensure robustness in our findings
- Analyze both the levels and changes in Country ESG ratings to determine whether countries that improve their sustainability are rewarded in the financial markets.

By doing so, we aim to provide a clearer understanding of how country-level ESG risk and sustainable development contributions may impact risk in global sovereign bond markets.

Key findings

ESG ratings can support risk objectives.

1. Default risk has a negative relationship with ESG ratings: Higher Country ESG ratings correlate significantly with lower CDS spreads, driven particularly by the governance pillar. This means that countries with higher ESG ratings generally exhibit lower levels of investment risks.
2. Default risk reduces with recent improvements in ESG ratings: Countries with an enhanced social pillar of the ESG ratings have experienced lower CDS spreads in recent years. This indicates that recent improvements in social factors reduce default risk.

SDG scores support positive impact and do not need to sacrifice risk.

1. SDG scores have a limited relationship with risk: While there is no clear linear relationship between SDG scores and CDS spreads, countries with highly negative scores tend to exhibit higher spreads. This suggests that countries with -2 and -3 have higher risk.

2. This paper will focus on past spreads and is no way a representation of future results.

Robeco Country ESG rating

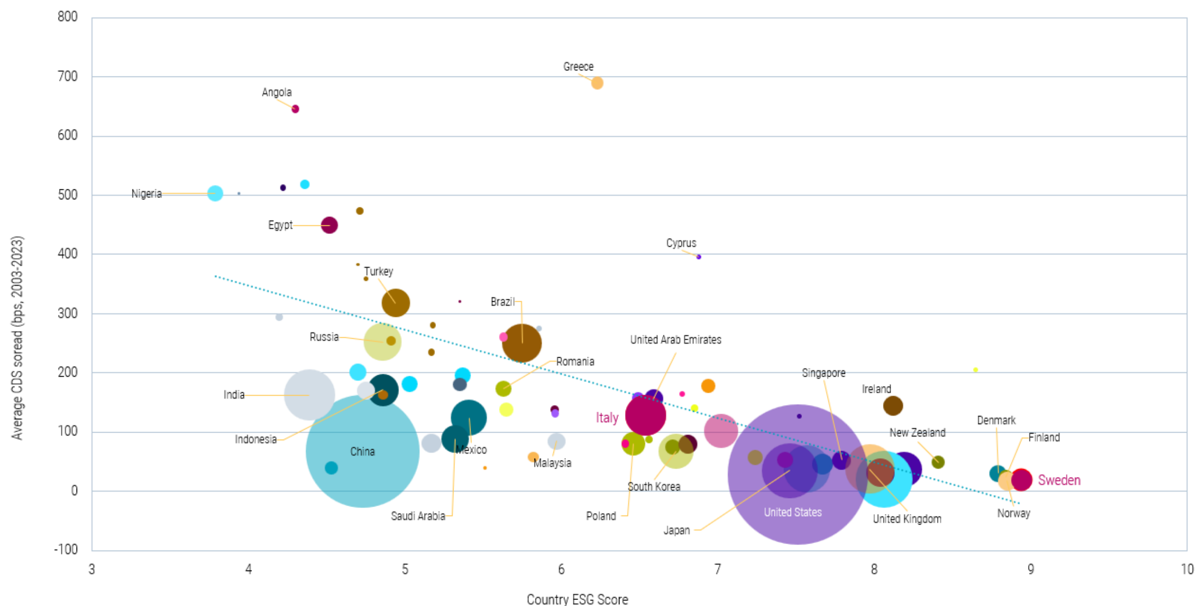
The Robeco Country ESG Framework is our main tool to identify ESG risks and opportunities in sovereign investments. Our findings in this research confirm that using the framework from an ESG risk and financial risk perspective can be beneficial. In this section, we examine the results and share insights.

