EVERGREEN

AN LSESU GREEN FINANCE PUBLICATION

COLLABORATION WITH TITAN ASSET MANAGEMENT

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About Us

The LSESU Green Finance Society is the sole sustainable finance-focused society at the London School of Economics (LSE). Our mission is to encourage greater consideration of environmental risks in financial decision-making and to equip LSE students with the skills and background knowledge required in this field. United by a shared vision of a climate-secure and sustainable future, our international membership pool represents a mix of engaged undergraduate and postgraduate students.

Our Aims

Educate

Improve the knowledge and understanding of green finance of our members, providing them with practical and targeted knowledge through periodic newsletters and weekly crash-crosses.

Engage

Ensure our members are well informed of the latest trends and opportunities in green finance through monthly events with industry professionals.

Act

Empower our members to apply their knowledge and develop their investment skills through workshops and the Green Finance Summit.

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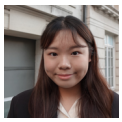

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Foreword

James Peel,
Portfolio Manager, Titan Asset Management

Government bonds are an important tool in any investors toolkit, and especially for a company like Titan Asset Management with a global, multi-asset class mandate. Across our sustainable investment proposition, we have historically struggled to find government bond strategies that effectively integrate sustainability considerations into the investment process. Consequently, we have tended to have a little less exposure to government bonds across this part of our proposition, compared to other parts.

As the three teams of analysts from the London School of Economics (LSE) Green Finance Society explore in this report, the various challenges include: the poor quantity and quality of non-financial data, a lack of international frameworks to aid comparison, and a complex set of stakeholders with different priorities.

Having acknowledged these challenges, the teams then reviewed a selection of literature from academia and practitioners on the subject, and used their findings to design a government bond methodology that integrates sustainability considerations. I am extremely impressed by their proposals and look forward to using their work to improve Titan's approach to sustainable investing in the future.

TEAM A

Team A Report on Exchange Traded Fund (ETF) Portfolio Construction

a) What are government bonds and how do investors usually use them when allocating capital?

Definition

Government bonds are a type of debt security issued by a government to raise funds. Governments issue bonds to finance various projects, such as infrastructure development, education, and social welfare programs.

Capital Allocation

Government bonds are an investment option for investors who are - seeking a safe and stable source of income or diversifying portfolios and managing risk (Pimco, 2017).

1) Government bonds are commonly used to generate income. When an investor buys a bond, they lend money to the government for a fixed period, and in return, they receive periodic interest payments. The interest rate on a government bond is usually lower than other types of investments, such as stocks, but the risk is also lower. Government bonds are considered a safe investment because they are backed by the full faith and credit of the government that issued them.

They are highly liquid, and as such, they can be bought and sold on the secondary market relatively easily. This makes them a popular choice for investors who need to access their capital quickly. Additionally, government bonds are exempt from state and local taxes, making them a tax-efficient investment option.

By investing in government bonds, they can ensure a steady stream of income while also protecting themselves against market volatility.

2) Investors typically use government bonds to diversify their portfolios and manage risk. Because government bonds are considered a safe investment, they are often used as a hedge against other investments that may be more volatile. In times of economic uncertainty, investors may go for government bonds as a haven asset (Fidelity, 2023).

b) Why is it difficult to apply traditional environmental, social and governance (ESG) analyses to government bonds?

Complex Stakeholder Dynamics

A bond that caters to all stakeholders without causing conflicts can be a difficult task, especially for governments that have a wide range of stakeholders with diverse priorities.

One way to address this complexity is to involve stakeholders in the bond design process. This can help to ensure that the bond is designed with input from all relevant stakeholders and that their priorities are taken into account. Another approach is to use a "social impact bond" (SIB) or "green bond" model, which is specifically designed to address social and environmental challenges. SIBs are typically structured in a way that ties bond repayments to specific social or environmental outcomes, such as reducing recidivism rates or improving air quality. This can help align the interests of stakeholders around a common goal and create incentives for governments to achieve these outcomes. Similarly, green bonds are designed to finance environmentally sustainable projects, such as renewable energy or clean water initiatives. By using green bonds, governments can attract investors who prioritise environmental concerns, and raise funds to support sustainability efforts.
Overall, designing a bond that caters to all stakeholders without causing conflict can be challenging, but involving stakeholders in the design process and using models such as social impact bonds or green bonds can help align priorities and create incentives for positive social and environmental outcomes.

Lack of consensus over ESG scoring using the Sustainable Developmental Goals (SDGs)

Upon researching, we have found that most of the sovereign green bonds are graded under the ESG framework according to how well they are able to fulfil the United Nations SDGs. However, this poses a new challenge regarding ESG scoring because there is a lack of consensus regarding the SDGs. This is because the SDGs are complex and interconnected, measuring progress towards the SDGs may be inconsistent, and the timeframe for achievement of the SDGs may vary (Boffo et al., 2020).

The SDGs cover a variety of issues, from poverty reduction and health to climate change and gender equality. Progress towards each goal is closely linked to progress towards the others, and changes in one area can have ripple effects across the system. This makes it challenging to isolate the impact of specific projects for which the issuance of government bonds is required.

Moreover, measuring progress towards the SDGs requires a lot of data, much of which is not easily accessible or available in many parts of the world. Even when data is available, it may be of poor quality or may not be collected in a standardised method across countries, affecting the assessment of government bonds across the globe.
Furthermore, there is no single, agreed-upon framework for measuring progress towards the SDGs. Different organisations and researchers may use different indicators, making it difficult to compare results across studies and to develop a comprehensive picture of progress, which makes it obscure to grade government bonds.
Lastly, many of the SDGs require long-term investments and changes, and progress towards them may not be immediately apparent. This makes it difficult to assess the bonds at face value and ascertain their future impact.

c) What datasets, methodologies or frameworks are available to help with these analyses?

There are various methodologies and frameworks used to analyse and assess sovereign green bonds used by different firms. Here, we evaluate and weigh them against one another to select the most effective and useful framework for our analysis.

Allianz's approach of using corporate ratings for sovereign bonds

Allianz's research into the incorporation of ESG factors into sovereign bonds and country credit ratings hinges fundamentally on a mapping of ESG ratings that MSCI compiles on governments and countries around the world on empirically observed sovereign bond credit ratings. This aims to further the conversation surrounding the manners in which ESG ratings can and should meaningfully be incorporated in investors' analyses of sovereign bond investments, which are seen primarily as mechanisms for capital preservation. In general, therefore, this paper looks at ESG mostly as a risk management tool (Hörter. 2017).

The paper outlines some key conclusions. To begin with, it would appear that ESG scores are not fully reflected in country credit risk assessments as they currently stand, particularly when it comes to significant differences between countries on environmental or social risk exposures. This is, therefore, an opening for investors to factor this information into their investment process.

Second, the paper outlines a strong correlation between social and governance factors, and default risk, which does not quite hold on average with environmental factors. Social and governance parameters may likely have a more direct, material impact on the strength of an economy's institutions, which is in turn likely to ensure the smooth, robust functioning of its sovereign bond issuance and banking systems and keep it from default.

Third, environmental and social factors seem to play a strong role, relative to the surprisingly mixed results on governance factors, in explaining credit spreads between developing and developed markets- this may be due to a fundamental alignment between several developing markets' long-term economic health and environmental and social justice in a manner that does not quite affect developed markets so strongly.

The key challenge in this methodology is its backwards-looking nature, which does not inform impact investors much on where a country is likely to head so much as it captures snapshots of what countries have done so far. By not tying the use of funds to these instruments, the purpose behind investing to make an impact gets lost. Moreover, the factors themselves are likely to be baked into the existing economic parameters that go into the calculation of credit ratings anyway- good governance, for example, is likely to result in strong, independent, and stable institutions and economic growth that can lower credit risks in those sovereign bond markets, so the use of incorporating them as factors unto themselves may be questionable.

Aegon Asset Management's UN SDG incorporation

Aegon Asset Management uses a series of homogenous indicators that apply to all countries based on the Bertelsmann-Stiftung and Sustainable Development Solutions Network (SDSN). This incorporates the United Nations Sustainable Development Goals that 193 member states of the UN adopted to achieve by 2030 as a framework to assess sovereign green bonds with ESG significance (Kurochkina et al., 2022). Each one of these indicators is translated into an index score published by the Sustainable Development Goals (SDG) organisation (28-29) (Sustainable Development Report, 2022).

