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ENVIRONMENTAL, SOCIAL, AND GOVERNANCE INVESTING

A Primer for Central Banks' Reserve Managers



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ABSTRACT

This primer responds to central banks' growing demand for knowledge on social, governance, and environmental considerations (ESG) in the investment process. This area has gained traction in the last two decades. More recently, central banks' interest in ESG has increased, but much of the information available is aimed at investors with different investment objectives and broadly diversified portfolios. We fill that information gap by reviewing the definitions of ESG and the main ESG investment approaches, including their applicability to asset classes. We then examine how foreign reserve managers could apply ESG investing in their reserve management operations. We find limited scope for implementing ESG strategies in reserve management, given that most central banks still invest primarily in sovereign bonds of major economies. Yet, we also identify opportunities and critical considerations for central banks interested in implementing ESG investing in their reserve management operations.

JEL Classification: M14, G24, G23

Keywords: ESG, fixed-income portfolios, responsible investing, central banks, investment management, sustainable investing SRI, reserve management, asset allocation¹

¹ The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations or those of the Executive Directors of the World Bank or the governments they represent. The authors thank Daniel Vela Baron for his input and Mikaela Ballon Carneiro and Ali Shahbaz for their research assistance. Earlier drafts of the paper benefitted from comments by Heung Sik Choo, Carmen Herrero, Philip Dongsoo Hong, Farah Imrana Hussain, Heike Reichelt, James Seward, Rodrigo Silveira, and Shinya Tamada.

FOREWORD

Message from Anshula Kant

Managing Director & Chief Financial Officer,
The World Bank Group

The World Bank Group is the largest multilateral provider of development finance, including climate finance, deploying \$83 billion over the past five years. Last year, we recorded the largest total climate investment in our history, \$21.4 billion. We are on track to exceed this level as we implement our new target of 35 percent of financing for projects with climate co-benefits for the next five years.

Over the past thirty years, we have acquired broad experience in several areas of climate finance that can be useful for multilateral development banks (MDBs) and the private sector.

4 First, we have mobilized significant resources by leveraging capital markets, partnering with the private sector, and engaging donors. The World Bank brought innovation in the climate finance space by issuing the first green bond in 2008. We went further, harnessing the power of capital markets for sustainable development through sustainable bonds, issuing around \$80 in Sustainable Development Bonds last year. The “sustainability” label reflects our global work in development, but also the fact that all our bonds meet the strictest level of “sustainability”, supporting positive impact around the globe. Additionally, we played a key role in developing the green bond market infrastructure through our work on the Green Bond Principles and the Harmonized Framework for Impact Reporting.

Second, we have worked with our member countries to facilitate the development of their sustainable capital markets. Our efforts range from technical assistance on design and implementation of Nationally Determined Contributions under the Paris Agreement to policy advice and advisory on the sovereign issuance of sustainable and thematic bonds, development of green taxonomies, and green bond frameworks in many countries around the world.

Third, we have continued to refine the environmental, social, and governance standards we use to design and assess the sustainable development projects we finance. The World Bank was the first MDB to require project assessment for climate change impact through the lens of safeguards several decades ago. The safeguards evolved into the Environmental and Social Framework we currently use for all our projects that cover a broad range of sectors. As we created our own standards with input from many stakeholders and through extensive consultation processes, we also supported the development and harmonization of environmental and social standards for other MDBs, including through the Multilateral Financial Institution Working Group on safeguards we established in 1992.

On the investment side, the World Bank Treasury's Reserve Advisory and Management Partnership (RAMP) is the leading provider of technical assistance on asset management to official institutions. In this publication, we are extending our expertise in sustainable finance to our work with official sector investors. Foreign currency reserves exceed \$12 trillion globally and support development by facilitating countries' access to international markets. Therefore, investing these significant resources in assets that finance ESG initiatives could have a crucial impact in tackling climate change and meeting urgent development needs.

Reflections from Jingdong Hua

Vice President & Treasurer, The World Bank

The World Bank Treasury brings over 70 years of experience, innovation and expertise, connecting capital markets to development, while always remaining a trusted advisor to borrowing countries. Through the Reserves Advisory and Management Partnership (RAMP), the World Bank Treasury has improved the capacity of central banks, sovereign wealth funds, pension funds, and other official institutions to manage foreign reserves and other portfolios. Additionally, we remain a pioneer in financial market innovation and a triple-A rated manager of the World Bank's finances. A major driver of financial sustainability, the World Bank Treasury has also been an agent of change and a catalyst for economic transformation and achievements, which would not have been possible without continuous support from our shareholders, investors, partners, and colleagues.

Since 2008, when IBRD issued the first-ever green bond, the Bank Group has issued \$16 billion equivalent through over 185 bonds in 23 currencies by IBRD. The World Bank issues green bonds to respond to specific investor interest in efforts dedicated to climate and as an opportunity to focus attention on the World Bank's commitment to climate action and related projects that are supporting developing countries to advance their climate commitments and create more jobs in emerging and greener sectors.

The World Bank's commitment to climate action extends to Sustainable Development Bonds, which support the financing of a mix of projects that address both climate action and other social challenges and respond to investors' interest in supporting a broader range of activities. Our engagement with investors helps raise awareness for SDGs and development challenges, using World Bank-financed projects as examples. Dedicated themes have included food loss and waste, gender equality, health and nutrition of women and children, education, water and oceans, and sustainable cities.

As we look to the future, World Bank Treasury will continue to innovate and to expand the possibilities for incorporating ESG into the international capital markets to support global development. We will continually expand our product offerings to meet investor needs, respond proactively to market developments and new technologies, and collaborate with partners around the world, while always ensuring the financial strength and integrity of the World Bank. As well, RAMP is now helping

central banks to include ESG in the management of foreign reserves and this publication is a product of that effort. Furthermore, we are also collaborating with the Network for the Greening the Financial System to find a common approach to the challenges that reserve managers face in incorporating ESG.

We remain committed to harnessing the power of capital markets to create a more resilient, prosperous, and equitable planet.

Introduction by Thérèse Couture

Director, Asset Management & Advisory Department, The World Bank Treasury

For twenty years, the World Bank Treasury has provided investment management related technical assistance and capacity building to central banks and other public asset managers through the Reserve Advisory and Management Partnership (RAMP). Today, RAMP serves 60 central bank members. The Partnership began from requests by central banks for the World Bank Treasury to share its expertise and practices through advisory and training.

RAMP's services offer clients opportunities for advisory and training through a peer-to-peer approach: practitioners provide advice and training based on their professional experience and expertise. Members have access to a trusted World Bank Treasury adviser—to collaborate, solve problems, and provide perspectives on global best practice on investment management to boards and committees. Treasury specialists and subject matter experts deliver peer to peer customized advisory services and oversee a robust annual workshop program across topics ranging from governance, legal, and investment and risk management to strategic asset allocation, operations, and IT. RAMP Engagement Managers provide direct consultations to members on incorporating ESG into their investment operations. In addition, RAMP—through its robust annual training program—hosts a workshop on ESG for public investors each year. Public asset managers from central banks, international financial institutions, pension funds, and sovereign wealth funds, gather for a week-long discussion on how high-grade fixed-income investors can incorporate ESG approaches into investment policy and operations.

Today, RAMP has grown to a partnership of 78 members with \$28 billion in assets under management. Treasury specialists deliver advisory and capacity-building services along with asset management services to fit the various needs of RAMP members. The RAMP team stands committed to delivering new products, cutting-edge research, and fostering peer-to-peer knowledge exchange to serve institutions that serve our societies and safeguard our member countries financial assets. I hope that you will find this primer informative and as a testament to the World Bank's priority in ESG knowledge development.

This primer, provides the background ESG investing, followed by an in-depth review of how high-grade fixed-income investors, specifically central banks, can incorporate ESG factors into their investment policy and investment analysis and make better-informed investment decisions. It comes at a critical time: the global challenges facing central banks today make their role crucial to maintaining economic and financial stability. Central banks impact our daily lives in many ways with their role to promote the economic and financial welfare of citizens.

CONTENTS

Executive Summary	10
1. Introduction	12
2. Background on ESG	14
2.1 Definitions of ESG	14
2.2 Approaches for incorporating ESG considerations into the investment process	16
2.3. Impact investing	23
2.4 Major organizations supporting ESG and green finance	29
2.5 The impact on financial returns of integrating ESG into investment processes	33
2.6 Challenges of ESG investing	36
3. Central Bank Reserve Management and Responsible Investment	42
3.1. Current objectives of central bank reserve management operation and ESG	44
3.2 Empirical evidence on central banks' ESG practices	46
3.3 Composition of central banks' foreign exchange portfolios	48
4. Defining and Implementing an ESG Strategy for Central Bank Reserves	50
4.1 Formulating an ESG policy for reserve management	50
4.2 ESG scores and ratings	53
4.3 ESG and strategic asset allocation	58
4.4. Transparency and reporting	64
4.5 Engaging external managers for ESG strategies	71
5. Conclusions	73

Appendices	76
Appendix 1: Construction of ESG scores	76
Appendix 2: Bank of Finland, Responsible Investment Policy Outline	77
Appendix 3: Hong Kong Monetary Authority, Responsible Investment Charter	79
Appendix 4: Banque de France, Responsible Investment Charter	81
Appendix 5: Example of Detailed Quantitative Impact Reporting from the Information Provided by Issuers for a Model Portfolio	83
References	85

EXECUTIVE SUMMARY

The expansion of environmental, social, and governance investing (ESG) into the fixed-income space has attracted the interest of central bank reserve managers.

The practice of considering ESG when making investment decisions has developed over the past 60 years, but only recently has it gained ground among institutional investors.

For any investor, implementing ESG investment approaches presents multiple challenges. First, a uniform definition of ESG is still lacking, and investors consider a multitude of factors under the broad term ESG. Second, investors lack consistent accounting frameworks and disclosures, constraining their ability to compare and assess investments across all areas of ESG. Third, empirical research on the impact of applying ESG on financial returns is still inconclusive, especially in the fixed-income space. Fourth, measuring whether impact investment achieves its desired effects is difficult. Finally, the thematic bond market is very small, concentrates on few issuers, and has lower liquidity than the market for conventional bonds.

In the case of reserve management, an essential consideration is whether ESG is consistent with investment objectives. The participation of central bank boards in this decision is critical, as it can guide management and staff throughout implementation. Above all, ESG implementation should be consistent with the existing reserve management framework. Including ESG considerations in the investment policy is the most effective way to institutionalize this practice. ESG can support the traditional objectives of safety, liquidity, and return. For example, ESG analysis could improve risk management and support the safety objective. In practice, central banks consider ESG not only for financial reasons but also to manage reputational risk and to set a good example. An ESG policy for reserve management may not be convenient for all central banks, however. Some of the factors that may hinder or delay formulation of an ESG policy include regulatory obstacles, low buy-in from critical stakeholders, lack of portfolio diversification, and weak institutional capacity.

The most crucial challenge for implementing ESG in reserve portfolios is their asset composition. ESG developed first in the equity space and continued with corporate bonds. ESG strategies are still in their early stages of development for fixed-income instruments with low credit and market risk. Foreign reserve portfolios are usually concentrated in these fixed-income instruments, limiting the opportunities to apply ESG investing. Consequently, scope is limited for implementing traditional ESG methods in foreign reserve portfolios.

Five broad approaches are used to incorporate ESG considerations into investment processes:

1. Negative or exclusionary screening
2. Positive or best-in-class screening
3. Integration of financial material ESG factors into the investment process
4. Impact investing
5. Active ownership and stewardship

For reserve managers, integration of financial material ESG factors into the investment process, particularly risk management, and impact investing through impact bond portfolios are the most feasible methods. ESG integration, using tools like ESG scores, can broaden risk analysis and allow central banks to account for emerging risks. Also, gradual buildup of sustainable bond portfolios, which can be included in the impact investing approach, is a strategy already being implemented by some central banks.

One caveat of impact investing is that the potential size of impact bond² portfolios is likely to be small because of low market capitalization and the sizable investor demand for these instruments. Including unlabeled bonds from selected issuers can increase the opportunity set. The other ESG methods are more appropriate for the relatively few central banks with equities and corporate bonds in their portfolios.

A final consideration for implementing ESG in central banks is transparency and reporting. These are fundamental elements of a sustainable investment strategy. Reporting has two roles. First, it allows decision makers to monitor progress and measure the impact of the policies. Second, it informs external stakeholders about the sustainable investment efforts the organization is making. Central banks can use ESG scores to measure ESG implementation, both in absolute terms and relative to the benchmark, and to develop impact reports. The most critical challenge for producing ESG metrics and impact reports, however, is that data from issuers remain limited.

² Market participants also use the term thematic bonds to refer to impact bonds.

INTRODUCTION

The practice of considering environmental, social, and governance issues (ESG) when making investment decisions has developed over the past 60 years.

Starting in the 1960s, investors began to exclude stocks or entire industries from their portfolios to avoid morally questionable businesses.³ In the 1990s, socially responsible investing (SRI) developed, denoting investing money in companies and funds with a positive social impact.⁴ In 2000, the United Nations Environmental Program Finance Initiative published the United Nations Global Compact report reviewing the voluntary application of ESG into investment processes and formulating six responsible investment principles. The acronym ESG originated from this report. The Swiss government and over twenty major financial institutions endorsed the groups's findings and recommendations, and in 2005, under the motto "Who Cares Wins," then United Nations Secretary-General Kofi Annan invited financial institutions and asset managers to develop guidelines and recommendations for integrating environmental, social, and corporate governance issues.⁵ The growing awareness about climate change and its potential impact on financial assets has also increased investor interest in sustainability. Since 2005, ESG considerations have become more critical for all investors. In addition to considering ESG as an opportunity to finance for positive impact, investors now increasingly consider ESG factors in assessing expected risk and return of investments beyond the strictly financial metrics that investors have traditionally used.

ESG expanded gradually from equity to fixed income. The initial focus on equity investments was consistent with exclusion strategies, such as divesting from stocks and sectors in controversial businesses. More recently, with the arrival of impact bonds in 2008, ESG investing has become more prominent in the fixed-income space. The first green or social bonds were issued by the World Bank that year, followed by other types of labeled bonds, such as social and sustainability bonds and sustainability performance-linked bonds. Currently, investing in these securities is included within the ESG approach known as "impact investing."

³ MSCI ESG Research (2018)

⁴ See Capelle-Blancard and Monjon (2012)

⁵ https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FFinancial_markets%2Fwho_cares_who_wins.pdf.

The expansion of ESG into fixed income has attracted the interest of central banks. Since high-quality fixed-income securities are the most significant asset classes in reserves portfolios, impact investing may offer an opportunity for central banks interested in adopting ESG. Notwithstanding this interest, lack of a uniform definition of ESG and of consistently used ESG investment labels complicates reserve managers' assessments of the suitability of ESG.

This primer provides background on ESG and reviews how high-grade, fixed-income investors, specifically central banks, can incorporate ESG approaches into their investment policy and operations. We aim to fill an information gap by focusing on the ESG issues relevant to central bank reserve managers. In this primer, we use the term ESG to denote an investment approach that is “a strategy and practice to incorporate environmental, social and governance (ESG) factors in investment decisions.”⁶

This paper has five sections, including this introduction. The second section offers general background on ESG, including definitions and investment approaches. The third section describes how central bank reserve managers can integrate ESG into their investment processes, given their objectives and asset composition. This section also uses the Reserve Advisory and Management Partnership (RAMP) surveys of central bank reserve management practices to inform readers on existing central bank ESG practices and the composition of reserves portfolios across institutions. The fourth section then reviews how a central bank can implement ESG investment practices into its investment framework. The final section draws some conclusions on integrating ESG investment practices.

6 <https://www.unpri.org/an-introduction-to-responsible-investment/an-introduction-to-responsible-investment-policy-structure-and-process/4917.article>.

BACKGROUND ON ESG

This section covers fundamental ESG concepts for fixed-income investors.

Besides explaining standard definitions and practices, it also provides data on market structure and discusses empirical evidence and research. The section concludes by highlighting the challenges of ESG investment practices.