Higher ESG ratings coincide with lower default risk

Our analysis of Country ESG ratings reveals a significant finding – countries with superior ESG performance tend to have a lower risk of default, as priced in the CDS market. Specifically, among the 83 countries analyzed between 2003 and 2023, we find a statistically significant negative relationship between their Country ESG ratings and 5-year CDS spreads. In numerical terms: considering the average CDS spread is 196, a country ESG score that is 0.1 higher is on average associated with a 10 bps lower level of the CDS spread.

To illustrate this, let us look at two EU countries: Sweden and Italy (highlighted in red in the chart below). Sweden is consistently among the top ten scoring countries, reflecting its strong governance, environmental management and social policies. These factors, along with others, contribute to its low CDS spread. In contrast, Italy, which ranks in the middle of the Country ESG ratings, faces moderate challenges such as an aging population, environmental risks and issues with institutional capacity. These factors contribute to relatively higher CDS spreads compared to Sweden, signaling a higher perceived risk of default.

Figure 1 – Average CDS spread and Country ESG rating for each country; the size of each bubble represents GDP



Source: Robeco, 2024.

The examples of Sweden and Italy reveal that a country's debt repayment ability is influenced by various financial and macroeconomic factors. We noticed that ESG-related risks tend to be lower for higher income countries, which tend to invest more in education, health care and renewable energy while also investing in policies that help with the mitigation of climate risk. Countries with better macroeconomic conditions also tend to be considered less risky by investors, as they are more confident in the countries' repayment abilities.

Therefore, it is important to control for various macroeconomic and financial variables such as GDP per capita, GDP growth, fiscal balance, inflation, debt, current account, reserves and export ratios, and other harder-to-quantify factors

3. Countries in EMBI are classified as emerging markets while countries in GBI are classified as developed markets.

such as political instability. After integrating these factors, we still find a negative relationship between Country ESG ratings and CDS spreads. These robustness checks are crucial to demonstrate that the relevance of sovereign ESG ratings is not merely coincidental, or due to omitted variable bias, but holds true across different conditions.

Besides controlling for many factors, we have also analyzed the impact of the bond market's liquidity. For this purpose, liquid bond markets are defined as countries in the JPM EMBI Global Index plus the developed markets in the JPM Global Government Bond Index. Our research suggests that the liquidity of bond markets matters, as we find that the negative relationship between Country ESG and CDS spreads only exists in liquid bond markets. In contrast, for the residual, less liquid bond markets, we do not find a relationship between Country ESG ratings and CDS spreads. In short, the negative relationship in Country ESG level results seems to be driven by countries in liquid bond markets.

To break this insight further down, we looked to see whether the relationship between CDS spreads and Country ESG levels is stronger in emerging or developed markets.[3] CDS spreads tend to be higher and Country ESG levels lower in emerging markets than in developed markets. We found that an increase in Country ESG rankings is associated with a larger decrease in CDS spreads in emerging markets than developed markets.

For example, Egypt, which is included in the EMBI index, is considered an emerging market. Despite its low ESG rating of 4.5, which has remained relatively stable, Egypt faces high CDS spreads. This can be partially attributed to its poor ESG performance, influenced by an increase in social unrest and political risk. The political environment can heavily influence economic development, affecting businesses, financial markets and the broader economy through decisions on taxes, regulations, trade policies, and more.

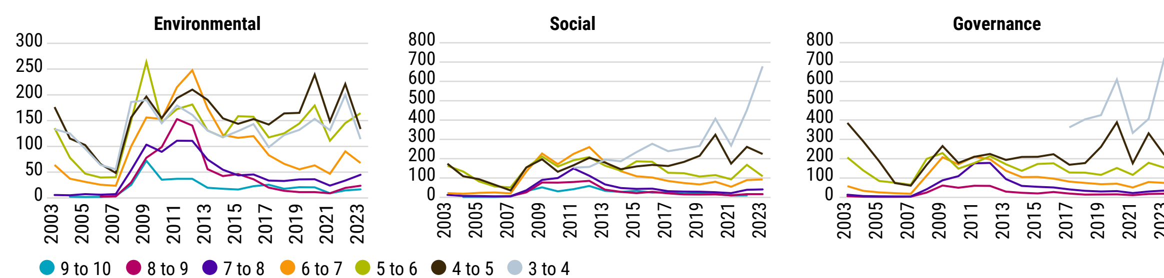
Strong governance linked to lower CDS spreads