To start, Aegon graphs the sustainable index score from the sustainability report against the momentum for each country. Momentum is calculated from a 5-year historical report data on ESG scores. From this data, and per capita GDP, Aegon collects other measures to inform their decision; Relative Sustainability Performance (region and income) and Sustainability Delta (developments/deterioration over time). Finally, the Fixed Income Sustainable Investment Committee challenges the case and makes a final declaration of each country on a case-by-case basis, using a 5-tier ranking system for each applicable country: Leader, Influencer, Improver, Neutral, and Detrimental (Aegon Asset Management, 2021).

Some challenges associated with this methodology are that some government policies currently in place may not be yet reflected in the scores, but will affect the future assessment of such countries when evaluating green sovereign bonds from different countries. Moreover, a higher SDG score for a green sovereign bond does not automatically mean that a country is on the right track to sustainable development. Thus, it is important to evaluate SDG scores within the context of other country attributes, such as development stage or GDP level, and to evaluate countries relative to other regional peers. There may also be disparity about SDGs as a standardised metric across different governments which may further complicate the scoring process.

PIMCO's focus on the purpose of issuance of bonds

Green bonds, social bonds, and sustainability bonds are the 3 types of bonds that are dedicated to financing projects with positive environmental and social impacts in PIMCO.

Green bonds are focused on financing environmentally friendly projects such as renewable energy, clean transportation, and wastewater management.
Social bonds finance social projects, including those aimed at marginalised populations, such as those living below the poverty line or people with disabilities. Sustainability bonds finance a combination of both green and social projects.

All three types of bonds are guided by voluntary principles set out by the International Capital Market Association (ICMA), which promotes transparency and reporting on the bonds' environmental and social objectives. Examples of eligible project categories for these bonds include affordable housing, access to essential services, and climate change adaptation (PIMCO, 2017).

Schroders' committee-based approach

Schroders has a Sovereign Sustainability Committee (independent committee from investment) with quarterly meetings focusing on establishing:
a) Firm Views
b) Firm Position
c) Identifying developing concerns/ mitigating risks from ESG

It is also in charge of generating 3-5 investment themes from the Quarterly Investment Forum.

The bond is mostly Sterling-dominated Fixed Income Focused, aimed at helping countries outperform their peers in meeting the UN SDGs (Catalyst and Diversification). Targeting delivering a return of 2.5% + Bank of America 3-month Government Bill index (Sterling) the ETF is composed of 60+% investment grade bonds, with the rest of corporate bonds screened by excluding sectors with Immoral Practice/ High gas emission. It also takes into account internal scores and ratings from MSCI and SustainEx. With an average effective duration of 2.22 years and an average yield of 2.96, the average credit rating of the ETF is A+ (Investment grading) (Grainger, 2022).

UBS's Impact Investing through Multilateral Development Banks

Multilateral development bank (MDB) bonds can be an alternative way of investing in government bonds with a focus on sustainability for several reasons. Firstly, MDB bonds are issued by multilateral development banks with a strong credit rating comparable to US
treasuries (mostly AAA-rated) and are often backed by several sovereigns including G7 Countries. This makes the bond relatively similar to government bonds. Secondly, MDBs are committed to financing projects that have positive social and environmental impacts, with objectives aligned with 17 SDGs, making them more aligned with ESG principles than many other fixed-income instruments. Lastly, the transparency of MDB bonds is high, with many MDBs publishing detailed reports on the projects they finance, allowing investors to assess the environmental and social impacts of their investments (UBS, 2020).

Upon evaluating these different approaches to designing and analysing sovereign green bonds, we decided to design our version of the iShares Global Government Bond ETF by considering criteria such as performance, risk, maturity, fund size, investment objective as well as their relevance to the UN SDG.

Issuer	Weight
United States Treasury Bills	42%
Germany	18%
United Kingdom Green Gilt	16%
China	9%
Sweden	5%
Canada	5%
India	5%

The largest weightage in our portfolio is associated with US Treasury Bills, amounting to 45%. This was chosen due to it being a low-risk investment and generally very stable, which can be used to hedge the entire portfolio. However, T-bills limit the returns to a certain extent because T-bills have a low return on investment, which may disincentivise risk-neutral investors to switch to this portfolio.

The next largest weightage, of 18%, is attached to Germany's new green Federal bunds. These bonds are part of Germany's new, unconventional method of "twin bond" issuance, which has the pleasant side effect of enabling investors who may be interested in this to directly measure any "greenium" that may be built into the green bonds over regular bunds. These green bonds are essentially identical to regular bunds with the only caveat being that their proceeds go toward "measures in the Federal budget that have an environmental impact." We argue that this bond is appealing to sovereign bondholders who may be looking for a mix of capital preservation and impact generation potential from their investments. Consider the first goal of capital preservation. German green bunds share their non-green counterparts' risk profiles, possessing a AAA credit rating and scoring particularly well on most governance metrics (Fitch, 2023), making them safe and liquid instruments to trade. Their impact generation potential is also reasonably strong. We identify the following statistics (as of September 2022, for the bonds issued in 2020) as being salient and noteworthy from this standpoint. €1.7 billion were allocated toward new construction and expansion projects in rail and waterways (which was anticipated to reduce 1.5 million tons of CO2-equivalent per year), €4.15 billion of eligible funds were spent on renewals of tracks, switches, and bridges, and €2.9 billion of eligible expenditure of financing or co-financing of international sustainability projects, particularly in especially at-risk emerging economies (Deutsche Finanzagentur, 2022). In fact, this last statistic is one of the major reasons why we believe that this bond is an appealing investment, given that it is a strong use of proceeds, and the capital invested in it goes to a credible governing body to oversee the way these partnerships and projects are handled elsewhere in the world, generating sustainable outcomes in vulnerable economies around the world while also mitigating the risk exposure that direct investments in those economies may have resulted in for investors here in the UK.

That said, we do want to note that the "greenium" has been shrinking for green bonds as market evolutions have ended up straining their liquidity, as measured by bid-ask spreads and transaction costs.

Moreover, these instruments also seem to be quite tailored toward long-term buy-and-hold investors, so if frequent rebalancing is an aim or activity built into Titan's portfolio construction, this instrument's benefit may be somewhat blunted. However, we want to emphasize our belief that these issues are minor, and do not sufficiently detract from what we maintain to be a fundamentally sound investment to consider, which is why we allocate such a sizable part of our bond portfolio toward these instruments.

Following this, we allocated 16% of the portfolio to the United Kingdom Green Gilt. This gilt was issued to fund clean transportation, energy efficiency, renewable energy, pollution prevention and control, living and natural resources, and climate change adaptation, which fulfil the UN SDGs 6, 7, 9, 11, 12, and 13 (see Appendix). Another impressive trait of this bond is that it is a 32-year bond, maturing on 31 July 2053, making it the sovereign green bond with the longest maturity in the world and reflecting the UK's long-term commitment to reach net zero by 2050 (GOV.UK, 2021). This bond was also recognised as the Largest Green Sovereign Bond and the Sovereign Green Market Pioneer for its impact on the green finance industry in 2021.

We have also allocated 9% of the portfolio to Bank of China's issued green bonds. These
bonds issued to fund projects related to renewable energy, clean transportation, sustainable water and wastewater management (Annual Report on Bank of China's Green Bonds, 2017). These target the UN SDGs 6,7,9,11,12,13 (see Appendix), having a significant impact on the sustainability forefront. Moreover, China has built one of the world's biggest green bond markets, with more potential than any other to alter the course of climate change (Kan et. al, 2022). However, we did not increase the weightage attached to China's green bonds beyond 9% as we found that emerging markets, such as China, are more vulnerable to ESG issues. Institutions are typically less developed, limiting policymakers' ability to act in times of crisis (Ground, 2017). To maintain the integrity of our low-risk portfolio, we decided to keep the composition at this level. Despite this riskiness, we think that it is still an important investment and should be included in the portfolio. This is because investor focus has shifted towards the crucial role of emerging markets in achieving global sustainability goals (Davis et al., 2022).

We have also allocated 5% to Sweden's, Canada's, and India's green bonds. Green bonds issued by the Swedish National Debt Office were issued to fund projects

related to renewable energy, clean transportation, sustainable water and wastewater management (Annual Report on Bank of China's Green Bonds, 2017). These target the UN SDGs 6,7,9,11,12,13 (see Appendix), having a significant impact on the sustainability forefront. Moreover, China has built one of the world's biggest green bond markets, with more potential than any other to alter the course of climate change (Kan et. al, 2022). However, we did not increase the weightage attached to China's green bonds beyond 9% as we found that emerging markets, such as China, are more vulnerable to ESG issues. Institutions are typically less developed, limiting policymakers' ability to act in times of crisis (Ground, 2017). To maintain the integrity of our low-risk portfolio, we decided to keep the composition at this level. Despite this riskiness, we think that it is still an important investment and should be included in the portfolio. This is because investor focus has shifted towards the crucial role of emerging markets in achieving global sustainability goals (Davis et al., 2022).