2.1 Definitions of ESG

The term ESG, often used interchangeably with sustainable investing, denotes an investment approach in which analysis goes beyond purely financial factors. Market participants use various terms to describe ESG investments and investment strategies, and, as mentioned, no uniform definition of ESG exists. Table 1 provides some of these definitions.

TABLE 1 Defining ESG

SOURCE	DEFINITION
ROBECO	“ESG means using Environmental, Social and Governance factors to evaluate companies and countries on how far advanced they are with sustainability. Once enough data has been acquired on these three metrics, they can be integrated into the investment process when deciding what equities or bonds to buy.”
MSCI	“ESG Investing is a term that is often used synonymously with sustainable investing, socially responsible investing, mission-related investing, or screening. At MSCI ESG Research we define it as the consideration of environmental, social and governance factors alongside financial factors in the investment decision-making process.”

Note: These definitions appear on the respective company websites.

There is neither a standard definition of ESG nor a standard set of criteria that investors can look to in each of the *E*, *S*, and *G* subcategories. Table 2 provides an example of issues an investor might consider under each subcategory. Moreover, no uniform disclosure regimes help investors or data providers collect data in a standard format to support their assessment of ESG criteria across companies and countries. Finally, technologies, policies, values, and social preferences differ across regions and evolve in different directions or at different speeds.

TABLE 2 ESG Issues

ENVIRONMENTAL ISSUES	SOCIAL ISSUES	GOVERNANCE ISSUES
CLIMATE CHANGE AND CARBON EMISSIONS	Customer satisfaction	Board composition
AIR AND WATER POLLUTION	Data protection and privacy	Audit committee structure
BIODIVERSITY	Gender and diversity	Bribery and corruption
DEFORESTATION	Employee engagement	Executive compensation
ENERGY EFFICIENCY	Community relations	Lobbying
WASTE MANAGEMENT	Human rights	Political contributions
Water scarcity	Labor standards	Whistleblower schemes

Source: CFA Institute.

The analysis of ESG issues can be performed both at the corporate and at the sovereign level. For companies, an example of environmental analysis measures the direct or indirect impact of a company's activity on the environment, such as its waste management, level of carbon dioxide emissions, and degree of energy efficiency. At the same time, climate change can also impact the value of a company's assets; for example, a higher frequency of weather-related disturbances may disrupt operations or demand for a company's products. Social considerations include the direct or indirect impact of a company's activity on customers, employees, local communities, and society in general. Finally, the governance assessment focuses on the relationships among a company's shareholders, management, and board of directors. Governance criteria aim to assess how the company is managed and controlled and how day-to-day business is conducted, including the extent to which the company is transparent about its activities and operates and adheres to regulations and laws.

In the case of sovereigns, the evaluation uses variables at the country level. Here, environmental performance measurements could include energy, climate, resource policies, and exposures to climate change. For social performance, analysts typically consider variables like inequality, employment, human capital and innovation, health, and social well-being. Finally, corruption control, government effectiveness, political stability, the rule of law, and voice and accountability are useful to evaluate governance. As highlighted in Section 4.2, the World Bank offers a wealth of public ESG data on sovereigns (Sovereign ESG Data Framework).⁷

2.2 Approaches for incorporating ESG considerations into the investment process

Investors use a range of methods for integrating ESG considerations into their investment decision making.⁸ These approaches were traditionally applied to equity investments but are now also being used for fixed-income and other asset classes. These methods are not mutually exclusive and are often deployed in combination. Investors use five broad strategies for including ESG considerations in their investment processes.⁹

1. Negative or exclusionary screening
2. Positive or best-in-class screening
3. Integration of financial material ESG factors into the investment process
4. Impact investing
5. Active ownership and stewardship

Negative or exclusionary screening

Exclusions or divestment campaigns have been part of the evolution of ESG considerations in investing. In the broadest sense, screening refers to restricting the investment universe based on preselected criteria or screens. Negative screening entails systematic exclusion of controversial companies, sectors, or countries from the investment universe. For example, a significant divestment campaign took place against South Africa in the 1980s in response to the apartheid regime. The latest divestment campaign pertains to fossil fuels in the context of climate change and affects a wide range of sectors, from coal mining to steel. Historically, divestment campaigns have been based on moral values, raising concerns about fiduciary duty and financial performance. However, the discussion around stranded assets has real economic implications. It describes the risk that

⁷ <https://datatopics.worldbank.org/esg/framework.html>.

⁸ As Dimson et al. (2015) note, no single strategy or set of approaches is followed universally as investors have specific investment objectives and strategies and legal mandates (see also Inderst and Stewart 2018).

⁹ See UNPRI classifications.

some climate-sensitive assets, most notably fossil fuel reserves, could suffer from write-offs or downward revaluations because of changes in the regulatory regime to mitigate climate change.

Positive or best-in-class screening¹⁰

Best-in-class is a broad strategy that involves either positive screening or index-adjusted weighting (ESG tilting) by comparing a firm's or country's characteristics to those of its peers. Investors can either use simple screens to implement this approach or apply scoring methodologies. Today, providers like Sustainalytics, MSCI, and others generate ESG scores and market indices for governments, corporates, and other entities. Investors can either use these external providers or develop their own methodologies. As explained in Section 4.3, diverging analytical approaches and the different weighting schemes applied to *E*, *S*, and *G* factors significantly impact outcomes. Comparing various scoring methodologies is therefore challenging.

An immediate concern with exclusions or best-in-class ESG approaches is the potential reduction of the investment universe. Screening may also lead to sector or factor biases within the portfolios that must be identified and managed. Moreover, data inconsistencies may adversely impact scoring strategies. Finally, excluding specific countries based on ESG metrics or the membership in certain treaties or conventions can be politically sensitive, especially for public-sector investors.

Integration of financial material ESG factors in the investment process

Under an ESG integration approach, investors systematically include financially material ESG factors in their investment analysis, portfolio construction, and risk management to improve the portfolio's risk-return profile. Investors typically perform an analysis to determine which ESG criteria are financially material, and they may deploy scoring methodologies to assess investments across a selected set of standards (see Section 4.3 on Scoring).¹¹ For example, in sovereign credit analysis, material factors adversely impact a country's ability to meet its debt obligations, thereby affecting the market valuation of its bonds.¹² Identifying the materiality of factors also depends significantly on the investment time horizon. For instance, climate change poses potentially material risks to a sovereign's ability to repay its debts or to its economic structure over various time horizons (see UNPRI 2019). Financial risks associated with climate change arise from two categories. The first category relates to physical risks due to climate-related damage from, for example, storms, hail, or flooding. The second risk arises from transition risks following shifts to a low-carbon economy (see NGFS 2019).

¹⁰ Some market participants differentiate between norms-based screening and best-in-class investing. We subsume norms-based screening under this category as positive screening.

¹¹ See UNPRI's guide, Slogget (2016), for ESG integration for equity investing, and UNPRI (2019) for sovereign debt.

¹² As UNPRI 2019 highlights, identifying and selecting material ESG factors is arguably the most difficult component of integrating these factors into sovereign credit analysis, as the factors are often interrelated. A country's governance profile can help exacerbate, prevent, or mitigate social and environmental shocks. Credit agencies have also started to include ESG factors in their credit models.

Impact investing

Impact investments seek to combine attractive risk-return profiles with a desired specific intentional and quantifiable positive social or environmental outcome. Impact investing was first applied in private equity and now includes several public market instruments such as green bonds, social bonds, and sustainability bonds (explained in more detail in Section 2.3). World Bank Treasury issued the first green bond in 2008, providing a critical blueprint for the Green Bond Principles published and coordinated by ICMA and, more generally, for the labeled bond market.¹³

Active ownership and stewardship

Active ownership refers to the practice of entering a dialogue with companies or countries on ESG issues and exercising ownership rights, including voting and “voice.” The latter is particularly relevant for bondholders as they do not have voting rights as a means of effecting change. This ownership approach is an alternative to exiting or selling the equity or bonds from companies with practices considered undesirable or divesting based on specific sector-wide assets (e.g., removing fossil fuels as stranded assets). Generally, implementing an engagement strategy requires (1) articulating goals clearly; (2) determining measurable key performance indicators (KPIs) to monitor progress; (3) formulating a timeline; and (4) devising strategies in case KPIs are not met or are only partially met (NGFS 2019).¹⁴

Table 3 summarizes the objectives of the ESG approaches discussed above and highlights key considerations and examples (UNPRI 2019).

¹³ See <https://www.worldbank.org/en/news/immersive-story/2019/03/18/10-years-of-green-bonds-creating-the-blueprint-for-sustainability-across-capital-markets> and <https://www.icmagroup.org/sustainable-finance/>.

¹⁴ According to NGFS (2019), central banks must preserve their independence and avoid the perception of conflicts of interest; therefore, a voting and engagement strategy may need to be implemented anonymously or at arm's length.

TABLE 3 Key Approaches to ESG

	OBJECTIVE	KEY CONSIDERATIONS	EXAMPLES ACROSS ASSET CLASSES
1. Negative screening	Exclude entities from the investment universe based on sector, products, or services or specific behaviors that an investor deems undesirable based on the investor's values or ethics.	<ul style="list-style-type: none"> ■ Clearly defined screening criteria ■ Possible implications for investment returns ■ Regular reviews of the portfolio for compliance to screening policy 	<ul style="list-style-type: none"> ■ Tobacco-free portfolios ■ Controversial weapons screening
2. Positive screening/ best-in-class approach	Actively target companies that score well on ESG metrics relative to benchmarks to generate positive financial, environmental, or social outcomes, or all three. Screens are based on investor's preferences, values, or ethics.	<ul style="list-style-type: none"> ■ Determine the balance of desired financial, environmental, or social outcomes ■ Identify ESG value drivers ■ Use sector or universe-level ESG benchmarks ■ Use simple screens or scoring methodology to assess the universe 	<ul style="list-style-type: none"> ■ ESG leaders exchange-traded fund ■ Clean energy fund ■ Social enterprise fund
3. Integration of financial material of ESG factors into investment process	Manage risk holistically. Integrate qualitative and quantitative ESG information into traditional investment decision-making processes, such as valuation and portfolio construction, to enhance investment decision making.	<ul style="list-style-type: none"> ■ Source quality ESG data ■ Understand the materiality of individual ESG factors ■ Ensure ESG analysis leads to meaningful decisions 	<ul style="list-style-type: none"> ■ Adjusting internal credit ratings for heavy emitters based on a shadow carbon price
4. Impact investing	Actively target positive environmental or social impacts where intentionality, additionality, and impact reporting are explicit. Targeted investment returns may be competitive or below-market rates.	<ul style="list-style-type: none"> ■ Address potential trade-offs between positive impact and financial returns ■ Impact reporting criteria ■ Trade-off between negative ESG impacts and positive outcomes ■ Clearly define of ESG themes 	<ul style="list-style-type: none"> ■ Venture funding for social enterprise ■ Low-cost healthcare fund ■ Green bond investing ■ Microfinance lending ■ Clean energy assets ■ Social housing fund
5. Active ownership or engagement	Monitor and manage ESG challenges. Use investor influence as lenders of capital to manage exposures to ESG risks and enhance a borrower's transparency.	<ul style="list-style-type: none"> ■ Implement efficiently ■ Share engagement outcomes among investment team ■ Track and report the success of engagement activity ■ Proxy voting important strategy in equity space 	<ul style="list-style-type: none"> ■ Engaging a food and beverage company to disclose plans to address regulation on sugar content ■ Requiring a manufacturer to produce regular reports on health and safety

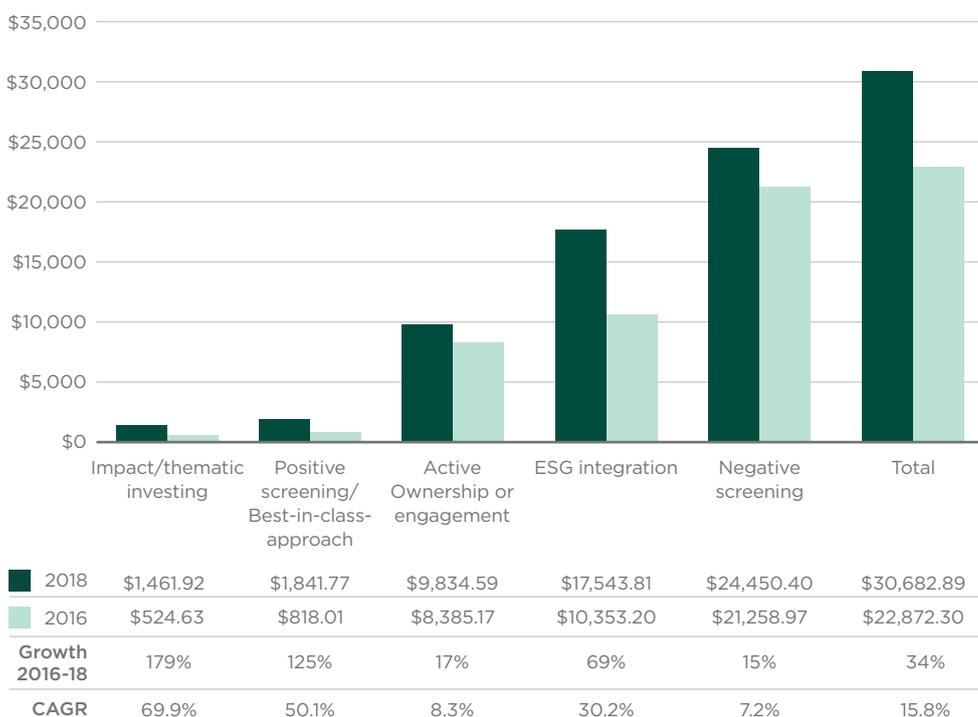
Source: UNPRI (2019).

Assets allocated to various ESG investment approaches

As of 2018, the allocation to all ESG investment approaches reached over \$30 trillion (Figure 1). However, many investors use more than one method of ESG investing. Negative or exclusionary screening had the highest share of assets (\$24 trillion), followed by ESG integration (\$17 trillion).¹⁵ Impact investing stood at \$1.4 trillion, or five percent of sustainable assets.

Figure 1 Global Growth of Sustainable Investment Strategies (millions of US dollars)

GLOBAL GROWTH OF SUSTAINABLE INVESTING STRATEGIES 2016-2018

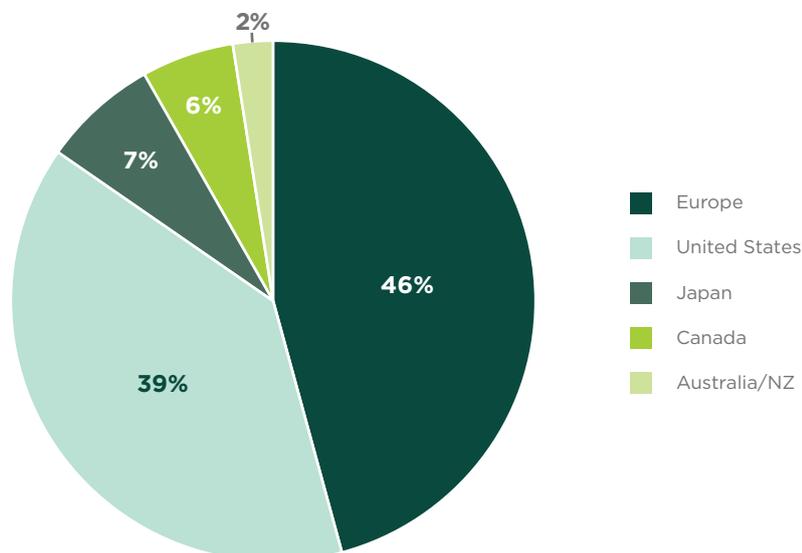


Source: Global Sustainable Investment Review (2018). Numbers do not add to the total as investors may be using more than one investment strategy.