As the Country ESG rating is made up of three pillars – environmental, social, and governance – we try to find which pillar is the main driver of the negative relationship between Country ESG ratings and CDS spreads. Our findings suggest that it is driven by the governance score. Over the whole sample period, we find a negative relationship between this governance score and CDS spreads.

The governance sphere analyzes the capacity of a nation's political, judicial and network of policymaking institutions to protect, nurture and strengthen the foundations and conditions needed for economies to innovate and grow. Our findings suggest that good governance practices can enhance investor confidence and reduce perceived sovereign credit risk, thereby leading to narrower CDS spreads. For example, countries with robust governance frameworks are less likely to experience political instability or mismanagement of public resources, both of which can lead to financial distress and higher credit spreads.

As for the other two pillars, we find no concrete evidence of a relationship between the environmental scores and CDS spreads over the whole sample period, while for the social scores we find a less strong relationship than for governance. This suggests that, while environmental factors are crucial for the long-term resilience of a country, they do not have a direct impact on sovereign credit risk as perceived by the market. It is possible that any problems arising from a weak environmental profile could impact the creditworthiness of a country on the longer-term horizon, rather than having an immediate impact.

Figure 2 – Average default risk per E, S and G pillar



Source: Robeco, 2024.

In addition to examining the levels of E, S and G scores, we also look at the changes within these scores. Specifically, we want to understand whether countries that improve their ESG scores over time have lower CDS spreads. We find that countries improving their social scores tend to have a lower default risk, indicated by a negative correlation between changes in social scores and CDS spreads. This trend appears to have become more pronounced in recent years. For changes in overall ESG scores, we find no evidence of a relationship with CDS spreads.

Key findings

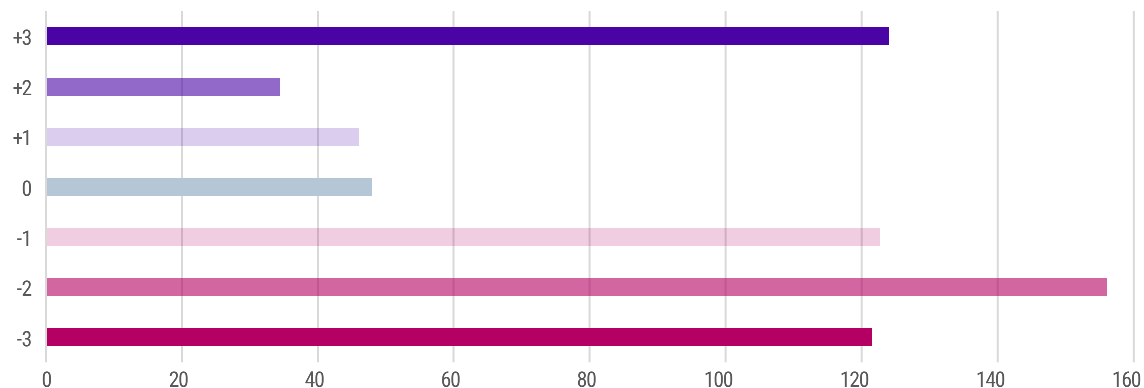
- Country ESG ratings are negatively related to CDS spreads
- Of the individual pillars, the governance pillar shows a negative relationship with CDS spreads
- In recent years, improvements in the social pillar have coincided with lower CDS spreads.