We have also allocated 5% to Sweden's, Canada's, and India's green bonds. Green bonds issued by the Swedish National Debt Office were issued to fund projects related to the protection of valuable natural environments, climate investments and railway maintenance. These show a clear focus on the UN SDGs 7, 9, 11, 12, and 13 (see Appendix). Sweden has stable public finances and this bond has a decently long maturity of ten years, which makes this an attractive bond to be a part of the portfolio (Riksgälden, 2020). Sweden has been a leader in the corporate green bond markets, and sovereign bonds are meant to support the ambitious environmental objectives of the country (SSFC, 2020). Meanwhile, India's newly launched Sovereign Green Bond makes for an exciting new instrument as far as impact generation potential and financial reward are concerned, given the highly dynamic and burgeoning green space in the Indian economy at this time. This will, of course, come with a higher risk profile than most of the very safe developed market bonds we have considered here- which is perhaps the main reason why we have gone with a relatively low 5% allocation to this bond. We do believe, however, that the current tranche that has been launched, as well as the next sale due sometime in the first half of the 2023-24 financial year (which could amount to up to $3 billion), has some unique advantages which may be appealing for Titan's purposes. The bonds' proceeds have been pegged by the Ministry of Finance's green bond framework to encourage investments in everything ranging from energy efficiency projects, emissions reduction, climate resilience and/or adaptation, biodiversity, and ecosystems management. The risk in these impact generation plans is, of course, that definitions in a lot of these areas may be subjective and loosely defined,

which raises challenges from a monitoring and impact due diligence standpoint, meaning transparency will be paramount. Even so, this could be a gamechanger in the green finance space, particularly as multiple states in India have followed the Central government's lead here and announced their explorations of thematic debt for their capital-raising plans, because of India's unique positioning in the green transition, and the opportunities that its economic ecosystem could present going forward (Grantham Research Institute and LSE, 2023).

Canada's green bonds were launched by the Government of Canada to allocate funds to projects supporting sustainability, such as clean energy and transportation, and sustainable open space. This is to achieve their emissions goals by 2030 and achieve net zero by 2050. Under the green bond program, the government published the Green Bond Framework (Green Bond Framework, 2022) in March 2022, followed by the issuance of an inaugural $5 billion green bond—the largest green bond issuance in Canadian history. The framework, which aligns with the International Capital Market Association (ICMA) Green Bond Principles, reflects key climate and environmental priorities and identifies categories of expenditures that are eligible for the allocation of green bond proceeds. They have also formed an Interdepartmental Green Bonds Committee to make decisions concerning the bond in the future, which shows Canada's commitment and suggests long-term efforts on their end.

Reference List:


TEAM B

Government bonds and their use in allocating capital

Government bonds, or sovereign bonds, are debt securities issued by governments to finance their spending needs (Investopedia, 2022). By purchasing government bonds, investors are lending money to the government for a predetermined period, referred to as the bond's term to maturity. Investors buy bonds in exchange for a fixed rate of interest, known as the coupon, paid regularly until the bond's maturity date (PIMCO, 2017).

Investors use government bonds as a low-risk, fixed-income investment option. Government bonds are generally considered a safe investment and may be used to balance out riskier investments such as stocks or corporate bonds (IG, 2022). This is because they are backed by a government's ability to meet its debt obligations, whereas corporate bonds are issued by private companies that may default on their debt. The chance of the issuer defaulting on a bond is reflected in its credit rating, which is higher for government bonds.

Investors allocate capital to government bonds based on their personal investment goals and risk tolerance. Conservative investors who prioritise capital preservation may allocate a larger portion of their portfolio to government bonds than more aggressive investors who seek higher returns through riskier investments. In times of economic uncertainty, investors may therefore increase their allocation to government bonds as a safe investment.

In addition to individual investors, institutional investors such as pension funds and insurance companies also allocate capital to government bonds (IG, 2022). These investors typically have longer-term investment goals and prioritise stability and predictability in their investments, making government bonds an attractive option.

Issues associated with applying traditional ESG analyses to government bonds

Applying traditional ESG analysis is challenging as there is a lack of consistency in defining and measuring material ESG factors. This is largely due to a shortage of clear and standardised reporting frameworks for sovereign bonds. This is in stark contrast to equity and corporate bonds, which currently have a wide range of precise frameworks, such as the Global Reporting Initiative and the Sustainability Accounting Standards Board (ETF Stream, 2023).

Furthermore, different countries are exposed to different ESG risks and opportunities, and the extent to which these ESG factors are significant also varies across countries. For instance, physical climate risk vulnerability may be more significant for a low-lying island state or a nation that is prone to natural disasters. Meanwhile, factors such as economic inequality and class divides may be more relevant to countries which are more economically advanced. Hence, it is challenging to do a cross-comparison of countries based on these factors, as the weights accorded to these factors cannot be standardised across countries and have to be individually evaluated and assigned.

Additionally, it is vital to recognise the disadvantages associated with applying traditional ESG analysis for emerging market sovereign bonds. They are less likely to score well as they have limited resources for sustainability and are in the early stages of their economic development. They will be especially disadvantaged if the ESG analysis is rooted in sustainable development goals (SDGs), which would allow advanced economies currently fare better in. Hence, traditional ESG analysis tends to be biased towards countries with relatively higher incomes (Brown Advisory, 2023).

Unlike corporate bonds, which are expected to explicitly state the uses of the debt sales' proceeds, sovereign bonds are not subjected to the same disclosure requirements Unlike corporate bonds, sovereign bonds are not subjected to the same level of reporting and disclosure requirements. This may lead to a lack of transparency and accountability over sovereign bonds. This will especially be so if governments choose to withhold ESG-related information at their discretion or provide minimal specifics about the purposes of their bonds. (A-Team Insights, 2023).

Unlike firms, governments can also choose not to open themselves up to audits, monitoring or scrutiny. Hence, data about sovereign bonds may not be that accurate as they may not be properly verified.

Assessing ESG factors for sovereign bonds also requires engagement with bond issuers instead of solely gathering and analysing data. However, engagement with sovereign bond issuers may be more challenging than engagement with corporate bond issuers. For instance, engagement requires reaching out to a wide variety of stakeholders, such as non-governmental organisations (NGOs) or trade unions (Responsible Investor, 2022). However, such engagement may be wrongly perceived as politically motivated interventions or lobbying, and this may result in undesirable backlash.

Datasets, methodologies and frameworks used in the analysis

The UN's Sustainable Development Goals (SDGs) provide a useful framework for investors to analyse countries' progress in sustainable development. The Sustainable Development Report is a crucial SDG scoring methodology. Its SDG Index Rank ranks 193 countries on their progress towards achieving the SDGs. Each country is awarded an SDG Index Score – the percentage of SDG achievement – and a Spillover Score, which assesses the externalities of that country's actions on other countries (Sustainable Development Report, 2022). Externalities are a particularly significant issue for many developed countries, as they tend to exploit the production capacity of less developed countries to maintain their consumption levels (Aegon Asset Management, 2021). Hence, it is crucial for investors to monitor countries concerning their global impact and not on a standalone basis.

Additionally, when evaluating SDGs, investors also need to consider the context of each country— its GDP as well as the performance of other countries in the region. This is because the financing gap for SDGs is particularly wide in low-income countries – to attain the SDGs by 2030, they must spend 15.4% of their annual GDP, in comparison to <1% for high-income countries (van Zanten, Swinkels, Scholten and Schieler, 2023). Thus, SDG assessment frameworks must be flexible and granular enough to account for differences between countries. This will enable greater diversification – of progress in SDG indicators, regions and income groups – in portfolios. This is crucial not just from a risk-return perspective, but also to ensure that capital is allocated to a broad range of sustainable development needs (Aegon Asset Management, 2021).