Note: The Global Sustainable Investment Review categories have been revised for consistency with our own labels. Impact community investing and sustainability-themed investment merged into impact/thematic investing. Corporate engagement and shareholder action are included in active ownership or engagement. Finally, norms-based screening and negative-based screening merged into negative/exclusionary screening.

By region, Europe leads the world in proportion of sustainable assets (Figure 2). The United States comes second with 39 percent. Holdings in Japan, Canada, Australia, and New Zealand have smaller participation in ESG strategies.

¹⁵ In the exclusionary category, tobacco-related restrictions appear to account for a significant share of the exclusions. In 2018 in the United States alone, tobacco-related restrictions were applied to 36.6 percent of assets, followed by weapons-related restrictions applied to 24.0 percent of assets.

Figure 2 Participation of Global Sustainable Assets by Region (2018)**PROPORTION OF GLOBAL SUSTAINABLE INVESTING ASSETS BY REGION 2018**

Source: Global Sustainable Investment Alliance: 2018 Global Sustainable Investment Review

Scope for implementation of the various ESG approaches by asset class¹⁶

The choice of a particular ESG approach depends on investor preferences and the eligible asset classes in a portfolio (Table 4). The development of most ESG strategies occurred in the equity space. As a result, equity portfolios can apply most of the ESG approaches discussed above. For fixed income, adopting some of these approaches poses more challenges as equities and fixed income have critical differences.

On the one hand, the analysis of equity and fixed-income instruments differs. Fixed-income instruments have an asymmetric downside risk because credit events may result in losses, but there is limited upside potential from capital appreciation. Additionally, while fixed-income instruments have a finite investment horizon, equity holdings are perpetual. Consequently, fixed-income investors focus on the creditworthiness of a sovereign or company and its ability to pay back debt. In contrast, equity investors pay more attention to the long-term earnings potential of a company. These characteristics of fixed-income instruments limit the possibilities, such as positive screening, for implementing specific ESG approaches in fixed-income portfolios.

On the other hand, shareholder and bondholder rights differ significantly, reducing the scope for active ownership and engagement (see UNPRI 2014 for details). Equity investors can exercise their shareholder rights, whereas bondholders have limited capacity to influence a company.

¹⁶ The scope for implementation also depends on the depth of markets, as many of the bond instruments in the impact space are still small compared to the broader bond markets and offer limited liquidity (see Section 2.6 on Challenges of ESG investing).

Table 4 Adopting ESG Approaches Across Instruments and Asset Classes

ESG INVESTMENT STRATEGIES	1. NEGATIVE / EXCLUSIONARY SCREENING	2. ESG BEST-IN-CLASS/ POSITIVE SCREENING	3. INTEGRATION OF FINANCIAL MATERIAL FACTORS IN THE INVESTMENT PROCESS	4. IMPACT INVESTING	5. ACTIVE OWNERSHIP AND ENGAGEMENT
EQUITIES	Significant scope	Significant/ some scope	Significant scope	Significant scope in private equity	Significant scope
FIXED-INCOME CORPORATES	Some scope	Some scope	Significant scope	Significant/ some scope	Limited scope
FIXED-INCOME SOVEREIGNS	Limited scope	Some scope in EM space	Some scope in EM space scope	Limited scope	Limited scope

Source: Authors' assessments with consideration of Ngo (2016) and SSF (2017) and others.

22

In the fixed-income space, corporate bonds offer more opportunities for ESG implementation than sovereign bonds. Overweighting certain issuers and underweighting others relative to the benchmark is a common practice for corporate bond investors. Therefore, including ESG considerations to support those decisions is consistent with negative screening, best-in-class investing, and ESG integration. Moreover, impact investing through impact bonds is easier to implement in the corporate space, considering that the corporate green bond market is significantly larger than the sovereign green impact bond markets. Corporates are the largest issuers in terms of impact bond market capitalization. Implementing an active ownership approach in the corporate space is, notwithstanding, more challenging because bondholders do not have voting rights, and engagement strategies, while gaining importance, are less effective in the corporate area.¹⁷

In the case of sovereign fixed-income portfolios, the scope to implement any ESG approach is narrow. SSF (2017) suggests that using exclusion approaches is highly relevant to sovereign bond investing. In contrast, Ngo (2016) believes that there is limited scope for this approach in the sovereign bond space. Depending on the type of portfolio, both perspectives may make sense. Investors with well-diversified sovereign portfolios, including emerging market bonds, have room to implement the first three approaches, as noted in Table 4.

¹⁷ Some bondholders have increased the pressure on issuers. For example, see "Bond Investors Start Grilling EM Sovereign Issuers on ESG," <https://www.globalcapital.com/article/b1pj54q3t3g50r/bond-investors-start-grilling-em-sovereign-issuers-on-esg>.

On the other hand, portfolios concentrated in highly rated governments face more challenges applying any ESG investment approach. If, for example, the United States had remained permanently out of the Paris Agreement,¹⁸ fixed-income investors with significant exposures to U.S. Treasuries would not have been able to reduce or eliminate that exposure. That is the case for central banks, as we will discuss in Section 4.1. Moreover, official sector investors may be reluctant to use ESG criteria to avoid investing in particular countries because it may seem politically motivated. This limitation leaves impact bonds as the preferred ESG strategy for investors with portfolios mainly consisting of advanced government and sovereign, supranational, and agency (SSA) debt.¹⁹ Hence the following section discusses impact investing in greater detail and investigates the extent to which it can be used to adopt ESG in reserve portfolios.

2.3. Impact investing

As mentioned previously, impact investing refers to financing an entity or a project with the disclosed intention of generating and measuring social and environmental benefits alongside a financial return. Like ESG, impact investing has multiple definitions (Table 5).

18 The Paris Agreement is an international treaty on climate change. The objective of the Agreement is to limit global warming to well below two degrees Celsius (preferably 1.5 degrees), relative to pre-industrial levels.

19 As discussed in Section 2.4, empirical analysis suggests scope for best-in-class/negative screening and integration of financial material factors in the investment process in the emerging market sovereign bond space.

Table 5 Defining Impact Investing

IMPACT INVESTING	
SOURCE	DEFINITION
UNPRI	"...a strategy and practice to incorporate environmental, social and governance (ESG) factors in investment decisions and active ownership."
Cambridge Institute for Sustainability Leadership	"...investment that creates long-term social, environmental and economic (sustainable) value; an investment that combines financial and non-financial value creation, or investment that correctly prices social, environmental and economic risk."
Global Impact Investment Network	"Impact Investments are investments made to generate positive, measurable social and environmental impact alongside a financial return."
JP Morgan Private Bank	"It is made with the intention to generate measurable positive social or environmental impact alongside a financial return."
Harvard Business School	"Impact investing is defined by both intention of generating social and/or environmental outcomes and measuring those outcomes, alongside a range of returns, from principal to above-market."
Royal Bank of Canada	"It is an investment where an investor is hoping first and foremost to generate social or environmental impact. An impact investor also wants to earn a return they may be willing to take a capital loss as long as some tangible result for the investment can be seen."
World Economic Forum	"...an investment approach that intentionally seeks to create both financial return and measurable positive social or environmental impact."

Note: These definitions appear on the respective organization websites.

According to the Global Impact Investing Network (Core Characteristics of Impact Investing), impact investments typically have four characteristics. First, investors intend to have a social and or environmental impact with their investments. Second, the design of these investments uses evidence and impact data, with the expectation of generating a financial return on capital or, at a minimum, the return of capital. Third, investors are committed to measuring and reporting social and environmental impact. Fourth, the investor is committed to contributing to the growth of the industry.

Impact investing has seen exponential growth in recent years. The Global Investment Sustainable Review indicates that impact investing accounted for \$444.26 billion or 1.45 percent of total sustainable investing assets in 2018 (Global Sustainable Investment Review 2018). Historically, impact investing was best-known in private equity or venture capital. However, impact investing now has a broader use, including investments in impact bonds.

Impact debt issuance has experienced a remarkable increase (Figure 3). Among impact bonds, green bond issuance increased most significantly, but all types of impact bonds are becoming more widely available. ICMA publishes the most relevant principles and guidelines for impact bonds. Using ICMA's impact bond label, issuers commit to adhering to a set of voluntary practices, including providing transparency and disclosures on the use of proceeds. As ICMA guidelines are voluntary, investors can use third-party assurance to confirm the use of proceeds as stated in the prospectus.²⁰

Figure 3 Global Sustainable Debt Annual Issuance (in billions of dollars)



Source: Bloomberg-NEF.

Note: Bloomberg only includes bonds that are “tagged.” It does not include all bonds that finance sustainable activities.

Green bonds

Green bonds are an innovation in the impact investing market designed to facilitate funding for specific projects or companies with a positive environmental impact. An equivalent amount of the bond proceeds are allocated to finance new or existing eligible green projects, e.g., projects to combat pollution, climate change, or depletion of biodiversity and natural resources (Ehlers and Packer 2017; Fender et al. 2018). Green bonds are either asset-backed or asset-linked, and issuers of green bonds must declare the types of green projects eligible to receive funds at issuance. On a stand-alone basis, green bonds do not necessarily decrease the total emissions of a company or other issuer because the issuer may have other projects that increase emissions.

A key catalyst for growth of the green bond market was the 2014 introduction by the International Markets Association (ICMA) of the “voluntary process guidelines”

²⁰ An Approved Verifier provides a formal assurance report, following an auditing and assurance standard (ISAE 3000). Climate Bonds Initiative, <https://www.climatebonds.net/certification/assurance>. According to Bloomberg/NEF, \$789-billion worth of green bonds (70 percent of green bonds issued since 2010) have an assurance report.

and the Green Bond Principles (GBPs).²¹ The GBPs govern (i) the use of proceeds; (ii) the process for project evaluation and selection; (iii) the management of proceeds; (iv) and reporting. Bonds are often issued to align with the GBPs or the Climate Bonds Initiative (CBI) Climate Bond Standards (CBS). Investors usually expect a second opinion or green bond certification from a third-party provider such as CICERO, Sustainalytics, or the CBI. The accreditation aims to show how the issuers' processes align with the GBPs and to avoid "greenwashing," the intentional or unintentional provision of false or misleading information to make a project appear environmentally friendly.²² The primary benefit of labeled bonds is that they provide transparency on how the issuer allocates bond proceeds to eligible projects and what process the issuer follows to ensure it adheres to ESG principles in its lending activities. Investors expect detailed impact reporting that shows how the supported projects contribute to a positive environmental impact.

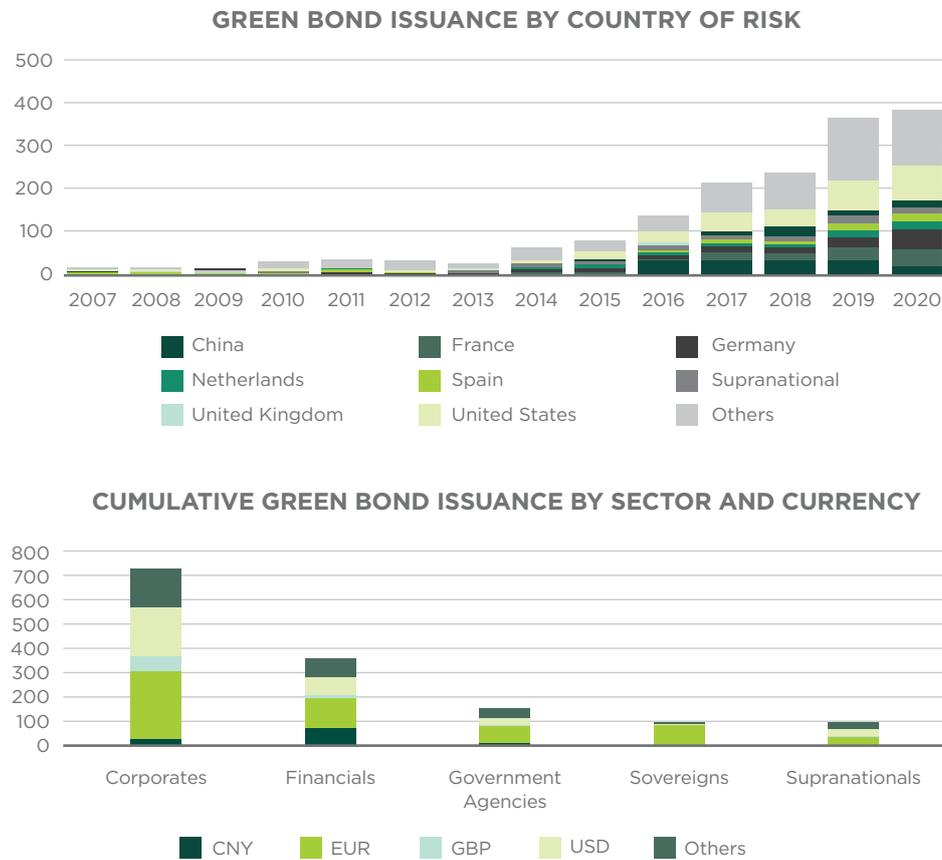
Multilaterals, beginning with the World Bank in 2008,²³ were the first to issue green bonds, but corporates and financial issuers have now taken the lead (Figure 4). The cumulative issuance of green bonds from 2007 to 2020 was \$1.1 trillion. Corporate and financial institution green bonds represent the most significant fraction of that number, followed by government agencies, sovereigns, and supnationals. Furthermore, Western European issuers dominate within the developed market universe accounting for 63 percent of the current debt stock. Chinese corporations are the most prolific bond issuers in emerging markets, representing 20 percent of global debt stock.²⁴

21 ICMA, Green Bond Principles Voluntary Process Guidelines for Issuing Green Bonds (2019), 1-8.

22 Many jurisdictions have developed their own national taxonomies of what constitutes eligibility as a green bond. For details, see Ehlers and Packer (2017). Green bond indices also provide certification, as they identify and specify bonds as green via their stated methodology for constructing the index. Currently, Bank of America, Merrill Lynch, Barclays, MSCI, Standard and Poor's, and JP Morgan are well-known green bond index providers.

23 See <https://www.worldbank.org/en/news/immersive-story/2019/03/18/10-years-of-green-bonds-creating-the-blueprint-for-sustainability-across-capital-markets>.

24 JP Morgan (November 23, 2020).

Figure 4 Characteristics of the Green Bond Market (in billions of US dollars)

Source: BloombergNEF.

In a critical development for the green bond market, the German government issued a Green German Federal Securities framework in August 2020.²⁵ With this framework, the German government commits to issuing green bonds in different maturities to create a green yield curve. Notably, the German government will offer green bonds with the same maturities and coupons as existing conventional bonds (“twin bonds”). It will allow investors to swap their holdings of German sovereign green bonds for their conventional “twins.” All else being equal, this should positively impact the liquidity of these securities and their pricing (see also Section 2.6).

Social bonds

Issuers of social bonds use the proceeds to raise funds for new and existing projects with positive social outcomes. Social bonds are very similar to green bonds: the issuer defines eligible types or specific projects and allocates an equivalent amount of bond proceeds to these projects, reporting to the investor on what projects were eligible and their expected positive social impact. Social

²⁵ <https://www.bundesfinanzministerium.de/Content/EN/Pressemitteilungen/2020/2020-08-24-Germany-to-issue-Green-German-Federal-Securities-from-2020.html>.

bond-labeled issuance started in 2010, and cumulative issuance reached \$192 billion at the end of 2020. The COVID-19 pandemic represented a significant boost to these instruments' growth—2020 issuance reached \$147 billion (76 percent of the total).²⁶

Sustainability and sustainability-linked bonds

Sustainability bonds are hybrid instruments. Bond proceeds support the financing of a combination of both green and social projects.²⁷ Sustainability-labeled bond issuance started in earnest in 2014, reaching \$143 billion at the end of 2020.²⁸

In the case of sustainability-linked bonds, the payoff depends on achieving specific objectives. Sustainability-linked bonds are very different from sustainability bonds because the issuer does not link the proceeds to particular projects. Instead, financial terms change depending on the achievement of key performance targets. Therefore, sustainability-linked bonds' financial and structural characteristics can vary depending on whether the issuer achieves predefined sustainability or ESG objectives.²⁹ Sustainability-linked bonds account for the smallest share in the thematic bond universe, with only \$15 billion issued since 2019.³⁰

Unlabeled bonds

An impact or sustainable bond strategy could include bonds that do not carry a specific label: so-called unlabeled bonds. An unlabeled impact bond is an instrument that finances a green, social, or environmental project but that the issuer did not label as green, social, sustainable, or otherwise. Most supranational or government agencies adhere to strict environmental and social standards in issuing bonds and could thus be considered unlabeled bond issuers. They fund activities that have an intentional (positive) impact. Investors with an issuer-focused approach typically include these issuers in their sustainable or impact bond strategies if the institutions' policies and practices align with the investors' intent.