Robeco Country SDG score

The Robeco Country SDG Framework helps identify countries that should be prioritized in investment portfolios to support sustainable development. We find no linear relationship between countries with positive SDG scores and CDS spreads, suggesting that investors can create SDG-aligned government bond portfolios from countries with varying risk profiles. We also find that countries that have negative SDG scores (-2 & -3) have a higher risk of default, and this is priced into the CDS market.

We find a non-linear relationship between the CDS spread data and country SDG scores (see Figure 4 below). Countries with negative SDG scores tend to have higher default risks than those with neutral (0) and positive SDG scoring (+1 and +2) countries. An exception to this pattern concerns very high SDG scoring (+3) countries which exhibit similarly high default risks as those with negative SDG scores.

Figure 3 – Non-linearity between CDS spreads and Country SDG scores



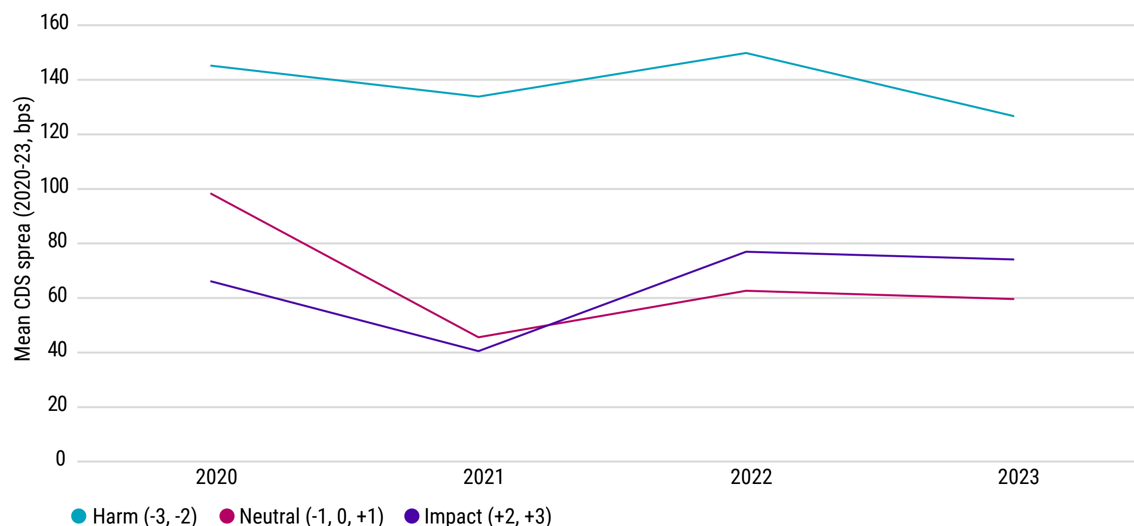
Source: Robeco, 2024.

An example here would be Senegal, which has an SDG score of +3 that is partly a result from its good policies toward the SDGs. In recent years, the country has improved significantly in terms of gender equality and health care outcomes. However, Senegal has one of the highest CDS spreads in our sample, which can be attributed to the poor financing conditions in the country. While investing in countries like Senegal may be risky, it can support closing the SDG financing gap, and thereby promote positive sustainable development outcomes.

To address this complexity, we have analyzed whether countries with a deeply negative score (-2 and -3) and those with a high positive score (+2 and +3) have a different CDS spread compared to intermediate countries (-1, 0, +1). The results reveal that countries negatively affecting the attainment of the SDGs exhibit higher CDS spreads compared to their intermediate counterparts. This could be explained by the greater institutional challenges, and the poorer governance, that such countries typically face.

Conversely, countries with high positive SDG scores have CDS spreads that are comparable to those of intermediate countries, with -1 to +1 SDG scores. These findings underscore the nuanced relationship between Country SDG scores and CDS spreads. Investors can create SDG-aligned government bond portfolios from countries with varying risk profiles.

Figure 4 – Average CDS spread of countries that are categorized as high positive, high negative and intermediate



Source: Robeco, 2024.