Additionally, several ratings build on data from companies that provide ESG research. The Morningstar Sustainability Rating is used to assess corporate and sovereign ESG risk by tapping on data from Sustainalytics, a leading provider of ESG ratings and research (Morningstar, 2023). Sovereign ESG risk, in particular, is first assessed by calculating the Portfolio Sovereign Sustainability Score. This score is computed by obtaining an asset-weighted average of Sustainalytics' Country Risk Ratings. Deductions will be made based on the controversies that the portfolio's holdings are involved in. Then, the Historical Sovereign Sustainability Score is calculated by obtaining a weighted average of the trailing 12 months of the Sovereign Sustainability Scores (Corporate Finance Institute, 2023). Historical scores are not equally weighted as more recent portfolios are deemed to be more relevant and hence weighted more heavily as compared to more distant portfolios. Funds which have historical scores will then be ranked based on a normal distribution. They will subsequently receive a rating of 1 to 5 based on where they rank, with 5 denoting the lowest ESG risk. The Morningstar Sustainability Rating is issued monthly (Morningstar, 2021).

Sustainalytics assesses sovereign ESG risks through Country Risk Rating. This rating focuses on two key aspects – Wealth and ESG Performance. Wealth is measured by the government entity's current stock of capital and is an indicator of the country's vulnerability to ESG risks (Sustainalytics, 2023). The wealthier a country, the lower its vulnerability to ESG risks. There are 4 distinct categories of capital stock – Natural Capital, Human Capital, Produced Capital and Institutional Capital. Meanwhile, ESG Performance is assessed by examining socioeconomic indicators, conducting trend analysis and assessing salient events that have happened in the country. Sovereign risk scores are then determined by averaging the scores for Wealth and ESG Performance for each type of capital and combining them as a weighted sum. Sovereign Risk Scores will subsequently be used to determine Country Risk Ratings, by categorising sovereign bonds into one of the five ESG risk categories.

Another example of such a rating is the MSCI Government Rating. MSCI is a leading provider of data and research services that bring greater transparency to financial markets and help to inform the decisions that investors make. The MSCI ESG Government Rating considers a country's management of ESG risk factors and how they impact the sustainability of its economy, and provides a long-term view, making it compatible with traditional analysis of government bonds for analysing credit rating (MSCI, 2020).

The government rating covers 198 countries and 45 local authorities, including developed, emerging and frontier markets using data backfilled to 2008, and it is updated every month (MSCI, 2020). Countries are rated on a seven-point scale, ranging from 'AAA' to 'CCC', with the latter being the worst rating; these ratings are determined by scores from 0-10, relating to the three ESG pillars: Environmental, Social and Governance (MSCI, 2020).

This methodology gives a general score for a country, based on a foundation that provides a more in-depth analysis of its degree of sustainability. MSCI ESG Government Ratings are therefore effective in helping investors to determine the attractiveness of government bonds, as the ESG risk exposure and management assessed by this rating has significant implications for the long-term sustainability of a given country. The rating measures ESG risk exposures against risk management, forming the basis for a final evaluation of a country's sustainability. Risk management is defined in the methodology of this rating as the efficiency of resource utilisation, performance on socio-economic factors, financial management, corruption control, political stability and other factors (MSCI, 2020). In identifying this, an investor can use this rating to more comprehensively integrate ESG considerations into their portfolio.

Datasets, methodologies and frameworks used in the analysis

Table 1 shows the allocation of several government bonds into our proposed ETF, all yields mentioned here are as of 27th March 2023.

Issuer	Weight
Germany	30%
United States Treasury Bills	20%
France - Green OATS	15%
Hong Kong - Green Bond	15%
Chile - Sustainability-linked Bond	8%
Sweden - Green Bond	5%
Uruguay	5%
India - Green Bond	2%

Table 1: Government bond ETF

German government bond:

Germany's 10-year government bonds are an attractive investment, with a high credit rating of AAA by Fitch and a yield of 2.22% (Fitch, 2022); (Bloomberg, 2023). The lower yield reflects the low risk associated with this bond, yet it still promises a good return. This bond provides ESG integration, given Germany's serious sustainability considerations and rank 6th in the UN's sustainable development report (UN, 2022). These considerations are shown in Germany's policies, such as the Renewable Energy Acts (Clean Energy Wire, 2022). We have allocated **30%** of the ETF to Germany's government bonds due to the promise of a good return while having a considerable degree of ESG integration.

US treasury bond:

US government bonds with a 5-year maturity are currently offering a 3.51% yield, and are an attractive investment given the inversion of the treasury yield curve (Bloomberg, 2023). These bonds are considered a good investment option due to their low risk and high credit rating of AAA by Fitch, with a stable outlook (Fitch, 2022). In addition, they have a strong ESG rating, ranking 41 out of 163 on the SDG Index and receiving a score of 74.5 (UN, 2022). US bonds are also rated 12th by Sustainalytics with a score of 12.46, making them an attractive option for investors looking for ethical and sustainable investments (Sustainalytics, 2023). For these reasons, we have allocated **20%** of our ETF to US government bonds.

France Green OATS:

France has conducted 3 issues of green bonds, with maturities ranging from 16 - 22 years and yields ranging from 0.10% to 1.75% (Agence France Tresor, 2023). The latest issue was on 25th May 2022 and the bond was indexed to the European Consumer Price Index, making it the first inflation-linked sovereign green bond. (Natixis, 2022)

France Green OATs are attractive due to their high transparency. They clearly state that proceeds will be spent on a diverse range of projects, including clean transportation, waste management and land development. There is a clear investment selection process, where proceeds will only be invested in projects with the TEEC label, a certification awarded by the French Ministry of Ecological Transition to firms committed to energy and environmental transformation. (Agence France Tresor, 2017)

However, their yields are significantly lower compared to sovereign bonds with similar maturities. This is due to their high demand at the point of issuance, leading to them being heavily oversubscribed. The second issue was 5 times oversubscribed, resulting in a yield of 0.526% at issuance (Scope Ratings, 2021). Despite this, the high demand highlights investors' confidence in the bonds' creditworthiness and ability to finance valuable sustainable projects. Additionally, France has a high credit rating of AA from Standard & Poor and Fitch, underscoring its creditworthiness too (Trading Economics, 2023). The bonds are also credible as they are backed by banks such as BNP Paribas and Barclays. With high transparency, low risk and its ability to hedge against inflation, we have allocated **15%** in our ETF.

Hong Kong green bond:

Hong Kong has issued HK$800m (US$101m) of the world's first tokenised sovereign green bond, using the Goldman Sachs Digital Asset Platform. The benefits of such tokenisation include increased liquidity, faster settlement, lower costs and improved risk management (BNY Mellon, 2019).

This bond has a 1-year maturity and 4.05% yield. Its yield is very high relative to its low risk – it has obtained the highest short-term issue credit ratings of A-1+ (S&P)/F1+ (Fitch) (HKMA, 2023), and the government has a low risk of defaulting on loans. Since the bond is HKD-denominated, if the HKD is unpegged to the USD this shift in currency value could affect the bond's performance. However, given its short-term maturity, this is not a significant concern.

This bond is strong from an ESG perspective. The proceeds from green bonds will finance projects that fall within 9 eligible categories under HK's Green Bond Framework. Analysis by Vigeo Eiris, an independent provider of ESG research, determined HK's Green Bond Framework to fulfil 8 SDGs and achieve a 'robust' contribution to sustainability. Additionally, all their green bonds align with ICMA's Green Bond Principles (Vigeo Eiris, 2022). HK's carbon emissions have observed a downward trend since 2014, and the country is making promising progress towards its goal of carbon neutrality before 2050 (GovHK, 2022).
Hence, due to its high returns, low risk and good ESG performance, we have allocated **15%** in our recommended ETF.

Chile Sustainability-linked Bond:

The Chile sustainability-linked bond has a maturity of 20 years with a yield of 4.34%. This bond has high demand, reaching more than $8 billion at the point of issuance, 4.1 times the original placed amount (S&P Global, 2022). This highlights investors' confidence in the Chilean economy and their commitment to sustainability.

The bond is underpinned by two key performance indicators, namely reducing overall levels of greenhouse gases and increasing renewable energy adoption in Chile. (Sustainalytics, 2022). Chile has strong ESG credentials, achieving a high ESG score of 77.8 in 2022, placing it 28th out of 163 countries (World Economics, 2022).

Although Chile's credit rating by Standard and Poor's is AA-, indicating that holding the bond poses a slight risk, the consensus is that Chile is still quite creditworthy as it is stable and prosperous. (World Bank, 2023)

With strong returns, good ESG performance and relatively low risk, we have allocated **8%** in our proposed ETF.

Swedish Green Bond:

Although the Swedish Green Bond offers a limited yield of 0.09%, the government asset is widely known for its low-risk factors (Riksgälden, 2020). This bond has maintained AAA credit ratings with a steady prognosis over a 10-year maturity term. Having pioneered sustainable practices and policies that are now adopted globally, Sweden's green sources account for more than 50% of its energy portfolio.