Since credit risk is identical for labeled and unlabeled bonds, a key difference is that an unlabeled bond does not necessarily follow the transparency, disclosure, and reporting guidelines specified in the Green and Social Bond Principles. Including unlabeled bonds in a sustainable investment strategy requires the investor to perform his/her own due diligence to verify that the selected issuer and the use of proceeds for the specific instrument meets the investor's ESG objectives.

²⁶ Bloomberg and authors' calculations.

²⁷ ICMA, Sustainability Bond Guidelines (2018), 1-4. This does not include most supranational and agency issuers' bonds that are unlabeled but have been used to finance their sustainable activities for decades. Many issuers, such as the World Bank, use the Sustainable Development Goals as a framework to engage with investors around certain themes and provide reporting through detailed impact reports. See <https://treasury.worldbank.org/en/about/unit/treasury/ibrd>.

²⁸ Bloomberg and authors' calculations.

²⁹ ICMA (2020b), 1-11.

³⁰ Issuance numbers for social, sustainability, and sustainability-linked bonds come from Bloomberg-NEF.

2.4 Major organizations supporting ESG and green finance

Several organizations support ESG investing broadly and green finance more specifically. Below we provide a brief background on the most prominent for central bank reserve managers, such as the United Nations Principles for Responsible Investment (UNPRI), the Network for the Greening of the Financial System (NGFS), and the Global Impact Investing Network (GIIN).

United Nations Principles for Responsible Investment (UNPRI)

Principles for Responsible Investment (UNPRI or PRI) is a leading independent organization in sustainable investment. Supported by the United Nations, it is an international network of investors working together to implement the six principles published in 2006 at the request of then UN Secretary General Kofi Annan (Table 6).³¹ The network was created alongside the Principles to help put the framework into practice. Its goal is to understand sustainability and support signatories in incorporating these issues into their investment decision-making and ownership practices. They offer a menu of possible actions for integrating social, environmental, and corporate governance issues into investment practices across asset classes. The Principles are formulated broadly and are compatible with the investment styles of large, diversified institutional investors operating within a traditional framework.

Table 6 Investment Principles for UNPRI Members³²

PRINCIPLE 1	We will incorporate ESG issues into investment analysis and decision-making processes.
PRINCIPLE 2	We will be active owners and incorporate ESG issues into our ownership policies and practices.
PRINCIPLE 3	We will seek appropriate disclosure on ESG issues by the entities in which we invest.
PRINCIPLE 4	We will promote acceptance and implementation of the Principles within the investment industry.
PRINCIPLE 5	We will work together to enhance our effectiveness in implementing the Principles.
PRINCIPLE 6	We will each report on our activities and progress towards implementing the Principles.

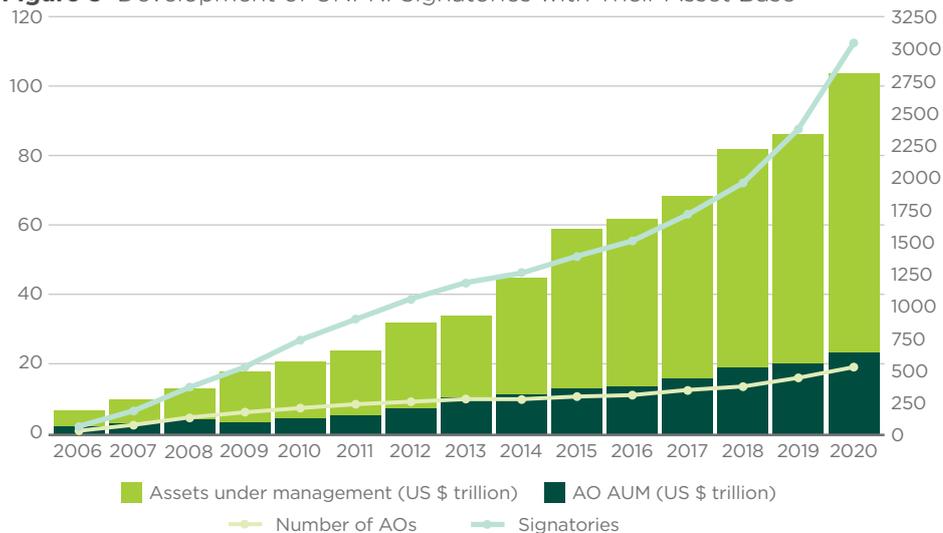
Source: UNPRI.

³¹ As stated in introduction, in 2005, Kofi Annan invited a group of large institutional investors to join a process to develop the Principles for Responsible Investments. The group consisted of a 20-person investor group drawn from institutions in 12 countries and supported by a 70-person group of experts from the investment industry, intergovernmental organizations, and civil society. The Principles were launched in 2006 at the New York Stock Exchange.

³² UNPRI describes these principles as nonprescriptive and aspirational.

Since the Principles' launch, the number of signatories has grown to over 3,000. Signatories manage roughly \$103 trillion in assets (Figure 5),³³ including institutional investors such as pension funds, sovereign wealth funds, and asset managers. At the moment, three central banks are also signatories: the Central Bank of the Netherlands, the Honk Kong Monetary Authority, and the Bank of Finland.

Figure 5 Development of UNPRI Signatories with Their Asset Base



Source: Bloomberg.

The Network for Greening of the Financial System (NGFS)

While UNPRI targets all investor types, NGFS concentrates primarily on environmental and climate issues for the central bank community. The network was set up at the Paris One Planet Summit on December 12, 2017. It initially consisted of eight central banks and supervisors who committed to sharing best practices, contributing to the development of environment and climate risk management in the financial sector, and mobilizing mainstream finance to support the transition toward a sustainable economy. By the end of 2020, the group had grown to 83 members and thirteen observers.³⁴ The Federal Reserve Bank of the United States joined the network on December 15, 2020.

NGFS published its first comprehensive report, "A Call for Action," on April 17, 2019, proposing six recommendations to facilitate the financial sector's role in achieving the objectives set out in the 2015 Paris Agreement (Table 6). The commitments of network members combine developing and sharing best practices (i.e., commitment one through four) and encouraging policy makers' actions (i.e., commitment five and six).

³³ Since 2015, "assets under management" excludes double counting resulting from subsidiaries also reporting and external assets managed by PRI signatories.

³⁴ World Bank Treasury is also part of this group of observers.

Table 7 Commitments of NGFS Members

COMMITMENT 1	Integrating of climate-related risks into financial stability monitoring and micro-supervision
COMMITMENT 2	Integrating of sustainability factors into own-portfolio management
COMMITMENT 3	Bridging the data gaps
COMMITMENT 4	Building awareness and intellectual capacity and encouraging technical assistance and knowledge
COMMITMENT 5	Achieving robust and internationally consistent climate and environment-related disclosure
COMMITMENT 6	Supporting the development of a taxonomy of economic activities

Source: Network for the Greening of the Financial System.

Sustainable knowledge group and other organizations promoting sustainable finance

In December 2016, the European Commission set up the High-Level Expert Group on Sustainable Finance. Its task is to advise the Commission on three areas: directing public and private capital towards sustainable investments; identifying the steps that financial institutions and supervisors should implement to protect the financial system's stability from environment-related risks; and deploying these policies on a pan-European scale (HLEG, European Commission). The Basel-based Financial Stability Board, an international organization that monitors and makes recommendations about the global financial system, also set up a task force on climate-related Financial Disclosures (TCFD).

Global Impact Investing Network (GIIN)

The GIIN started in 2009 to increase the scale and effectiveness of impact investing by building critical infrastructure and thorough research and training to support issuers' and investors' activities.

In addition, several other ESG investors' organizations, standards, and codes aim at furthering ESG initiatives (Table 8).

Table 8 Organizations and Initiatives

RESPONSIBLE AND SUSTAINABLE INVESTMENT	CORPORATE GOVERNANCE, ACCOUNTING, AND DISCLOSURE	GREEN AND CLIMATE-CHANGE INVESTMENT ASSOCIATIONS	INITIATIVES	IMPACT INVESTING
UN Global Compact (UNGC)	International Corporate Governance Network (ICGN)	Institutional Investor Group on Climate Change (IIGCC)	Carbon Disclosure Project (CDP)	Global Impact Investing Network (GIIN)
UN Principles for Responsible Investment (PRI)	Global Reporting Initiative (GRI); Global Sustainability Standards Board (GSSB)	Investor Group on Climate Change (IGCC)	Asset Owners Disclosure Project (AODP)	
EuroSIF, UKSIF, USSIF, SIF Japan, ASrIA, RIA Canada, RIA Australasia, etc.	Sustainability Accounting Standards Board (SASB)	Asia Investor Group on Climate Change (AIGCC)	Montreal Carbon Pledge	
Global Sustainable Investment Alliance (GSIA)	The FSB Task Force on Climate-related Financial Disclosures (TCFD)	GIC Global Platform	Portfolio Decarbonization Coalition	
Equator Principles	Asian Corporate Governance Association (ACGA)	Ceres	Action 100+	
International Capital Market Association (ICMA), Green Bond Principles (GBP), and Social Bond Principles (SBP)			Extractive Industries Transparency Initiative (EITI)	
			United Nations Environment Program (UNEP) Initiative	
			Finance for Tomorrow	
			Climate 100+	
			Net Zero Alliance	
			Tobacco-Free Alliance	

Source: Inderst and Stewart (2018).

2.5 The impact on financial returns of integrating ESG into investment processes

Understanding the financial implication of ESG investing is critical for investors. While there has been a significant empirical push to establish a link between ESG and financial indicators, results have been mixed due to substantial methodological issues. The two most significant challenges to empirical analysis are the lack of a consistent and uniform definition of ESG and lack of consistent ESG strategies. Another challenge is the absence of a clear understanding of how ESG factors relate to established factors in different pricing and credit risk models.

In the equity space, including ESG issues in the analysis is particularly challenging. The range of topics covered under ESG is wide and varied, from corporate governance to water stress to human capital. Every ESG topic is unlikely to have an equal impact on company performance. Understanding the relative significance of the different ESG issues is essential for integrating ESG factors into stock selection and portfolio construction.

Empirical evidence of the impact of ESG on equity returns is plentiful. Friede, Busch, and Bassen (2015) provide a comprehensive overview of this research body, examining the results of more than 2,200 primary and secondary data of academic review studies and concluding that 90 percent of the studies find a nonnegative relation between ESG and corporate financial performance at the security level. Their findings are more mixed and neutral for portfolio studies using either ESG funds or index performance data rather than single firm data. Since then, numerous studies have been published, again with inconsistent results.³⁵

For the fixed-income space, most of the focus of the empirical research on the impact of ESG on financial return has been on credit risk, assessing how ESG factors impact companies' or countries' creditworthiness. Most of the research indicates that ESG factors can constitute material credit risk but do not impact returns. Consequently, credit rating agencies have started to include ESG factors in their

35 The studies' results differed significantly depending on which ESG methodologies were used (e.g., various types of ESG scores or industry exclusions) and which financial metrics (e.g., stock price or exposure to Fama-French factors) were employed to assess the impact of ESG on stock performance. Given the variation in conceptualization and construction of both the independent and dependent variables in these studies, it appears difficult to obtain a clear consensus on how ESG considerations have affected stock price performance.

credit risk assessments.³⁶ Notwithstanding this development, most empirical research has concentrated on the relationship between ESG and corporates. ESG research in the sovereign space is still at the beginning stage.³⁷

Impact of ESG on corporate bonds

Most fixed-income studies utilize scoring methodologies that rank companies across a set of ESG criteria and investigate whether a higher ranking corporate issuer performed better or had a lower default incidence.³⁸ For example, Desclee et al. (2015, 2016) studied the impact of ESG on investment-grade corporate bonds' performance and found that issuers with a high ESG rating had a slight performance advantage. A positive tilt towards the governance factor had the most substantial impact on performance. These issuers also experienced a lower incidence of downgrades by credit rating agencies. Reznick and Viehs (2017) uses its measure of ESG risk for companies to examine its impact on credit default swap indices. They find that companies scoring lowest on ESG tend to have the widest CDS spreads and the broadest distribution of annual CDS spreads. Interestingly, they also find that ratings cannot serve as a proxy for ESG risk as, according to their analysis, these did not accurately reflect ESG risk.

The empirical evidence that companies with higher ESG scores achieve better financial results is, however, inconclusive. Some studies find a positive relationship between a more elevated and better ESG score and the issuer's financial performance; others cannot find a clear connection (see Devalle, Fiandrino, and Cantino 2017; BektiD 2018).³⁹

For sovereign bonds, most academic research investigates the impact of governance factors, such as institutional strength and political risks, on the issuer's ability to repay its debt and its willingness to do so. In one of the few OECD studies on sovereigns, Capelle-Blancard (2017) concludes that OECD sovereigns with high ESG ratings tended to exhibit lower default risk and lower bond spreads. Also, credit rating agencies have included governance factors in their analysis of sovereign issuers for a long time.

36 In the "Statement on ESG in Credit Risk and Ratings," credit rating agencies and institutional investors agreed to include ESG in credit risk assessment. See <https://www.unpri.org/credit-risk-and-ratings/statement-on-esg-in-credit-risk-and-ratings-available-in-different-languages/77.article>.

37 As Inderst and Stewart (2018) point out, most of the research on the impact of financial returns on ESG has focused on credit risk. How ESG factors influence market risks, inflation, liquidity, maturity, term structure, yield curves, income stability, and total returns, as well effects on default risk and recovery rates has been limited. The authors also note that further academic research is needed to evaluate the link between fixed income and ESG factors using transparent methodologies, over longer time horizons and across a broader range of fixed-income assets and countries.

38 Obviously, given that researchers may utilize different scoring methodologies, it is difficult to compare and contrast the empirical results of these different studies.

39 It is also important to note that credit rating agencies have now started to consider ESG factors in their ratings methodology. See, for example, Moody's Investor Services, December 2020.

Industry research also suggests a link between ESG, creditworthiness, and borrowing costs for sovereigns. Allianz (2017) advocates that sovereign credit ratings do not fully reflect ESG risks. They identify weak governance as a critical risk, followed by social risks. The study concludes that integrating ESG factors into the issuer credit analysis may mitigate tail risk better. According to Sustainalytics (2017), blending credit risk ratings with ESG scores and momentum (defined as a recent change in ESG scores) helps investors identify over- and undervalued countries. Finally, Lazard (2017) determines that ESG factors significantly affect sovereign issuer's borrowing costs in emerging markets.⁴⁰

Financial returns at the green-bond security level

Empirical studies on green bonds, the largest constituent of the impact bond market, have looked at bond pricing and subsequent performance. There is ongoing discussion on whether an issuer's green bonds enjoy a premium versus traditional bonds or are priced at the same level. They typically rank *pari passu* with conventional bonds if they do not have any additional credit enhancements. Evidence is inconclusive; any "greenium," if it exists, is *ad hoc* and negligible in size. An empirical analysis from Harrison (2021) found that, while there were some differences in some indicators in general, the bonds' pricing was very similar.⁴¹ Ehlers and Packer (2017) find that while green bonds are priced on average at a premium, their performance in the secondary market has been close to that of other bonds when currency risk is hedged. In his review of the empirical studies on green bonds, Zerbib (2019) finds that green bonds have an average -2 basis point spreads over conventional bonds when controlling for the lower liquidity of green bonds. Finally, the spread between the first German "twin bonds" (i.e., green and conventional bonds with the same maturity and coupon) was one basis point at issuance and had narrowed to 0.5 basis points as of March 2021.