These results suggest that investors can use country SDG scores to invest without adversely altering the financial risk profile of the portfolio. While there is no evidence that countries that are making significant strides toward sustainable development, like Senegal, are directly improving their creditworthiness, this may change in the future. Extant research suggests that once countries reach higher levels of development, their creditworthiness improves as well, indicating that financial markets notice such changes in the longer run.[4]

Key findings

- There is no linear relationship between Robeco Country SDG scores and CDS spreads
- Countries with a highly negative SDG score (-3 and -2) have a higher CDS spread compared to their intermediate or positive scoring counterparts
- Investors can align their portfolios with the SDGs without necessarily altering a portfolio's risk profile

4. Schoenmaker, D., Ten Bosch, E., & van Dijk, M. A. (2022). Do the SDGs affect sovereign bond spreads? First evidence.

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Conclusion

This paper aims to provide an overview of how our two lenses of country sustainability affect the financial risk of sovereign investments. We highlight three important findings:

1. There is a significant and negative relationship between Country ESG ratings and CDS spreads, which is driven by the governance pillar.
2. In recent years, improvements in the social pillar of the Country ESG rating has has coincided with lower CDS spreads.
3. We did not find a linear relationship between Country SDG scores and CDS spreads. However, countries that have a highly negative SDG score (-3 and -2) have a higher CDS spread compared to their intermediate or positively scoring counterparts.

Additionally, we integrate the Country ESG rating as an early warning signal in our investment research, enabling us to cover a wide variety of environmental, social and governance risks. We also use the Country SDG score to align portfolios with the ambitions of the Sustainable Development Goals and thereby steer toward positive impact for clients aiming to up their sustainability performance.

With the insights from both lenses, we feel well equipped to manage sustainable investments in sovereign bonds, identifying opportunities for development while also assessing investment risks generation.

Methodology

Model for risk assessment

To understand how country sustainability affects sovereign risk, we follow the current approach in academic literature.[5] To take advantage of the country and time dimensions of our data sample, we use a panel regression with country and time-fixed effects based on the following equation:

$$
\begin{aligned}
CDS\ Spreads_{i,t} = {} & \beta_0 + \beta_1 Country\ Sustainability_{i,t-1} + \beta_2 \frac{GDP}{capita_{i,t}} + \beta_3 \frac{Debt}{GDP_{i,t}} + \beta_4 \frac{Fiscal\ Balance}{GDP_{i,t}} \\
& + \beta_5 \frac{\Delta GDP}{GDP_{i,t}} + \beta_6 Inflation_{i,t} + \beta_4 \frac{Reserves}{Import_{i,t}} + \beta_4 \frac{Export}{Import_{i,t}} + \beta_4 \frac{Current\ Account}{GDP_{i,t}} \\
& + c_{i,t} + \lambda_{i,t} + \mu_{i,t}
\end{aligned}
$$

…where the dependent variable *(CDS spreads$_{i,t}$)* is the logarithm of the 5-year CDS spread of country *i* in month *t*. Country Sustainabilityi, t-1 is either the (1) Robeco Country ESG rating or (2) Robeco Country SDG score of country *i* in month *t-1*. It is lagged by one time period to address potential endogeneity issues. *β1* is the main coeffieicnt of interest and it measures the marginal effect of country sustainability on CDS spreads. For the Country SDG analysis we substituted the *Country Sustainability$_{i,t-1}$* variable with two dummy variables: (1) 'high negative' dummy for SDG scores of -3 and -2, or (2) a 'high positive' dummy for SDG scores of +2 and +3. The rest of the variables are macroeconomic and financial control variables that are known to have an effect on CDS spreads.