The government proceeds will heavily contribute to achieving Sweden's environmental and climate objectives, namely in the protection of natural habitats and climate maintenance (Regeringskansliet, 2021). Due to its first-mover advantage, the bond income will also be reflected in the transport sector where the nation aims to reach fossil-free by 2030 (ADEC Innovations, 2015).

Given the reliability of its interest payments, Swedish Green Bonds have been assigned to **10%** of the ETF. Despite the low-yielding nature of the asset, it is a perfect opportunity to broaden ESG horizons.

Uruguay Government Bond:

Uruguay's 1-year government bond has a higher yield of 4.69%, and higher risk with a rating of BBB- by Fitch (CEIC, 2023); (Fitch, 2023). This yield, paired with Uruguay's strong commitment to sustainability, makes the government bond an appealing investment. Uruguay ranks 31st in the UN's sustainable development report, and already runs on 98% renewable energy (UN, 2022); (World Economic Forum, 2023). It had made considerable investment into renewables, with a green hydrogen generation roadmap that will generate $2.1 billion in revenues and up to 34,000 jobs by 2040 (World Economic Forum, 2023). We have allocated **5%** of the ETF to Uruguay's government bonds as they are higher and risky but have the potential of providing a strong return.

Additionally, Uruguay is making serious headway on the sustainability front, providing a dimension of ESG integration to the bond.

Indian Green Bond:

The India Green Bond boasts the highest yield of 7.15% with maturity periods that varies from 5 to 10 years (Ali, 2023). Released just this year, the government asset received US$1 billion worth of debt securities in contributions, achieving greenium or 'green premium,' referring to investors preferring to pay the premium of green bonds over conventional bonds (Climate Bonds Initiative, 2023); (Pietsch and Salakhova, 2022). The large subscription rate to India's green bonds reflects strong investor confidence in the government's green initiatives, especially as it moves towards renewable energy sources and green infrastructure. Given the track record of suboptimal ESG compliance in India, government green bonds have been dynamic in reforming the region's industrial and agriculture sectors.

Nonetheless, the India Green Bond has a lower credit grade of BBB-, in addition to greenwashing tendencies in its opaque ESG reporting (Fitchratings.com, 2023). Overall, this high-risk asset will constitute **2%** of the ETF portfolio but is expected to generate strong margins alongside new initiatives in India's sustainability market.

Reference List:

Appendix

Appendix 1: Sovereign ESG indices assisting with ESG analyses

As well as companies providing data for ESG ratings, there are sovereign ESG indices which track the performance of countries concerning sustainability. The Sovereign ESG framework published by the World Bank is globally used to measure sovereign indices without being confined to a single ESG index. The framework investigates the performance of countries under 3 overarching pillars - Environment, Social and Governance, covering 17 core sustainability themes. The Environment pillar measures the environmental externalities that exist within a region's economic activity, as well as the degree of sustainable practices amongst its natural resource endowments. The Social pillar accounts for a population's access to basic needs along with inequalities within its social structure. Lastly, the Governance pillar assesses a government's social stability, legal system, and ability to efficiently address social and environmental adversities. To publicise the results of its findings, the World Bank has constructed an ESG data portal which facilitates the computing of 71 ESG indicators across 217 countries. To enhance the functionality of its data framework, the World Bank provides access to additional indicators such as GDP and inflation to offer context of one's economy during ESG analysis.

TEAM C

Overview: Government Bond and its Role in Portfolio Management

A bond is a loan that the bondholder makes to the bond issuer. The government bond sector is a broad category that includes “sovereign” debt, which is issued and backed by a central government (Abbas & Pienkowski, 2022). Investors use bonds as a way of diversifying their portfolios, generating income, preserving capital, and even using them as capital appreciation tools. Bonds are considered a defensive asset class because they are generally less volatile than others such as equities (PIMCO, 2023). Government bonds are usually viewed as low-risk investments, as governments generally have a close-to-zero default risk (IG, 2019). Since governments have the power to influence the market for their own bonds by manipulating the interest rates as part of their economic policy, such nature adds to the complications in bond analysis, especially in combined with an ESG framework (PIMCO, 2023). A bond Exchange Traded Fund (ETF) is a portfolio of bonds traded in an exchange. Investing in a bond ETF allows investors to reduce risk exposure as the fund holds a portfolio of bonds with different coupons, issuers, and maturity dates.

Sustainability-linked bonds are bonds that are tied to key performance indicators such as the UN SDGs and carbon net-zero goals. It presents a way for investors to tackle sustainability challenges as they are becoming tangible risks when evaluating long-term investment opportunities (PIMCO, 2023). Investing in assets that have taken climate and social risks into account, therefore, reduces the portfolio risk and enables responsible investments with positive impacts. According to a 2020 report by Morgan Stanley, approaches to help achieve ESG goals include:

Restriction screening: Avoid investments in certain sectors or specific issuers, based on values or risk-based criteria.

ESG integration: Considering ESG framework alongside financial analysis to identify risks and opportunities throughout the investment process, thereby excluding the unaligned companies and overweighting the impactful ones.

Thematic investments: Investing in companies focused on certain themes positioned to solve global sustainability challenges.

Stewardship engagement: Aiming to drive improvement in ESG activities or outcomes through proxy voting or active dialogue with invested companies or issuers.

Problems of ESG-integration in Bond

The ESG framework evaluates investments based on the following three criteria: Environmental which involves indicators such as emissions and use of natural resources; Social which looks at impacts on society involving human rights, labour practices, and community involvement; Governance which involves accountability and quality leadership (Brock, 2023).

The difficulties in applying the ESG framework to sovereign bonds analysis can be classified into 2 categories: 1) Conceptual difficulties in forming a framework and 2) Practical difficulties in applying a framework.

1. Conceptual Difficulties

In terms of designing the framework, the inconsistencies in definition and measurement render the identification of material ESG factors difficult. Materiality in ESG involves the process of determining the factors that are of significance for the organization, the negative consequences, and corresponding risk mitigation processes that require monitoring and reporting (Emerick, 2021). Current frameworks concerning equity and corporate bonds such as the Global Reporting Initiative, the Task Force on Climate-Related Financial Disclosure, and the Sustainability Accounting Standards do not exist for sovereign bonds. The inherent complexity of government bonds also makes the creation of a new framework for bonds difficult. ESG factors are often interrelated and can be manifested through an array of channels (Davies *et al*., 2022). For example, a volatile government with a low-quality institution is more likely to give in to corruption, which would in turn widen inequality gaps, worsen social welfare, or submit to race-to-the-bottom strategies which affect the environment. Furthermore, with the increasing influence of globalization in more developed countries (MNCs), the supply chain is seeing growing complexity (OECD, 2020). For example, a company based in the US might have assembly lines in Vietnam but retail sales all over the globe, making it hard to pinpoint which government should take on the ESG responsibilities. Hence, isolating individual ESG factors and assigning each a quantified rating ignores the social-historical context of ESG issues and neglects the global nature of sustainability challenges.

2. Practical Difficulties

In terms of practicality, the application of a framework in a real-world context still faces various obstacles after a framework is designated.

The first and most important issue is the lack of transparency government's development progress. For instance, some suggest using a country's progress in achieving their Nationally Determined Contributions (NDCs) from the Paris Climate Agreement as a benchmark. However, with no legally binding power, countries often fail to release progress updates, where many often greenwash or overstate their efforts in achieving Net Zero, leading to risks of overvaluation (Pauw et al., 2018).

Secondly, there is difficulty in achieving ESG incorporation in actively or passively managed portfolios. The Determination of ESG factors in a sovereign debt context requires both, profiling a country in its ability to mitigate ESG-related risks as well as the financial resilience to mitigate ESG and credit risks. Hence, to gain a holistic view of these criteria, active engagement with sovereign issuers is needed. Engagement in the sovereign market, which differs from shareholder-corporation engagement in a corporate bond market, can involve multiple stakeholders, including national institutions, ruling parties, NGOs, and many others. The political nature of governments also raises caution amongst stakeholders, as engagement in sensitive topics such as human rights can be misinterpreted as lobbying, advocacy, or interfering with internal government politics, raising the barrier of engagement and stewardship (Nuzzo, 2021).

Finally, there are also accuracy issues that come with adopting ESG frameworks in sovereign bonds. Trade-offs may arise from increasing a sovereign bond's index relative to its underlying benchmark, most notably, concerning Active Sharing and tracking error under the FTSE World Government Index (Nuzzo, 2021).