At the portfolio level, empirical results vary depending on the currency. A U.S.-dollar investor tracking the green index would have enjoyed a spread of four basis points above the conventional benchmark and, therefore, a positive greenium. In contrast, the euro-based investor would have earned twelve basis points less than the comparator market (i.e., negative portfolio greenium). Fender et al. also note that these numbers vary significantly over time due to changes in issuer composition. Moreover, green bond spreads have been wider than conventional bonds, although spreads have converged recently (Fender et al. 2019).

⁴⁰ The importance of institutional factors is also highlighted in other studies. For example, for a data set of 90 countries Qian (2012) shows that strong institutions are associated with fewer sovereign crises and fewer sovereign defaults. Other governance factors such as corruption and transparency also seem to matter. For example, Choi and Hashimoto (2017) show that data transparency policy reforms resulted in reduction of emerging market sovereign spreads.

⁴¹ From an issuer's perspective green bonds are more expensive as these are specifically structured instruments and require monitoring of the use of proceeds as well as reporting (Inderst and Stewart 2018).

2.6 Challenges of ESG investing

Lack of good data quality and availability

Data quality and availability are essential for investors. Relevant, timely, and comparable information is the basis for implementing several ESG strategies and monitoring their impact. For example, best-in-class investing relies heavily on data on ESG factors across instruments.

Investors nonetheless lack uniform accounting frameworks and disclosures. For example, corporations may disclose ESG-related data separately from the regular financial statements, making integration harder. An additional roadblock is the current accounting framework, which may not sufficiently capture the secondary and tertiary effects of decision making. For instance, electric cars may reduce carbon emissions if they replace traditional gasoline cars. But if electric car production increases the total number of vehicles in circulation powered by coal-derived electricity, the net carbon footprint reduction is arguably smaller.

In response to this challenge, some initiatives seek to improve ESG disclosure. For example, the Sustainable Stock Exchanges Initiative shows how exchanges can work with investors, regulators, and companies to enhance corporate ESG transparency. Similarly, data availability is on the rise, even if better quality and greater quantity are still needed. For instance, the number of large global companies that disclose their greenhouse gas emissions and water management and climate change strategies to the Carbon Disclosure Project, an environmental nongovernmental organization, rose from 295 in 2004 to 5,003 in 2014.

Furthermore, several efforts are currently underway to address the lack of uniform standards. For example, the European Commission has started work to define a green taxonomy framework.⁴² The World Economic Forum International Business Council met in October 2020 to review how to create consistency in the way companies inform investors about their behavior concerning ESG norms. Several other efforts are underway as well, including those of the Sustainability Accounting Standards Board, the Global Reporting Initiative, the Task Force on Climate-Related Disclosures, and the EU High-Level Expert Group on Sustainable Finance.

Regulation and consistency with fiduciary responsibilities

Regulation can be both a driver and a barrier for ESG investing. One of the most critical aspects in this context is whether ESG investing is compatible with the investor's fiduciary duty. Discussions on fiduciary responsibilities have evolved. While laws regarding fiduciary duty vary from country to country, initial rulings indicated that fiduciaries could only consider financial returns when acting in beneficiaries' interest. In several countries, guidance today goes a step further, requiring fiduciaries to incorporate ESG factors into their decision making. For example, Bordon et al. assess fiduciary obligations in eight civil and common law countries and conclude that "failing to consider long-term investment value drivers,

⁴² See also Edgecliffe-Johnson et al. (2020). The article also highlights some potentially repercussions for emerging markets.

which include environmental, social, and governance issues in investment practice is a failure of fiduciary duty” (Bordon et al. 2015). Similarly, the United Nations Environment Program concluded in a 2015 report that “failing to consider a long-term investment value driver, including ESG issues, is a failure of fiduciary duty” (Bordon et al. 2015).

Impact reporting and verification of desired results

Measuring whether impact investment achieves its desired effects is difficult. The impact bond market follows voluntary issuer disclosure standards that vary in scope and quality. Because the market relies on voluntary principles, both policy makers’ and investors’ key issue is whether existing certifications and standards result in the desired environmental impact (Economist 2020). A key question for investors in green bonds and similar instruments is how to verify the achievement of promised environmental benefits. Companies such as Sustainalytics, Vigeo-Eiris, Oekom Research, Moody’s, Cicero, and Trucost, now part of S&P Dow Jones Indexes, undertake green bond assessments. But even if these assessments verify that a specific project reduces the carbon footprint, it is not clear that carbon emissions decrease at the firm level (see Ehlers, Mojon, and Packer 2020).⁴³ Another question raised in the context of green bonds is whether they finance projects that would have been funded anyway or additional projects (Hayat and Orsagh 2015).

As the popularity of and interest in the green bond market rise, issuers increasingly stretch the boundary of what qualifies as a green or social investment. Debate is also ongoing over whether green projects from corporations with broader investment objectives should be eligible. Some observers note that issuing green bonds may signal a positive change within companies, while others are concerned that greenwashing could reduce the market’s credibility overall.

Limited choice of instruments and small market capitalization

Fixed-income investors have more limited options to implement ESG if they concentrate on labeled bonds. Equity investors can choose between active and passive investment instruments, including ETFs and smart beta instruments. In contrast, for fixed-income investors, the range of investment vehicles is more limited, and passive investment instruments are still in their infancy.

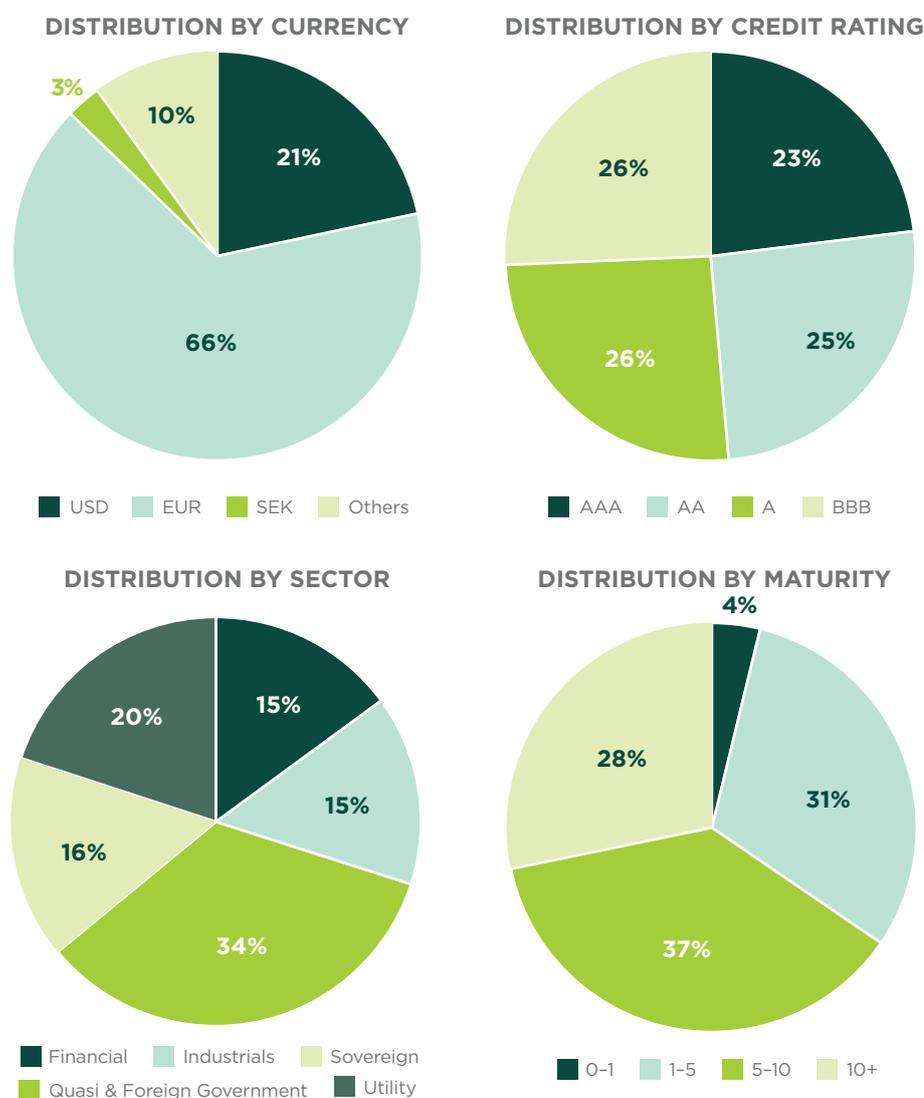
One significant constraint is the size of the impact bond market. The labeled green bond market has matured into a broad global market and now includes corporate bonds, asset-backed securities (ABS), project and infrastructure assets, and subnational and municipal issuers. With 70 percent of the total market capitalization outstanding, the corporate bond market is now the largest green bond market component. Despite this rapid growth, the market is still relatively small, with about 3.5 percent of total global bond issuance (i.e., \$7.15 trillion) (see

⁴³ Ehlers, Mojon, and Packer (2020) discuss the potential benefits of a firm-level rating based on carbon intensity (emissions relative to revenue) to complement existing project-based green labels. They argue that such a rating system could provide a useful signal to investors and encourage firms to reduce their carbon footprint.

Ehlers, Mojon, and Packer 2020).⁴⁴ As of December 2020, the ICE Global Green Bond Index's market capitalization, a proxy for the investable universe, was \$621 billion, representing a small fraction (i.e., 0.5 percent) of the global bond market capitalization. However, supply is likely to respond to increasing investor demand over time.

An additional obstacle for reserve managers is that only a small share of the green bond market is potentially available. Central banks tend to invest in high-quality bonds with short maturities. Yet long-maturity bonds, issued by corporates and financials, have the largest share (Figure 6). Furthermore, most green bonds are denominated in euros (66 percent), limiting even further the opportunities for central banks with small allocations to this currency.

Figure 6 Composition of ICE Global Green Bond Index (as of December 2020)



Source: ICE, Bloomberg.

⁴⁴ Hyun, Park, and Tian (2020) compare the pricing of green labeled and unlabeled bonds and find that unlabeled green bonds are likely to have a higher yield trading an average 24-36 basis points lower compared to their green counterparts.

The mismatch between central bank preferences and market composition hampers the implementation strategy. Green bonds denominated in U.S. dollars, the most important currency for reserve managers, amount to \$134 billion, or 21.6 percent of the green bond market. Within that space, SSAs have a \$38 billion market capitalization with 46 issuers.

Conservative investment guidelines for credit quality and liquidity significantly decrease the green bond opportunity set. Table 9 shows the result of considering only green bonds rated A- or higher in U.S. dollars. In the SSA universe, only 40 issuers, with an amount outstanding of \$38 billion, meet that requirement. A central bank that invests exclusively in U.S.-dollar SSAs and limits its allocation to a specific security to ten percent of market capitalization for liquidity purposes could not have a green bond portfolio larger than \$3.8 billion. Investors would need to take on higher credit risk and expand the investment guidelines to include corporates rated A- or higher to increase the portfolio's potential size.

Table 9 Characteristics of Green Bonds with Ratings Higher than A-

	U.S. SSA MARKET						U.S. CORPORATE MARKET					
	Number of issuers		Total market size (in billion USD)		Investible universe (10% issue limit)		Number of issuers		Total market size (in billion USD)		Investible universe (10% issue limit)	
Minimum credit rating	AA	A-	AA	A-	AA	A-	AA	A-	AA	A-	AA	A-
Labeled green bonds	35	40	33	38	3.3	3.8	23	79	15	53	1.5	5.3
Percentage of U.S. green bond index	18.8%	21.5%	24.6%	28.3%	2.5%	2.8%	12%	42%	11.1%	39.3%	1.1%	3.9%

Source: Authors' calculations.

An additional limitation is that demand outstrips supply significantly. For example, in November 2020, a sovereign green bond issued by Belgium was four times oversubscribed.⁴⁵ Once investors get these sought-after bonds, they are likely to hold them to maturity, resulting in low turnover. Consequently, thematic bond portfolios are likely to be smaller than the numbers shown in Table 9.

⁴⁵ OLO 1.25% 22/04/2033. Source: Belgian Debt Agency website.

The high concentration of issuers in the impact investment market

Labeled bond markets are highly concentrated, with a few large issuers dominating. The issuers' concentration is even more remarkable in the SSA market. For example, EIB is the largest single issuer of green bonds, amounting to \$30 billion or 15 percent of the SSA total market capitalization. The largest ten issuers represent 57 percent of this market segment.

Table 10 Participation of Largest SSA Issuers in the ICE Green Bond Index (as of December 2020)

ISSUER	# BONDS	OUTSTANDING (USD BN)	IN %
European Investment Bank	27	30	15
Kreditanstalt für Wiederaufbau	15	28	13
Société du Grand Paris	5	18	9
SNCF Réseau	5	8.1	4
Asian Development Bank	14	7.26	4
Nederlandse Waterschapsbank N.V.	10	6.7	3
Nordic Investment Bank	9	5.2	2
Kommuninvest I Sverige AB	6	5.1	2
International Bank for Reconstruction and Development	8	4.7	2
International Finance Corporation	9	4.7	2

Source: Bloomberg, ICE.

Low liquidity

Thematic bonds tend to be less liquid than conventional bonds. According to Borio et al. (2008), a financial instrument is liquid if a transaction can occur rapidly and with little impact on price. As shown above, while the green bond market's size has quickly grown in recent years, it is still tiny. Besides, primary markets are oversubscribed (CBI 2018b), and secondary markets see low turnover.

The low liquidity of the green bond market may be because long-term institutional investors dominate the market, and they tend to hold the bonds to maturity. According to Fender et al. (2019), the bid-ask spread in the green bond market is wider than that of conventional counterparts. Therefore, it is more costly to trade, indicating that liquidity is lower in the green bond market segment. Furthermore, data from Fender and McMorrow show more considerable differences in U.S.-dollar denominated bonds. However, it is critical to highlight that demand for these securities in the secondary market is always strong.



CENTRAL BANK RESERVE MAN- AGEMENT AND RESPONSIBLE INVESTMENT

This section discusses central banks' interest in responsible investment in light of their objectives and limitations.

42

Although more and more central bank reserve managers find ESG appealing, they are still assessing whether these strategies are consistent with their mandate and how to implement it, given their portfolios' current composition.

Central bank functions and ESG

Central banks have various roles and carry out a broad list of responsibilities and functions. However, institutions differ significantly in their functions' scope and nature, in their history, and in the economic conditions in which they operate. While the institutions vary substantially in structure and purpose globally, all institutions have an essential responsibility for monetary policy, the financial system's stability, and the financial infrastructure's core elements. Most central banks are also responsible for managing large portfolios, notably monetary policy portfolios and foreign exchange reserves (see Anasashvili et al. 2020).

Given the broad nature of central banks' functions and activities, the question arises of whether central banks could incorporate sustainability considerations into their operations. In the case of monetary policy, the case for considering how climate change will affect the economy is strong. Global warming and its associated effects, like total seasonal rainfall and sea-level rise, are likely to impact economic performance. The increased frequency, severity, and correlation of extreme weather events can also be significant in macroeconomic analysis. For example, inflation pressure might arise from a decline in the national and international supply of commodities or from commodity shocks caused by weather-related events such as droughts, floods, and rising sea level. Batten, Sowerbutts, and Tanaka (2020) review channels through which climate risk can affect central banks' monetary policy objectives. They also discuss approaches to incorporating climate change into central banks' economic modeling of the economy (see also Rudebusch 2021).

Besides, as regulators of financial institutions, central banks are increasingly concerned about the impact of climate change on financial stability. The Basel Committee on Banking Supervision created the Task Force on Climate-related Financial Risks (TCFR), highlighting the importance of assessing these risks and their possible impact on individual financial institutions or financial stability more broadly. Banking supervisors are particularly concerned about physical and transition risks. The former refers to the potential economic costs and financial losses that could come from climate-related events;⁴⁶ the latter focuses on the implications of the transition to a low-carbon economy. A clear consensus has emerged from the central banking community that more disclosure and standardized reporting from the financial sector would be beneficial. Better disclosures could allow better comparisons across companies nationally and globally, make risk transparent, and allow for better risk assessment.