These are: GDP per capita ($\frac{GDP}{capita_{i,t}}$), sovereign debt as a percentage of GDP ($\frac{DEBT}{GDP_{i,t}}$), fiscal balance as a percentage of GDP ($\frac{Fiscal\ Balance}{GDP_{i,t}}$), GDP growth ($\frac{\Delta GDP}{GDP_{i,t}}$), inflation rate ($Inflation_{i,t}$), ratio of reserves to import ($\frac{Reserves}{Import_{i,t}}$), ratio of export to import ($\frac{Export}{Import_{i,t}}$), and current account to GDP ratio ($\frac{Current\ Account}{GDP_{i,t}}$). The residuals are: $c_{i,t}$ is the unobserved country specific effects, $\lambda_{i,t}$ the unobserved time specific effects, and $\mu_{i,t}$ is the error term.

Data

Table 2 provides an overview of all the variables used in this research along with a definition and source.

Table 2 - Variable description

Variable name (abbreviation)	Description	Data source
Risk model		
Dependent variable		
Credit default swap (CDS) spreads	5-year CDS spread of a country, monthly format (end of month), basis points	Bloomberg
Independent variable		
Country ESG score	Robeco country environmental, social and governance score	Robeco
Environmental score	Environmental score from the Country ESG rating	Robeco
Social score	Social score from the Country ESG rating	Robeco
Governance score	Governance score from the Country ESG rating	Robeco
Country SDG score	Robeco's country sustainable development goal framework	Robeco
Macroeconomic control variables		
GDP per capita (GDP)	GDP per capita, current prices (USD per capita)	IMF
Government debt as a % of GDP (Debt)	General government gross debt (percentage of GDP)	IMF
Fiscal Balance as a % of GDP (Fiscal Balance)	Primary net lending/borrowing (percentage of GDP)	IMF
GDP growth (GDP growth)	Real GDP growth (annual percentage change)	IMF
Inflation (Inflation)	Inflation rate, average consumer prices (annual percentage change)	IMF
Reserves relative to import (Reserves/Import)	Reserves and related items (BoP, current USD) Import of goods, services and primary income (BoP, current USD)	IMF
Export relative to import (Export/Import)	Export of goods, services, and primary income (BoP, current USD) Import of goods, services and primary income (BoP, current USD)	IMF
Current account as a % of GDP (Current account)	Current account balance (percentage of GDP)	IMF

Source: Robeco

Financial data

As a measure of default risk, we use the 5-year credit default swap (CDS) spreads. We download this in monthly frequency (end of month) from January 2003 to October 2023 from two sources within Bloomberg; CBIN and MSG1. Two sources are chosen due to the data availability of CDS spreads in Bloomberg and the average is taken to combine these sources. Furthermore, each single datapoint was double-checked, extreme outliers were deleted, and countries with very few datapoints where excluded from the sample. After a thorough data-cleaning process, we have a large sample of 83 countries.

5. See: (1) Capelle-Blancard, G., Crifo, P., Diaye, M. A., Oueghlissi, R., & Scholtens, B. (2019). Sovereign bond yield spreads and sustainability: An empirical analysis of OECD countries. Journal of Banking & Finance, 98, 156-169. (2) Schoenmaker, D., Ten Bosch, E., & Van Dijk, M. A. (2022). Do the SDGs affect sovereign bond spreads? First evidence. (3) Margaretic, P., & Pouget, S. (2018). Sovereign bond spreads and extra-financial performance: An empirical analysis of emerging markets. International Review of Economics & Finance, 58, 340-355.

Sovereign sustainability data

We use two measures of national sustainability. Firstly, the Robeco Country ESG Framework uses an extensive range of ESG metrics to create a score for 150 countries. At present the framework includes 51 indicators along the three ESG dimensions. The final score is a weighted sum of all standardized indicator scores where the environmental indicators have a weight of 30%, the social indicators 30% and the governance indicators 40%. The final score is on a scale from 1-10, where 10 is the highest. Furthermore, the scores are unrounded, which makes it easier to detect changes in country ESG performance over time.