Although various current frameworks claim to have resolved the two main areas of concern, the above difficulties still need to be taken into account when evaluating the ESG framework in real terms.

Existing ESG Framework and Methodologies in Bond Analysis

This section will analyse the asset manager BlueBay and Aegon's ESG portfolio analysis framework and examine the potential aspects that could be employed in our ESG-integrated bond construction process.

BlueBay Asset Management LLP

In 2018, BlueBay implemented a systematic process to incorporate ESG risks into their credit analysis across sovereign debt investments (Principles of Responsible Investment, 2019).

Environmental	Social	Governance
Issues relating to the quality and functioning of the natural environment and natural systems	Issues relating to the rights, well-being and interests of people and communities	Issues relating to the governance of companies and other investee entities
• Climate change • Deforestation • Pollution • Resource depletion • Waste	• Child labour • Employee relations • Human rights • Modern slavery • Working conditions	• Board diversity and structure • Bribery and corruption • Executive pay • Political lobbying and donations • Tax strategy

Figure 1. ESG Factors and Risks (BlueBay AM, 2021)

BlueBay Asset Management considers a myriad of different ESG factors and risks under each pillar which forms the foundation of its metrics. Some of these ESG factors and risks apply to sovereign bond issuers but may vary by a country's geography, size, and political ideology.

BlueBay's ESG framework produces two parameters:

1. Fundamental ESG (Risk) Rating
This indicates BlueBay's view of how well the ESG risks are managed. The rating is determined by the credit analysts and ESG team from BlueBay based on the framework shown in Figure 1.

2. Investment ESG score

Since sovereign bonds can act as both, a security and financial instrument, there may be multiple ratings for a single issuer across BlueBay. Figure 2 shows the spectrum of scores, which range from -3 (extremely high ESG risk) to +3 (very high ESG investment opportunities). A score of 0 is highly unlikely as it is rare for investments to be unaffected by ESG factors.

Fundamental ESG (Risk) Rating	(Indicative) Investment ESG Score	Description
Very high ESG risks	-3	Very high ESG investment related risks
High ESG risks	-2	High ESG investment related risks
Medium ESG risks	-1	Some ESG investment related risks
Low ESG risks	0	ESG considerations are unlikely to have an impact
Very low ESG risks	+1	Some investment opportunities as a result of ESG considerations
	+2	High investment opportunities as a result of ESG considerations
	+3	Very high investment opportunities as a result of ESG considerations

Figure 2. ESG rating and Investment ESG score (BlueBay AM, 2021)

Below are the risk exposure characteristics under each E-S-G pillar:

Environmental (E)

The extent to which the economy is dependent on primary sector agriculture activities, geographical location in terms of vulnerability to natural disasters, as well as the availability of natural resources. For instance, island nations like Haiti, which is geographically located in the Atlantic Hurricane Basin, will be more vulnerable to the physical risks of hurricanes as climate risks intensify over time (Law, 2019).

Social (S)

The nature and quality of the education and healthcare system of a country will heavily influence the degree of social inequality as well as the extent to which a country has access to a skilled labour force. Furthermore, important indicators such as the extent to which freedoms and rights are exercised will contribute to social unrest. For example, when looking at a country like Indonesia which has experienced enormous economic growth, it is important to consider other factors as well to examine which parts of the population are experiencing an actual improvement in living standards (Aegon Asset Management, 2021).

Governance (G)

The degree to which there are geopolitical and governance issues depends on the establishment of the rule of law and institutions. Where there is widespread corruption and weak government enforcement, trust in the government is undermined, thereby repelling foreign investment.

BlueBay considers all three pillars of ESG when conducting its credit analysis but pays closer attention to governance. This stems from their experience whereby good governance and solid institutions lay the foundation for strong environmental and social development. Considering lenders of capital cannot engage as comprehensively with sovereign issuers, they must look to governance factors as a key indicator of their ability to repay debt.

In summary, BlueBay's ESG evaluation process incorporates data and qualitative insights from a range of internal and external resources and expertise. The process involves both credit and ESG analysts working alongside each other to ensure a firm-wide approach is taken.

Aegon Asset Management

In 2018, Aegon created a proprietary methodology to integrate the ESG framework into the sovereign bond construction process. ESG Score is constructed to reflect external factors that are financially material to credit risk (Aegon Asset Management, 2021).

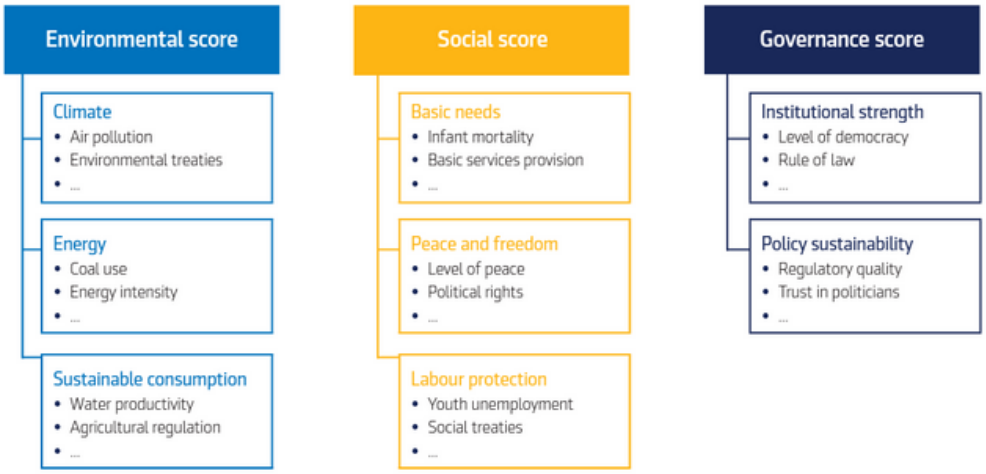

Figure 3. ESG Framework (Aegon AM, 2022)

Aegon ESG scoring methodology: Aegon has its proprietary database including 172 countries and 110+ variables. It also uses external data sources such as international institutions, NGOs, and ESG vendors to expand the data source. Subsequently, Aegon analyzes the raw data and aggregates them into sub-indicators under the three ESG pillars. The larger the impact on the credit spread of the country, the higher the final weight in the ESG score.

ESG weighting tailored to the stage of development

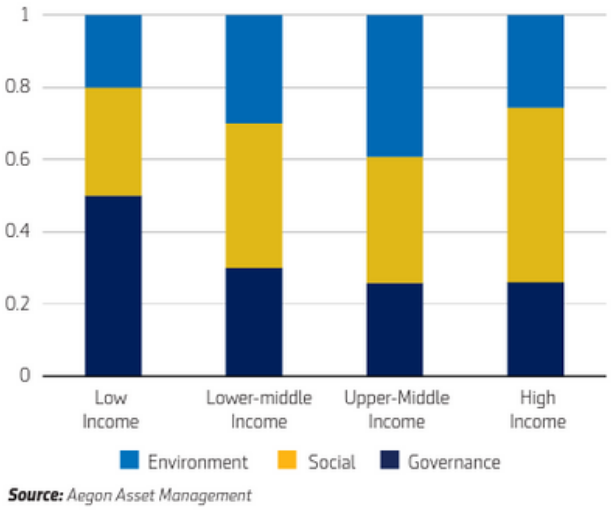

Figure 4. Income-weighted ESG scoring distribution (Aegon AM, 2022)

Aegon tailors the issuing of countries' ESG weightings to their respective stage development (Fanelli & Martinez, 2018). As shown in Figure 4, different income groups will have different materiality (weight) of each factor. For example, less-developed countries place more weight on governance. However, the environment has greater materiality for upper-middle-income countries as their production often relies more on the exploitation of natural resources than others. Social factors such as inequality and human rights abuses affected low-income countries the most, this is associated with the increase in populist political parties.

ESG Momentum

Apart from computing an ESG score for each country, Aegon also employs the "ESG Momentum" to show a country's average ESG improvement over the last five years in the selected indicators (Aegon Asset Management, 2023). Developed economies with high ESG scores could be stagnant at current development while emerging markets like Asia and the Pacific have relatively higher momentum and investment opportunities.