In portfolio management operations, the drive to implement sustainability considerations comes mainly from central banks' stakeholders. Central banks must determine whether adopting ESG objectives in those policy portfolios is possible without impacting their mandate (see NGFS 2019). However, the decision to implement ESG is not straightforward, because central banks manage different portfolios with various objectives and limitations. NGFS distinguishes between four portfolio types: policy portfolios, own portfolios, pension portfolios, and third-party portfolios (NGFS 2019).⁴⁷ This distinction may not apply to all institutions since several central banks do not have all portfolio types. For example, managing third-party portfolios like sovereign wealth funds is only performed in approximately 10 percent of central banks (Anasashvili et al. 2020).

Despite the importance of distinguishing among central bank portfolios, the NGFS taxonomy may still be too general. The "policy portfolios" category includes portfolios that support monetary policy operations and foreign exchange reserves, despite their being very different.

Monetary policy portfolios are denominated in local currency and typically invest in government bonds, even if quantitative easing has expanded the list of eligible instruments in some countries in recent years. In practice, central banks rarely manage these holdings actively to minimize the liquidity and market impact on their financial markets. Return is not necessarily an investment objective for these portfolios.

A lively debate is currently underway in Europe on whether monetary policy makers should incorporate ESG considerations into their quantitative easing framework by giving preference to "clean" corporations when acquiring corporate bonds. The Bundesbank is a proponent of not including any such criteria into their policy measures, arguing that it is in the purview of elected governments and parliaments (Weidmann 2019). Notwithstanding, he softened his approach in a speech at a June 2021 event saying that "If no adequate solution can be found

⁴⁶ See <https://www.bis.org/press/p200430.htm>.

⁴⁷ See definitions in NGFS (2019), 8 ff.

here [credit ratings reflecting climate risks] the Eurosystem would have to adopt alternative measures ..., for example by limiting the maturities or the amount of corporate bonds of certain sectors and issuers in the Eurosystem's monetary policy portfolio."⁴⁸ Similarly, Honohan (2019) argues that "it is important not to overstate what central banks can do." He believes that any actions need to be part of a clearly articulated framework that does not endanger a central bank's independence.⁴⁹ Another objection to implementing sustainable investment is that it will be less relevant once monetary policy normalizes and asset purchases decrease (Arnold 2021). Others believe that central banks require such action as the climate situation is too dire to ignore (Carney 2019).

By contrast, implementing ESG in foreign reserve portfolios has different implications. Reserves are invested in foreign currencies, and portfolios tend to be more diversified. Portfolios usually invest in deep and liquid markets, where they rarely have a market impact. As a result, reserve managers act like other institutional asset managers. Applying sustainable investment principles is thus a matter of making sure that it is compatible with the portfolio's investment objectives.

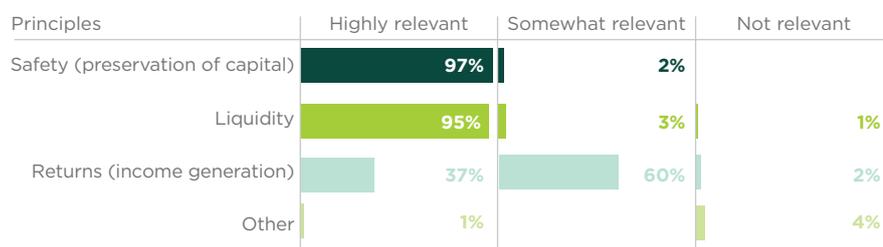
We proceed to analyze the possibilities and limitations of applying ESG in reserve management, considering its unique objectives, opportunities, and constraints. Therefore, in the rest of the document, we exclude from the analysis other central bank functions or even different portfolio types managed by central banks.

3.1. Current objectives of central bank reserve management operation and ESG

Incorporating ESG in reserve management should start with a discussion of the main objectives of this function. Understanding reserve management objectives will help in assessing a central bank's scope to employ either of the approaches discussed above. As Figure 7 shows, for almost all central banks, safety and liquidity are the core principles of the foreign reserve management. Income generation is less important; only 37 percent of institutions deemed return highly relevant, and 60 percent considered it somewhat relevant (Anasashvili et al. 2019). These responses are consistent with the intended use of foreign reserves—providing foreign currency liquidity for macroeconomic emergencies, for example, during balance-of-payments crises. The principles of reserve management are often in the law or the investment policy approved by central bank boards.

⁴⁸ Reuters, ECB's Weidmann drops opposition to making bond purchases greener, June 2, 2021.

⁴⁹ In a recent article Honohan (2019) warns that "even a central banker who is personally uninterested in the goals of a more equal and environmentally sustainable economy needs to be aware for a central bank to underperform on that secondary mandate (to use their powers to support wider goals of economic policies) is to risk exposure to increasingly sustained attacks on their independence, which could hamper achievement of their core objectives."

Figure 7 Principles of Central Banks' Reserve Management Operations

N=99.

Source: RAMP Survey on the Reserve Management Practices of Central Banks.

Some authors argue that central banks could include sustainability as a fourth reserve management objective (Fender et al. 2019), but challenges remain. In countries where sustainability is broadly accepted as a public policy objective, expanding reserve management objectives may be possible. However, that option may not be feasible for all central banks. In several countries, reserve management objectives are a matter of law. Changing laws is complex, and the political discussion could lead to undesirable outcomes, such as compromising the central bank's independence. Additionally, in countries where sustainability policies are not popular or the definition of fiduciary duty is too narrow, expanding reserve management objectives may not be easy.

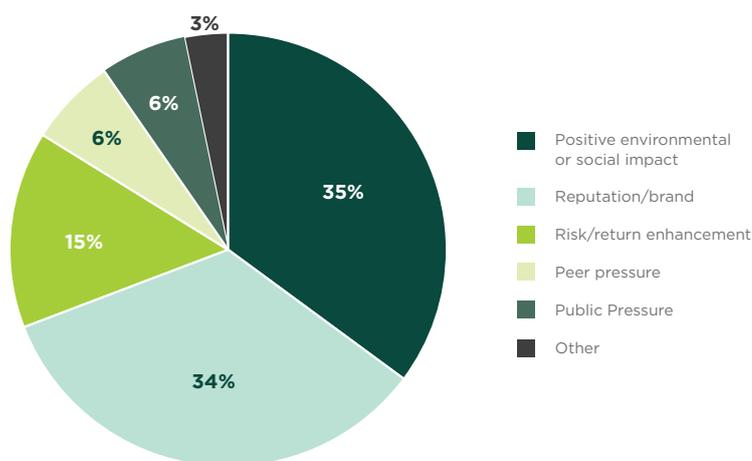
A more practical alternative is to include ESG in the investment policy to support the traditional objectives of safety, liquidity, and return. This approach, recommended by UNPRI for all types of institutional investors,⁵⁰ is likely to be less controversial than amending laws. UNPRI suggests that the investment policy explains why the organization is pursuing responsible investment and the links to its overall objectives. Therefore, ESG strategies that preserve safety and liquidity without sacrificing return should be consistent with the traditional policy objectives. Investing in highly rated green bonds with a reasonable yield is an example of these alternatives.

A compelling motive for including ESG in central banks' investment policy is to support the safety objective by improving risk management. Since climate change or new regulation to mitigate it may affect the value of specific securities (e.g., bonds issued by oil companies), the case for including ESG in the risk management framework is strong. Including financially material ESG considerations into risk management is consistent with a broad interpretation of central banks' fiduciary duty as managers of their countries' reserves. Nonetheless, as discussed earlier, empirical evidence on the importance of ESG to assess creditworthiness is still insufficient in the sovereign space for developed economies (see Section 2.4).

50 "Writing a Responsible Investment Policy," Principles for Responsible Investment (August 2012). <https://www.unpri.org/strategy-policy-and-strategic-asset-allocation/writing-a-responsible-investment-policy/3526.article>.

In practice, central banks' motivations to implement ESG investing go beyond supporting their traditional reserve management objectives. According to the forthcoming RAMP survey of central bank reserve management practices,⁵¹ 35 percent of central banks cite positive environmental or social impact as a motivation for ESG, followed by reputational considerations (34 percent). Only 15 percent of central banks do it to enhance the risk-return profile (Figure 8).

Figure 8 Motivations of Central Banks that Consider ESG



N=33.

Source: World Bank Treasury.

Regardless of the motivation to adopt ESG, board ownership is a critical requirement. Consequently, the investment policy statement should contain a clear direction for implementing sustainable investment, even if the board delegates operational details to the investment committee or senior management. Likewise, the board should decide to become a UNPRI signatory or NGFS member. Finally, the board needs to determine if the objective of sustainable investment is either to achieve a measurable impact or to mitigate risk through the inclusion of financially material risk in the investment operations. Board involvement will create a solid mandate to guide the reserve management team to make day-to-day investment decisions. Moreover, this approach is in line with reputational risk management.

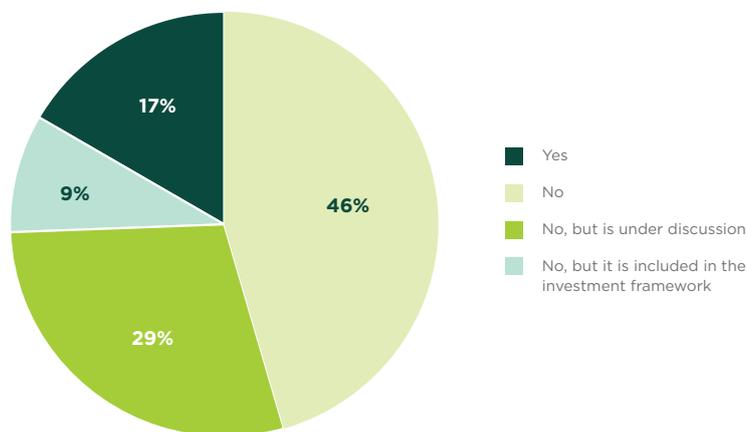
Another critical component of board ownership is accountability. Policy statements are the first step, but board oversight is more challenging. Reports to the board need to start incorporating ESG indicators, for example, the portfolio's carbon intensity; the participation of impact bonds; or the portfolio's overall ESG score (see Section 4.4). Simultaneously, the board must be aware that implementation is likely to be gradual because of the obstacles to implementing ESG approaches in fixed-income portfolios and the small size of the thematic bond market, as discussed in Section 2.

⁵¹ The third RAMP survey of central bank reserve management practices collected responses from 120 central banks in the first quarter of 2021. The results shown here are preliminary. The paper with the complete results is forthcoming in 2021.

3.2 Empirical evidence on central banks' ESG practices

ESG implementation in reserve management is gradually gaining ground. The RAMP survey on reserve management sheds light on how central banks have incorporated an ESG framework into their investment management operations. As Figure 9 indicates, only 17 percent of central banks included ESG in their investment policies. In addition, 9 percent considered ESG factors in their investment management framework. Nonetheless, the majority of institutions had not used ESG factors in the investment process. Twenty-nine percent of central banks reported having discussions but no implementation, while 46 percent had neither.

Figure 9 Central Banks that Incorporate ESG Factors in Their Investment Process

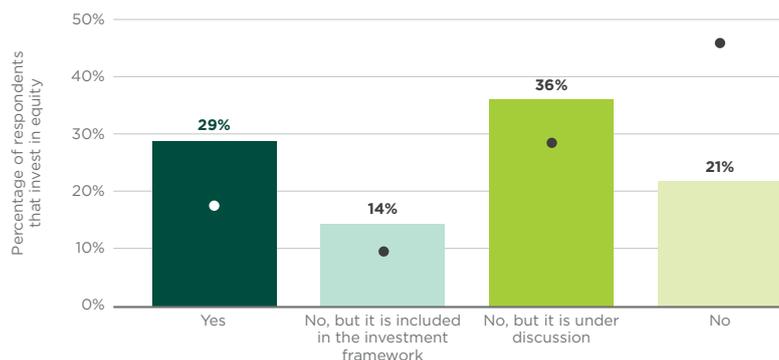


N=114.

Source: World Bank Treasury.

A closer look at the survey responses reveals that central banks with equity portfolios are more likely to have an explicit ESG framework. Forty-three percent of institutions that invest in equities do include ESG in the investment policy or have a detailed ESG framework, compared to 26 percent for the complete sample (Figure 10). This finding is consistent with the higher adoption of ESG considerations in the equity space.

Figure 10 ESG Adoption for Central Banks with Equities



Source: World Bank Treasury.

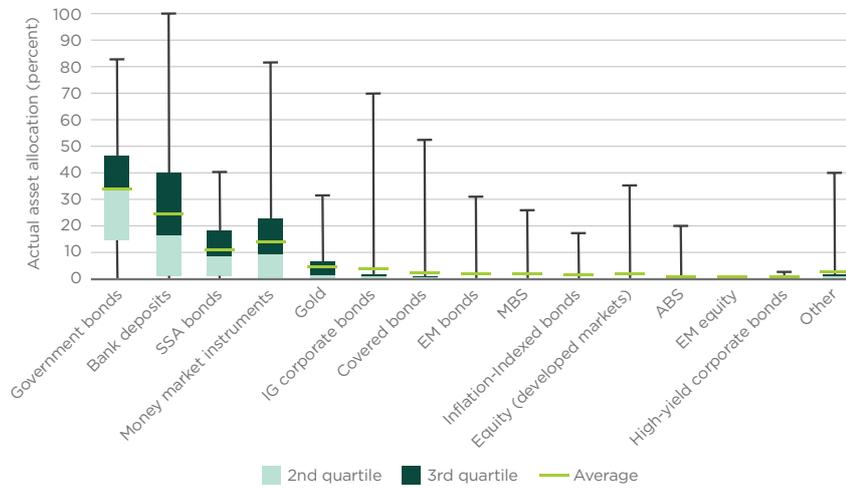
The 2021 RAMP survey also found that impact investing through impact bonds is the most popular ESG strategy within this investor group. Eighteen percent of respondents have bought thematic bonds, mostly governments and SSAs. However, the participation of those instruments is small: less than 3 percent of respondents have an allocation to these instruments larger than 5 percent of the portfolio. Central banks with corporate bond and equity portfolios are more likely to use negative screening, the second most popular strategy among the surveyed central banks. Fifty-two percent of central banks that include ESG in their investment policy or framework apply exclusions to corporate bonds, 36 percent to equities, and 32 percent to SSAs. Other ESG approaches are not as widespread. For example, only 4 percent of the respondents reported using ESG integration in SSA portfolios and 8 percent in corporate bond portfolios. The application to asset classes, other than corporate bonds or equity, is even lower.

A recent NGFS survey shows that measuring and reporting ESG metrics is still challenging (NGFS 2020). Only 33 percent of respondent central banks measure carbon footprint, while only 28 percent calculate ESG portfolio scores. Reporting on these measures is even less common. Only 15 percent of central banks provide public information on carbon footprint and 5 percent on the ESG score of their reserve portfolios. This outcome is consistent with the challenges faced by other fixed-income investors. According to UNPRI, “providers exist for measuring carbon footprints of fixed-income portfolios, though how best to do this is still under development and discussion” (UNPRI 2014).

3.3 Composition of central banks’ foreign exchange portfolios

The most crucial challenge for implementing ESG in reserve portfolios is their composition. Reserve portfolios invest primarily in sovereigns, supranationals, and agencies (SSA) bonds and short-term products (Figure 11). By contrast, the median allocation to equities and corporate bonds in reserve portfolios is less than 5 percent of reserves. The majority of institutions do not even classify equities and corporate bonds as eligible asset classes. As discussed earlier, applying ESG considerations to fixed income is more challenging, as detailed in Section 2.2.