We download the Robeco Country ESG ratings for the sample of 83 countries from 2003 to 2023. The total Country ESG ratings were downloaded as well as the individual E, S and G scores. These scores are published semi-annually at the end of Q1 and Q3. These scores are transformed to monthly data by holding the scores constant until the new score comes out. We also calculate the change in Country ESG ratings by subtracting the Country ESG rating at time t+1 from the Country ESG rating at time *t*.

The Robeco Country SDG Framework[6] is a three-step process to come to a final Country SDG score. It firstly assesses the policies of a country for attaining the SDGs by measuring 100 indicators that directly or indirectly link to the SDG targets. It then assesses if a country lacks access to capital markets. Finally, countries are screened for any controversies that might inhibit the achievement of the SDGs.

For each step, countries are assigned a score from -3 to +3. These are converted into an overall SDG score following the same scale. To do this, we first check if a country has a negative score in any of the individual steps. If so, the lowest score will become the country's total SDG score. This is because we recognize that countries with poor policies for the SDGs (step one) or those displaying behavior that strongly conflicts with the SDGs (step three) cannot be considered to have a neutral or positive alignment with the SDGs. Countries that have a neutral score in step one and no negative score in step three will receive a total score of 0. For those with a positive score in step one, we add the country's scores in step two. This is to reward countries with good policies for the SDGs that are in need of additional financing.

As the Country SDG Framework was first introduced in 2021, no timeseries exists. Therefore, we backfill the scores. As the data that goes into the SDG scores has limited historical availability, we were only able to backfill the Country SDG scores for two years. Therefore, we have yearly Country SDG scores for 2020, 2021, 2022 and 2023. These were transformed into monthly data by assuming that the score remains the same for the country until the new score gets released (end of Q4).

Control variables

We allow for multiple macroeconomic and financial variables that have been shown to have a relationship with CDS spreads. The variables, along with a reasoning of how they relate to CDS spreads, are shown in Table 3.

6. van Zanten, J. A., Swinkels, L., Scholten, R., & Schieler, M. (2023). Integrating the Sustainable Development Goals in Government Bond Investment Strategies. Available at SSRN 4365013.

Table 3 – Control variables and their relation to CDS spreads

Variable name	Description of the variables relation to CDS spreads
GDP per capita (GDP) and GDP growth	Countries with greater financial wealth are more likely to repay their debt. Economies experiencing growth are more likely to meet their debt obligations compared to those that are stagnating or shrinking. Therefore, we anticipate a negative correlation between CDS spreads and GDP per capita/GDP growth
Government debt as a % of GDP	Governments with higher levels of debt are less able to repay their debt compared to those with lower debt levels. Increased government indebtedness raises the risk of default, which in turn leads to higher CDS spreads.
Fiscal Balance as a % of GDP	Countries with higher fiscal deficits are typically seen as less creditworthy, increasing their default risk. Therefore, an increasing fiscal balance to GDP ratio would likely lead to a decrease in the yield spread.
Inflation	The effect of inflation on CDS spreads is twofold. On the one hand, higher inflation is associated with macroeconomic instability and an increased default risk. On the other hand, higher inflation reduces the real value of government debt, which may mitigate default risk and thus lower CDS spreads.
Reserves relative to import	The relationship between a country's reserves-to-import ratio and its CDS spreads is often intertwined. A higher ratio signifies a greater ability to weather financial storms, leading to lower perceived risk by investors. Consequently, this may result in lower CDS spreads. Conversely, a lower reserves-to-import ratio might signal vulnerability, potentially resulting in higher CDS spreads.
Export relative to import	A higher export-to-import ratio signals a stronger economy with a greater ability to generate revenue from exports, which can boost investor confidence and lower perceived risk of default. Consequently, this tends to result in lower CDS spreads.
Current account as a % of GDP	This indicator reflects a country's competitiveness and its capacity to secure funds for servicing debts. We expect when the current account balance strengthens, the sovereign spreads to decrease.

Source: Robeco, 2024.

Important information

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