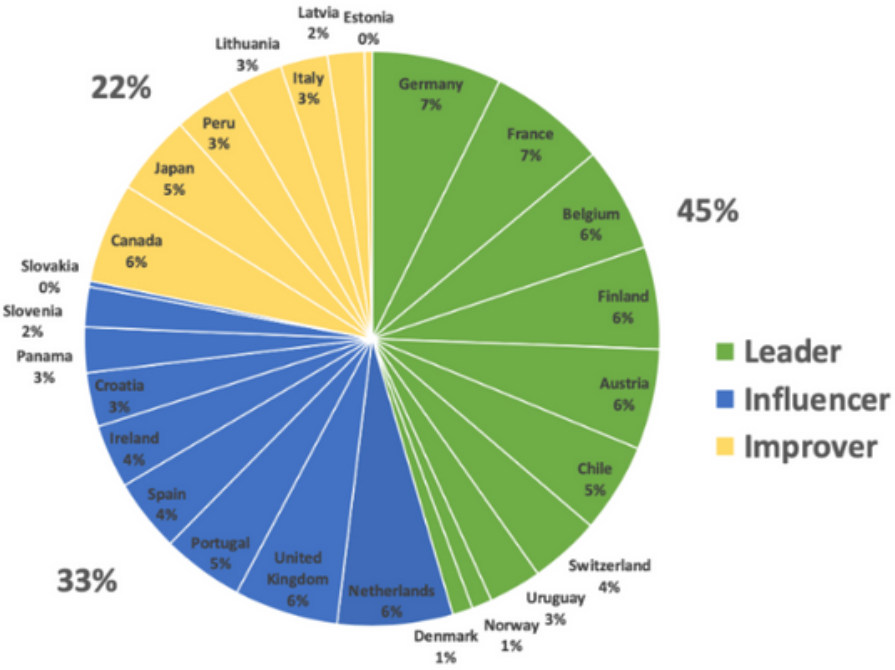

Figure 5. Portfolio diversification and country classification (Aegon AM, 2022)

Constructing an ESG-integrated iShares Global Government Bond ETF

This section will first summarize our exclusion and selection criteria used in constructing the ETF based on the challenges elaborated in the previous sections. A case study of the Netherlands and China will be used to demonstrate how the criteria are being exercised. Following this, we will provide our recommendations for the asset allocation for iShares Global Government Bond ETF with justification.

ETF Construction Criteria

1. Exclusion Criteria

"Sustainable Development Report" is the major index used as it summarizes each country's performance in 17 SDGs across the dashboard in a weighted SDG score index (Sachs et al., 2022). Transparency is also highly valued in the assessment process. Countries with more than 10% data unavailability are excluded.

We consider both Stewardship and Best in Class as the major principal in fund construction (Barbato, 2021). Countries with SDG scores that are 15% lower than the regional average are excluded from the ETF. Since the overall sustainability performance in the Global North is much better than Global South, excluding the world's lowest-scoring countries would benefit only the well-off minority but widen the development gap between countries. Hence, we aim to diversify the portfolio by engaging in stewardship to invest in countries with promising plans for progress despite a low outstanding performance.

2. Selection Criteria

2a. Country Selection

The selection process consists of both, a top-down and bottom-up research. The top-down approach analyses a country's SDG categorical achievement while the bottom-up research assesses their current ESG incorporation and future ESG momentum.

The top-down analysis identifies the countries with "Best in Class" SDG performance using the Sustainable Development Report. This prevents gaps in SDG investment due to regional or income group clustering, thereby diversifying the holdings to expand the scope of impact (Martinez et al., 2021).

Meanwhile, the bottom-up approach involves conducting case studies of individual countries to explore their current ESG performance compared to an income-weighted benchmark to account for regional development differences. “E” (environment) is the area that could be easily quantified by indicators such as carbon footprint, rendering cross-country comparisons to be standardized. However, even when a nation’s domestic carbon footprint is low, carbon leakage of developed countries in other parts of the world is still a major issue in sustainability measurement that needs to be materially estimated (Burns et al., 2016). On the other hand, the “S” (social) and “G” (governance) differ significantly between countries and should be analysed with in-depth qualitative assessments (S&P, 2020). For instance, “S” often focuses on specific stakeholder analysis, looking at how disadvantaged communities are impacted by a policy or project. Consequently, the “G” aspect should focus on how well these stakeholders are represented in the government’s decision-making process.

2b. Within Country: Bond Selection

For impact investment, labelled bonds such as green bonds and social bonds are preferred to conventional treasury bonds. Other bonds with proceeds used for development purposes such as poverty alleviation are also highly considered.

3. Weighting and asset allocation

3a. Financial Performances

Among the selected bonds that align with our SDG and ESG criteria, those with better financial performances, such as a smaller gap between current yields and inflation points, greater size, and more diversified holdings, are overweighted to seek higher returns (Martinez et al., 2021).

3b. Other Sustainability Ratings

- An average of S&P 500, Moody’s, and Fitch to represent conventional credit risk
- UN SDG Score
- Sustainability indicators: Sustainalytics, Morningstar Portfolio Sustainability Index, and Global Sustainable Competitiveness Index (GSCI)
- ESG Index: GSCI Natural Capital, Social Capital, and Governance Efficiency Scores (Specific compositions see Appendix I.)

Exercising ETF Construction Criteria in the Case Studies of Netherlands and China

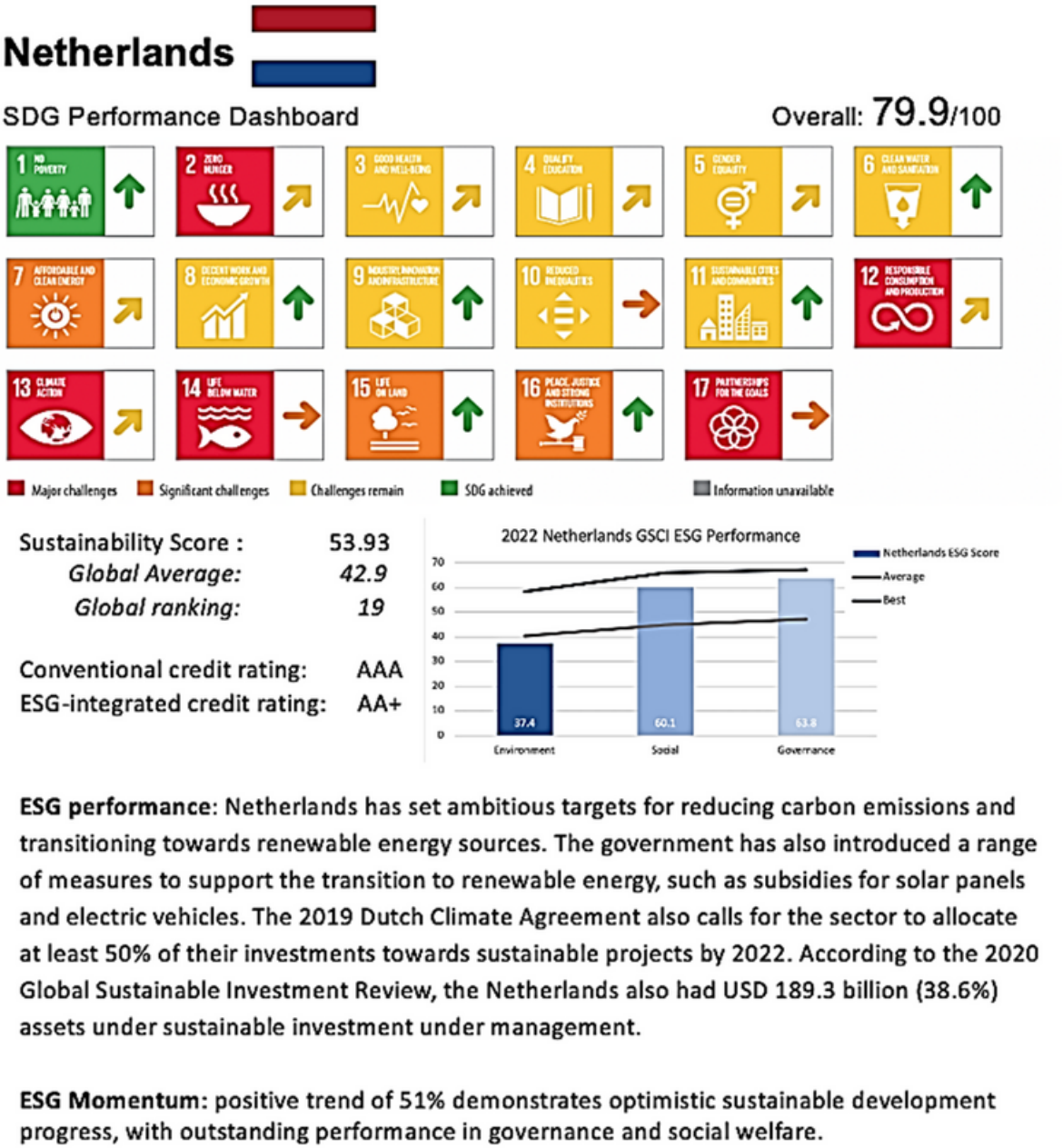

Figure 6. Case study of Netherlands with SDG Dashboard, ESG scores, and qualitative ESG Performance / Momentum analysis (UN, 2022; Solability, 2022)