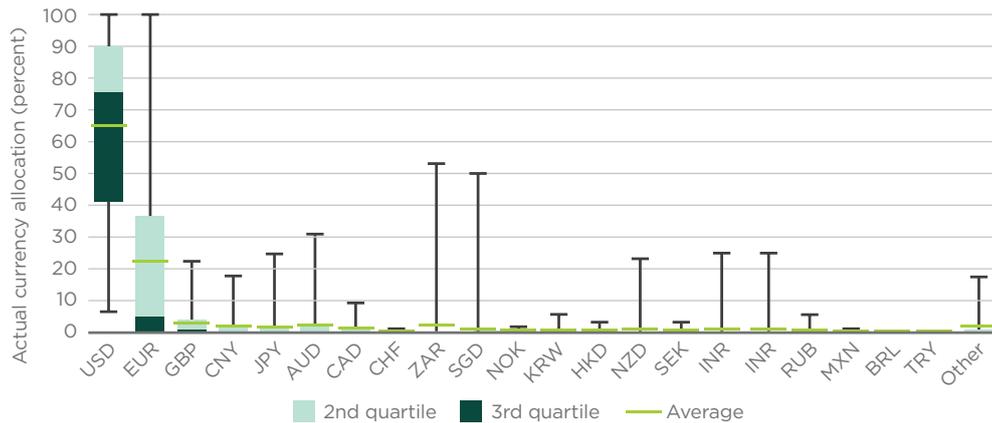
Figure 11 Asset Allocation of Foreign Reserve Portfolios



Source: Second RAMP Survey of Reserve Management (2020).

Another significant limitation is the currency composition of reserves. Central banks make this decision based on macroeconomic factors, such as the currency composition of imports or debt payments. For the median central bank, the reserve portfolio only has meaningful exposures to the U.S. dollar and the euro (Figure 12). As explained in Section 2.5, the euro dominates the green bond market, and the participation of the U.S. dollar is smaller. Additionally, central banks may refrain from investing in other currencies with attractive ESG ratings if they are ineligible or do not have deep and liquid markets.

Figure 12 Currency Composition of Reserve Portfolios



Source: Anasashvili et al. (2020).

DEFINING AND IMPLEMENTING AN ESG STRATEGY FOR CENTRAL BANK RESERVES

Once central banks have decided to include ESG investing in their reserve management framework, the next step is to formulate the implementation strategy. In this section, we will discuss the approaches central banks use to implement ESG.

4.1 Formulating an ESG policy for reserve management

Adoption of one of the ESG investment strategies should be consistent with the existing reserve management framework. UNPRI (2012) indicates that, before writing the responsible investment guidelines, an organization should consider the strategies that fit its philosophy and investment process and its jurisdictional and legal context.

The policy must include the ESG approach or approaches that the central bank will follow. In Section 2.2, we discussed the implementation scope for the various ESG approaches, depending on the asset class. These considerations apply to any investor. Table 11 extends the analysis to foreign reserve portfolios based on the central bank objectives and limitations explained in Section 3. We can see that more diversification across asset classes improves the opportunities to apply ESG approaches.

Table 11 ESG Approaches and Reserve Management

	TRADITIONAL ASSET CLASSES IN RESERVE PORTFOLIOS (GOVERNMENT AND SSAS)	CORPORATE BONDS	EQUITIES	EXAMPLES	SPECIFIC CONSIDERATIONS
Negative/exclusionary Screening	Limited scope	Significant scope	Significant scope	<ul style="list-style-type: none"> Avoiding issuers in specific sectors (e.g., oil and gas) and/or with low ESG scores 	<ul style="list-style-type: none"> Challenging for core reserve markets (e.g., US and Germany)
Best-in-class/positive screening	Limited scope	Significant scope	Significant scope	<ul style="list-style-type: none"> Build or increase exposure to issuers with high ESG scores Implementing ESG-tilted indices 	<ul style="list-style-type: none"> Due to the large size of reserves, difficult to increase allocation to countries or issuers with low market capitalization ESG-tilted indices are more common for highly-rated sovereigns are rare
Integration of financially material ESG factors in investment process	Some scope	Significant scope	Significant scope	<ul style="list-style-type: none"> Including ESG scores in risk analysis 	<ul style="list-style-type: none"> ESG scores for traditional asset classes are already high and not that different from credit ratings
Impact investing	Some scope	Some scope	Limited scope	<ul style="list-style-type: none"> Building thematic bond portfolios 	<ul style="list-style-type: none"> Labeled bonds have small market capitalization and strong demand from investors, limiting potential portfolio size This approach is problematic for public equities
Active ownership/engagement	Limited scope	Limited scope	Significant scope	<ul style="list-style-type: none"> Raise concerns during meetings with issuers Demand more ESG data from issuers Develop proxy voting policy for equities 	<ul style="list-style-type: none"> This approach is much easier for equity than for fixed-income investors, although some bondholders are becoming more engaged

Source: Authors.

As highlighted above, given the composition of reserve assets, there is limited scope for implementing all ESG approaches in foreign reserve portfolios. German Bunds, Japanese government bonds, and U.S. Treasuries have a traditional benchmarking role and represent sizable components of reserve portfolios (see also UNPRI 2019). Depending on their liquidity needs and risk tolerance, central banks may need to concentrate their portfolios in those markets, regardless of ESG considerations. In this regard, the only feasible alternative is that more governments follow Germany's footsteps and eventually create liquid green bond markets. Moreover, increasing exposure to governments with higher average ESG scores (e.g., Scandinavian countries) appears not feasible. The market capitalization of outstanding government bonds for these countries is insufficiently large to accommodate many central banks. Therefore, impact investing through sustainable SSA bond portfolios seems the most feasible strategy. However, the potential size of these portfolios is likely to be small because of low market capitalization and sizable investor demand (see Section 2.6). Finally, active ownership is only applicable to the few central banks with equity exposure.

Despite the importance of diversification, the list of eligible asset classes and the consideration of ESG are two separate decisions that should be executed sequentially. The choice of asset classes must be considered in the context of the central bank's risk tolerance and operational capabilities. Therefore, it is inappropriate to include corporate bonds, equities, or alternative investments (e.g., private equity and infrastructure) as eligible asset classes only to facilitate ESG investing. For central banks for which corporate bonds or equity are not an eligible asset class, including an ESG-tilted corporate bond index portfolio would increase their risk, as corporate bond portfolios have higher credit risk than sovereign bond indices.

Some factors that may hinder or delay formulation of an ESG policy at the central bank level include:

- 1.** Regulatory obstacles: As previously discussed, a narrow interpretation of fiduciary duty may be an obstacle for ESG implementation. Additionally, individual central bank charters limit the asset class universe, reducing the scope for particular strategies (see Section 2.6).
- 2.** Low buy-in from critical stakeholders: We covered the importance of board ownership in Section 3. But other vital stakeholders must also have a favorable view of sustainable investment policies. In this group are auditors, government officials, and even the public at large.
- 3.** Lack of portfolio diversification: Portfolios without diversification have little room to consider ESG strategies. For example, central banks that only invest in U.S. Treasuries have limited scope to incorporate any ESG approach. Central banks with low reserve levels or extremely short portfolio durations may be in a similar position.
- 4.** Weak institutional capacity: ESG, like any other investment strategy, requires proper governance and well-trained staff. Central banks unable to manage portfolio strategies like benchmark replication or active management may not be ready to take on more sophisticated investment methods like ESG.

4.2 ESG scores and ratings

ESG scores and ratings are among the most valuable tools for ESG investing, as they allow investors to compare issuers systematically across a set of ESG indicators. As seen in Table 11, at least three ESG approaches (negative screening, best in class, and integrating financial material ESG factors into the investment process) actively use these scores. For instance, ESG-tilted indices use these numbers to increase the participation of the best companies or issuers. Furthermore, reports frequently include average ESG scores at the portfolio and benchmark level.

ESG ratings and scores measure the resilience to long-term and material ESG risks (Briand 2021a). Several providers produce ESG scores for various types of companies and issuers, including governments, supranationals, and agencies. Some of these providers convert scores to ratings (AAA to CCC), following a predetermined scale. While ESG ratings are familiar because credit ratings have a similar scale, ESG scores provide and measure more granular information and are, therefore, better for quantitative analysis.

Institutional investors can obtain ESG scores in two ways. First, they can rely on external providers. Most providers initially focused on equity and have moved more recently into lower-risk assets, including fixed-income instruments issued by SSA and corporates. Second, investors can develop an internal ESG rating model using publicly available datasets. Regardless of the approach chosen, obtaining relevant, consistent data and producing ESG scores for all issuers and instruments in a portfolio is still challenging (see Section 4.2).

The number of ESG rating providers has been increasing over the last decade. Some actors seem to have taken the lead, newcomers have increased in popularity, and some acquisitions have also impacted the trend. Following Bouyé and Menville (2020), providers are in one of the following three groups:

- **The big players:** All major rating agencies have either acquired or launched an ESG data activity. Many major financial players have positioned themselves on ESG (e.g., S&P's, Moody's, Bloomberg, FTSE Russell, MSCI, Thomson Reuters, Morningstar).
- **The ESG specialists:** Data providers focusing solely on ESG research, ratings, and analysis (e.g., RepRisk, Arabesque, Covalence, CSRHub, Ethos, Inrate, RobecoSAM, Oekom Research, Vigeo Eiris, Sustainalytics).
- **The ESG specialists with focus:** Data providers focused on one or more aspects of ESG, but not all three. For instance, the Carbon Disclosure Project (CDP) focuses on climate change and water, whereas Trucost focuses on environmental risks, and ISS on governance.

Despite the usefulness of ESG ratings, ratings across providers of an issuer, including sovereigns, can vary significantly. As an illustration, Table 12 shows the UNPRI taxonomy for sovereigns (UNPRI 2019). As the table indicates, producing a sovereign rating requires a lot of data. In addition, mapping factors and assigning weights to the individual ESG components can be a subjective exercise. Providers do not always offer a full description of their methodology, leaving it unclear why individual issuers' ratings vary across providers.

Table 12 UNPRI Taxonomy for Sovereigns

PILLAR	SUBFACTOR	DESCRIPTION
ENVIRON- MENT	Natural resources	The availability and quality of biodiversity, water, air, and soil; land use (urban, agricultural and forests).
	Physical risks	The physical effects of climate change (such as weather volatility, sea-level rise); natural disaster risks (volcanic eruptions and earthquakes).
	Energy transition risk	Regulatory factors and technological developments associated with the global energy transition to a less carbon-intensive global economy.
	Energy security	The availability and management of (non)-renewable energy resources; resource depletion.
SOCIAL	Demographic change	Population trends; age distribution; rates of immigration.
	Education and human capital	Availability of and access to education; quality of educational attainment; employment rights.
	Living standards and income inequality	Respect for human rights (including the right to life, the right to freedom of association, and the right to health); measures of poverty and income inequality; gender inequality; unemployment rates; public sector wages; availability of and access to healthcare, personal safety, and housing; food security and obesity
	Social cohesion	Political freedom and representation; levels of trust in institutions and politicians; social inclusion and mobility; prevalence of civic organisations; degree of social order; capacity of political institutions to respond to societal priorities.
GOVER- NANCE	Institutional Strength	Strength of institutional and regulatory frameworks; independence of institutions; quality and availability of public data; prevalence of corruption; rule of law; ease of doing business; business climate.
	Political stability	Political rights and civil liberties; political upheaval and violence in society; freedom of expression; press freedom; freedom of information and speech.
	Government effectiveness	Quality of bureaucracy and administration; policy planning and implementation capabilities; and independence of the civil service from political interference
	Regulatory effectiveness	Efficiency of regulatory systems and policy implementation; predictability of policy making; ease of doing business; and business climate.
	Rule of law	Property rights; institutional and regulatory framework; independence of the judiciary
	Corruption	Accountability and transparency of institutions; money laundering/illicit financial flows.

Source: UNPRI (2019).

Discrepancies in ratings across providers may occur for three reasons. First, providers may use different taxonomies. Second, they may use different data as input for their assessments or assign different weights to each ESG subfactor and across ESG factors, reflecting a set of values that can vary across providers. Third, differences in scores across providers may also occur due to inaccuracies in the public sources used to generate the rating. Figure 13 shows normalized ESG ratings for sovereigns from four providers as of 2017 (Beyond Ratings, MSCI, RepRisk, and Sustainalytics).

Figure 13 Normalized 2017 ESG Ratings for Sovereigns from Four Providers: Beyond Ratings, MSCI, RepRisk, and Sustainalytics



Source: Bouyé and Menville (2020): Beyond Ratings, MSCI, RepRisk, and Sustainalytics.

In-house rating models may alleviate lack of convergence between providers. Using a set of independent and open-source data, investors can build their own ratings. ESG scores at the issuer level are the weighted sum of subscores for each component in the environmental, social, and governance pillars (Appendix 1 outlines the methodology to produce ESG ratings). For sovereign ratings, the World Bank Sovereign ESG Data Portal constitutes a valuable source that provides information on 17 key sustainability themes, spanning environmental, social, and governance components:⁵²

- **Environment:** Emissions and pollution; natural capital endowment and management; energy use and security; environment/climate risk and resilience; food security
- **Social:** Education and skills; employment; demography; poverty and inequality; health and nutrition; access to services
- **Governance:** Human rights; government effectiveness; stability and the rule of law; economic environment; gender; innovation

The choice between third-party providers and internal rating models depends on the preferences of and resources within each institution. Some central banks may prefer to have their own independent assessments or may hesitate to pay for additional subscriptions. Others may not have enough resources to create and update ESG ratings over time or may prefer to get the information from a well-known source. In either case, investors must be aware that ESG scoring methodologies are relatively new and will continue to evolve.

Besides ESG scores, some investors have decided to focus on Sustainable Development Goals or SDGs (see Box 4.1). This approach could be useful for sovereign bond portfolios.

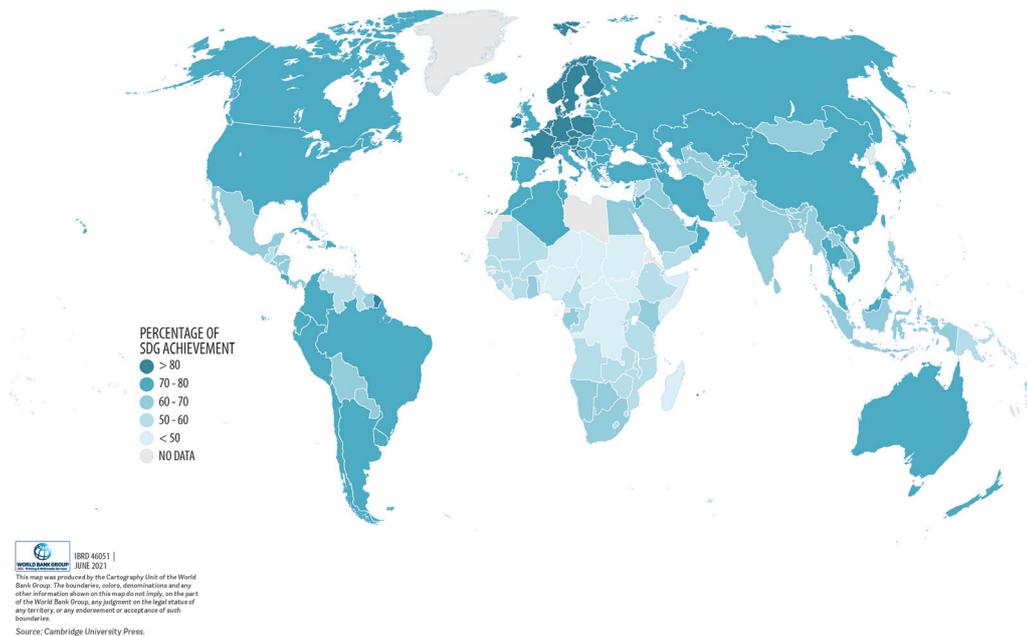
⁵² World Bank, Sovereign Environmental, Social and Governance Data, <https://datatopics.worldbank.org/esg/>.