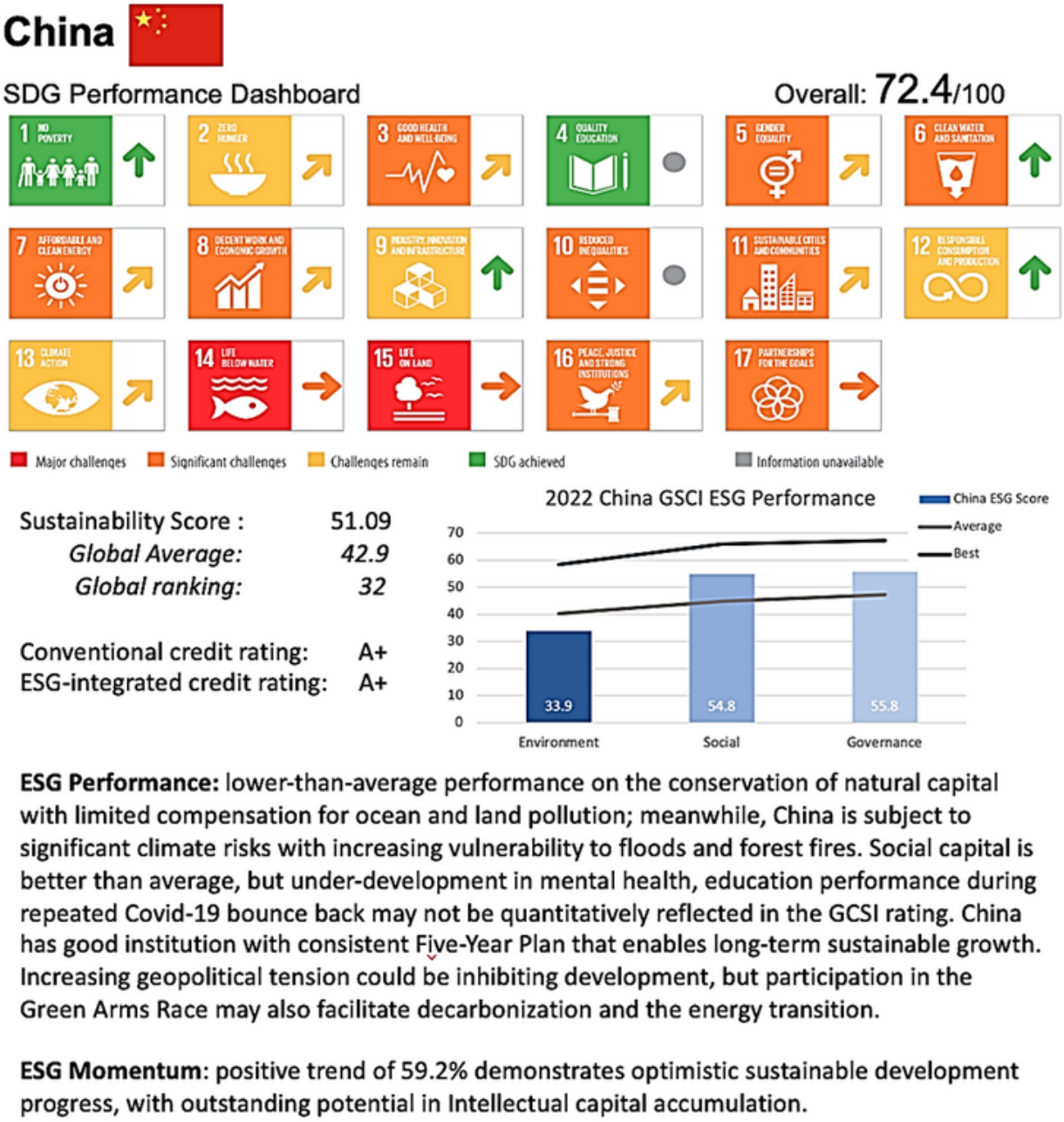

Figure 7. Case study of China with SDG Dashboard, ESG scores, and qualitative ESG Performance / Momentum analysis (UN, 2022; Solability, 2022)

The Goal of the ETF:

"To track the performance of an index composed of local currency bonds issued by governments of developed countries," with a small segment allocated to Asia's emerging markets with high ESG momentum and potential for stewardship engagement (iShares, 2023).

Focusing on ESG criteria such as biodiversity, carbon emissions, corporate governance, social responsibility, human rights, labour standards, gender equality, company controversies, and more, would enable investors to access a diversified portfolio of fixed-income securities that align with sustainability goals. Additionally, actively regulating sulfur dioxide emissions and addressing increasing obesity rates could be important areas of focus for the ETF as these issues pose significant challenges to the environment and public health.

The Fund allocation and each issuer's corresponding rating is summarized in Figure 8 and 9 below:

Issuing Country	Weight (%)	Bond Risk	UN SDG	Sustainability Indicators			GSCI ESG Indicators		
		S&P/Moody's /Fitch Avg	SDG Score	Sustainalytics	Morningstar	GSCI Sustainability	E	S	G
United States	35	AA+	74.55	12.46	21.7	A-	27.2	41.4	53.3
Canada	15	AAA	77.33	11.59	22.2	A-	55.3	51.7	60.3
Switzerland	7	AAA	80.79	9.31	20.94	AA	48	56.7	66.9
Denmark	7	AAA	85.63	11.32	21.3	AA	43.4	60.4	66.9
France	7	AA	81.24	13.49	18.88	AA-	45.8	57.3	63.9
Norway	6	AAA	82.35	8.82	23.64	AA	51.5	62.7	64.7
United Kingdom	6	AA-	80.55	12.89	22.08	A+	40.6	50.8	63.1
Netherlands	5	AAA	79.85	12.75	16.53	A	37.4	60.1	63.8
Japan	5	A+	79.85	14.44	24	A+	40.7	62.9	66
Germany	4	AAA	82.18	12.76	19.64	AA-	35	55.3	65.5
Singapore	1.5	AAA	71.12	13.89	23.82	BBB+	28.3	57	59.2
China	1.5	A+	72.38	/	28.22	A-	33.9	54.8	55.8

Outstanding | Above-average | Average | Below-average

Figure 8. ESG-integrated iShares Global Government Bond ETF Allocation (Solability, 2022; UN, 2022; Sustainalytics, 2022; Morningstar Direct, 2021)

Issuer	Weight (%)	Issuer	Weight (%)
United States	35.0	United Kingdom	6.0
Canada	15.0	Netherlands	5.0
Switzerland	7.0	Japan	5.0
Denmark	7.0	Germany	4.0
France	7.0	Singapore	1.5
Norway	6.0	China	1.5

Figure 9. iShares Global Government Bond ETF Breakdown by issuing country

Notable Changes in the ESG-adjusted Version of iShares Global Government Bond ETF:

- Underweighting of the United States due to its poor performance in E and S aspects. But a significant holding (35%) is retained to account for its global influence and future climate policy momentum.

- Overweighting of Canadian bonds for their outstanding performance in SDG, Sustainability, and ESG. A high credit rating and optimistic recovery from both pandemic and inflation will also enable the Canadian government to divert funds into climate and environmental initiatives (Thompson & Caridia, 2022).

- Significant over-weighting of EU sovereign bonds to account for their historically steady ESG performance and the new EU Taxonomy that will help to standardize the market (European Commission, 2022).

- Overweighting of the UK to account for its potential in renewable energy transition with offshore wind, albeit sluggish recovery from inflation.

- Adding Singapore and China into the portfolio to diversify the fund and seek decarbonization opportunities in Asia, particularly after the post-pandemic opening up and the gradual loosening of capital flow restrictions.

- By incorporating ESG factors into investment decisions, the iShares Global Government Bond ETF could provide investors with a diversified portfolio of fixed-income securities with lower carbon emissions, better social and governance practices, and potentially more stable returns over the long term.

Reference List:

Website: https://www.lsesugreenfinance.com/
LinkedIn: https://www.linkedin.com/company/lse-su-green-finance-society
Instagram: @lsesugreenfinance