BOX 4.1 SUSTAINABLE DEVELOPMENT GOALS AND INVESTING

In the spirit of the “Sustainable Development Goal imperative,” some institutional investors have been using the Sustainable Development Goals⁵³ as a metric for their sovereign portfolios. As indicated by the United Nations, “the SDGs are a call for action by all countries—poor, rich and middle-income—to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities while tackling climate change and environmental protection.”

Two initiatives are worth mentioning: the SDG index that proposes a ranking of all 193 UN Member States’ overall performance, and the Sustainable Development Investments (SDIs).

Figure 14 SDG Index



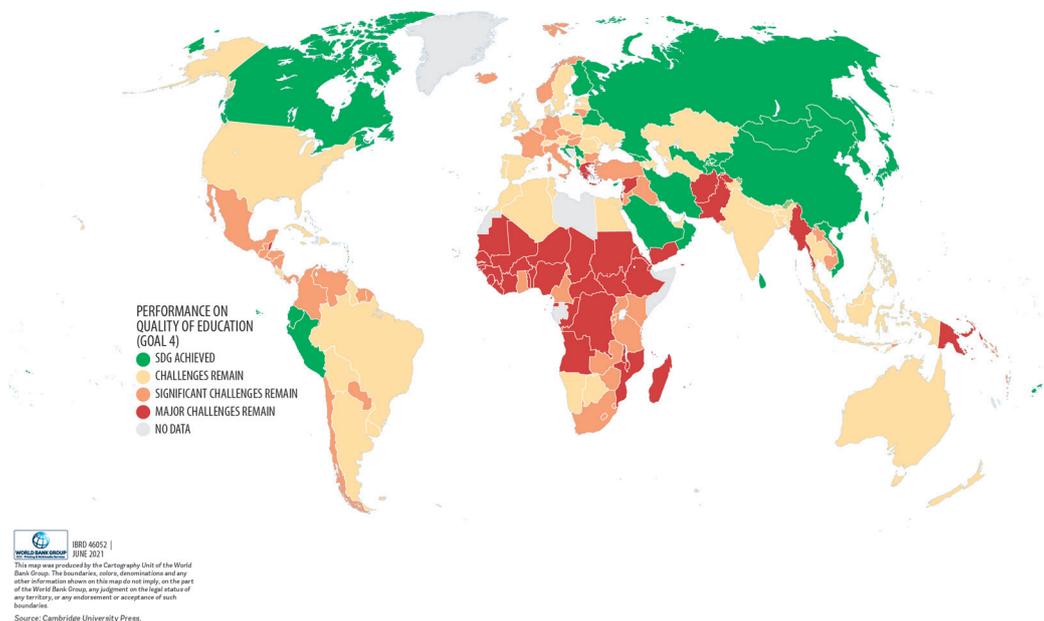
Source: <https://dashboards.sdginde.org/map>.

Note: The overall score measures a country’s total progress towards achieving all 17 SDGs. The score can be interpreted as the percentage of SDG achievement. A score of 100 indicates that all SDGs have been achieved.

53 The 17 SDGs are (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4) Quality Education (5) Gender Equality and Women’s Empowerment, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure (10) Reduced Inequalities, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Change, (14) Life Below Water, (15) Life on Land (16) Peace, Justice and Strong Institutions, (17) Partnerships for the Goals. <https://sdgs.un.org/goals>.

The SDG Index measures the performance of the 17 SDGs for each country, with the goals being equally weighted. The score measures a country's position from 0 (the lowest) to 100 (the highest). For example, Sweden's overall index score is 84.7 across all 17 SDGs. The SDG index data are publicly available on <https://www.sdginde.org/>. One way to arrive at an SDG index score for a portfolio is to compute the overall score for a sovereign portfolio by calculating the simple-weighted average with the weights equal to the amount invested for each country divided by the total size of the portfolio. Investors could also compute an SDG score for a specific SDG goal at the portfolio level. For example, Figure 15 presents the ratings for the quality of education (Goal 4 of the SDGs).

Figure 15 SDG Index Education Component



Source: <https://dashboards.sdginde.org/map>.

Note: Ratings provide a visual representation of a country's performance on the quality of education (Goal 4).

In 2020, APG, AustralianSuper, British Columbia Investment Management Corporation (BCI), and PGGM launched the Sustainable Development Investments Asset Owner Platform (SDI AOP). Their initiative focuses on using standard and artificial-intelligence-driven data to measure the contribution of corporate issuers to the SDGs. They have not extended their methodology to cover sovereign or supranational issuers, however.

4.3 ESG and strategic asset allocation

Including ESG in strategic asset allocation methodologies is still in its early stages. Some authors have extended modern portfolio theory to build "ESG optimal portfolios." These optimization exercises show tradeoffs between risk, return, and ESG scores. However, these methodologies face the same issues as standard models, mostly related to the model's calibration and robustness.

The academic literature takes two main approaches to including ESG considerations in the asset allocation process. The first is risk-based and aims to assess how the ESG environment can impact asset allocation. The second is impact-based and attempts to gauge the impact of asset allocation on the ESG environment.

Risk-based approach

In the risk-based approach, ESG factors are introduced in the underlying asset pricing model, leading to different risk-return combinations for asset classes. For example, environmental policy can affect the funding rates of a given government.

To build capital market assumptions under a risk-based approach, investors can incorporate an underlying macroeconomic model with ESG factors (Figure 16).

Figure 16 Integrating ESG Factors in the Strategic Asset Allocation

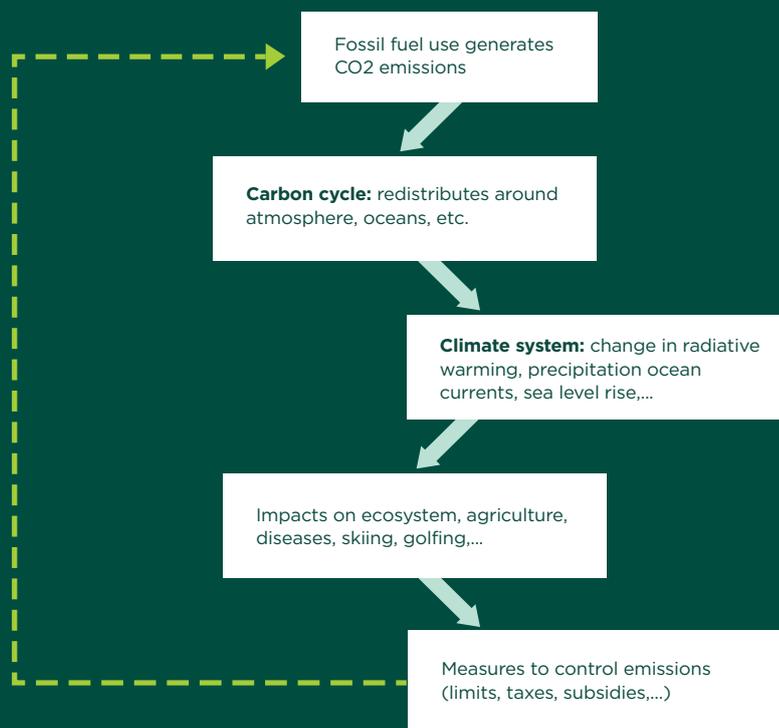


Box 4.2 presents an overview of a risk-based approach to including ESG factors in the asset allocation process.

BOX 4.2 RISK-BASED APPROACH TO INCLUDING ESG FACTORS IN ASSET ALLOCATION

A class of macroeconomic models, including climate considerations, has been developed over the last decades: The Integrated Assessment Models (IAMs). Many examples have been developed over the last decades, but here we discuss one example: the seminal DICE/RICE model. The Dynamic Integrated Model of Climate and the Economy (DICE) was introduced by Nordhaus in 1993 and is a simplified analytical and empirical model of the economics, policy, and scientific components of climate change.

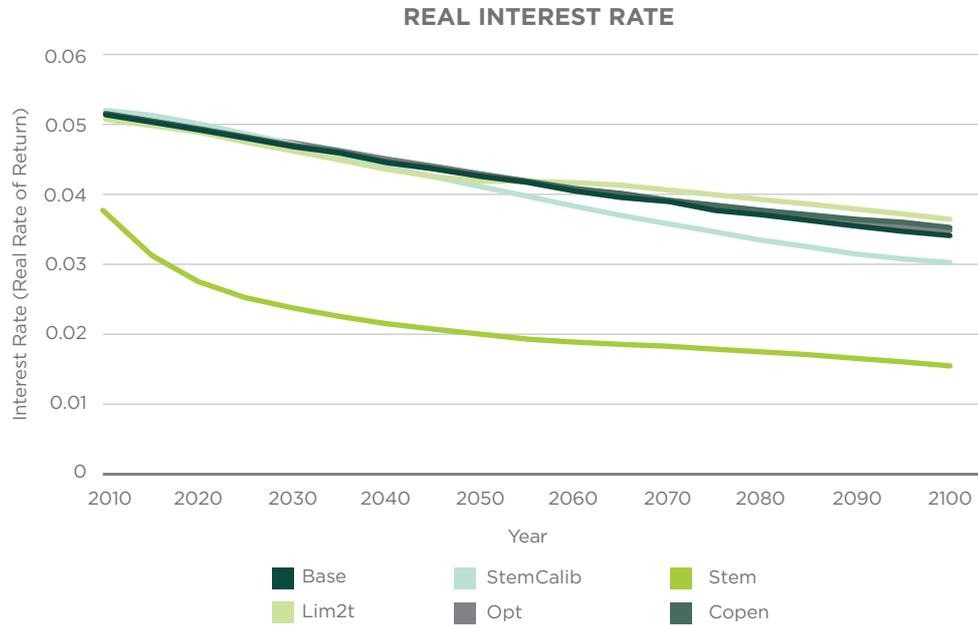
Figure 17 Flow Chart of a Fully Integrated Assessment Model (IAM) for Climate Change Economics, Policy, and Science



Source: Nordhaus and Sztorc (2013).

However, the DICE model (and its regional version, the RICE, or Regional Integrated Model of Climate and the Economy) is rooted in neoclassical growth theory and offers a very limited framework to model monetary and financial variables. Moreover, the horizon of the projections of such models is much longer than the investment horizon of central banks' reserve managers, as shown by the real interest rate projections in Figure 18. Last but not least, there are limited developments of the connection between macroeconomic models and asset pricing models. Some examples are presented below.

Six scenarios addressed include baseline, optimal, temperature-limited, low discounting according to stern review, low time preference with calibrated interest rates, and Copenhagen Accord.

Figure 18 Real Interest Rate in Alternative Scenarios

Source: Nordhaus and Sztorc (2013).

Impact-based approach

The impact-based approach attempts to gauge the impact of asset allocation on the ESG environment. Responsible investment is encompassed in the objectives of the investment policy. In this case, the investor's utility function includes an ESG reward in the inputs of the portfolio construction process to build an ESG-Efficient frontier. To address this methodological challenge, Pedersen et al. (2020) propose a model where the utility function is modified as follows:

$$U = E(P|s) - \frac{\gamma}{2} \text{Var}(P|s) + Pf(\bar{s}),$$

with the portfolio value with a vector of holdings $w = (w_1, \dots, w_N)$, the number of assets, $s = (s_1, \dots, s_N)$ the respective ESG scores, \bar{s} the weighted score, and γ the risk aversion parameter. The utility maximization becomes

$$\max_w \left(w' \mu - \frac{\gamma}{2} w' \Sigma w + f \left(\frac{w' s}{w' \mathbf{1}} \right) \right),$$

with μ and Σ the expected returns and covariance matrix. For an average score \bar{s} , the optimal portfolio is

$$w^* = \frac{1}{\gamma} \Sigma^{-1} (\mu + \phi (s - 1\bar{s})),$$

with ϕ the level of ESG preference. The optimal portfolio is a combination of the risk-free asset and three portfolios:

$$w^* = \frac{1}{\gamma} (\Sigma^{-1} \mu + \phi \bar{s} \Sigma^{-1} \mathbf{1} + \phi \Sigma^{-1} s),$$

with

$\Sigma^{-1} \mathbf{1}$ the minimum-variance portfolio,

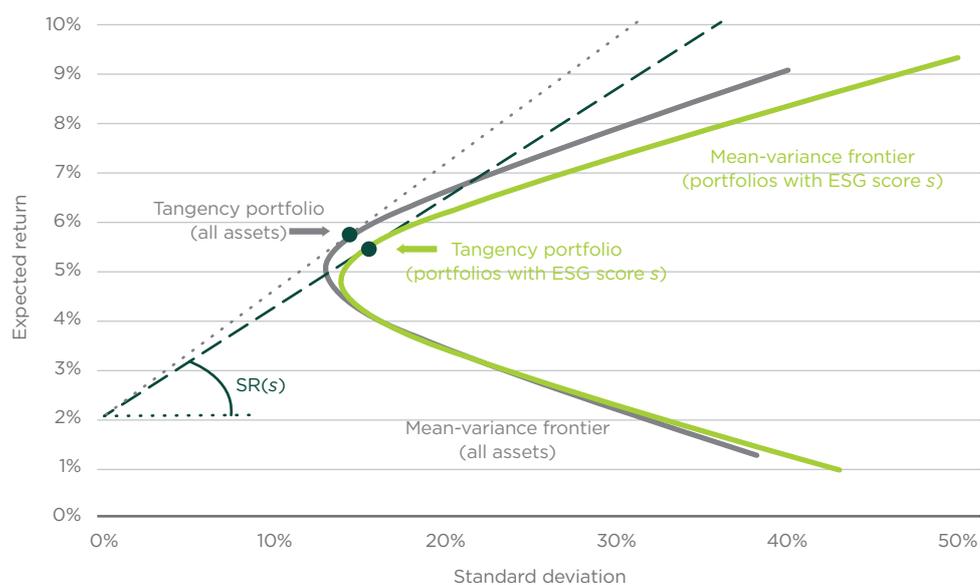
$\Sigma^{-1} \mu$ the market portfolio, and

$\Sigma^{-1} s$ the “ESG-tangency portfolio”.

Compared to the standard optimal portfolio, two additional components are added: the weight of the minimum-variance portfolio is a function of the average score and the level of ESG preference, and the ESG-tangency portfolio appears as a new building block of the allocation. It is similar in nature to the market portfolio but in the ESG dimension (see Figure 19). Box 4.3 provides a numerical example for the model.

62

Figure 19 Efficient Frontiers for Different ESG Scores



Source: Pedersen et al. (2020).

BOX 4.3 A NUMERICAL EXAMPLE OF ESG-EFFICIENT FRONTIER FOR A LOW-RISK FIXED-INCOME PORTFOLIO

As an illustration of Pedersen et al. (2020), let us assume three assets with similar expected returns and risks but different diversification and ESG scores:

Table 13 Assumptions for an Example of ESG-Sharpe Ratio Efficient Frontier

	EXPECTED RETURN	EXPECTED VOLATILITY	ESG SCORE
Asset 1	0.1%	0.3%	3.00
Asset 2	0.1%	0.3%	4.00
Asset 3	0.1%	0.3%	4.00

CORRELATION	ASSET 1	ASSET 2	ASSET 3
Asset 1	1	0.5	0.2
Asset 2	0.5	1	0.1
Asset 3	0.2	0.1	1

Source: Authors' assumptions.

Table 14 provides the decomposition of the ESG-Sharpe Ratio optimal portfolio in the three components. The minimum variance and market portfolios favor asset 3 as it brings the highest level of diversification in absolute terms to the overall portfolio. In our example, the contribution of the ESG-tangent portfolio is low but significant: it corresponds to 8 to 9 percent of the total allocation. Finally, we assess the impact of a change in the score of asset 1 from 3.0 and 3.5. Not surprisingly, it leads to an increase in the weight of asset 1 relative to other assets in the ESG-tangent portfolio.

Table 14 Examples of ESG-Sharpe Ratio Optimal Portfolio with a Different Value for the ESG Score of the Asset 1

	MIN. VAR.	MARKET	ESG-TANG	TOTAL
Asset 1	5.3%	17.6%	0.7%	23.6%
Asset 2	7.1%	23.5%	3.7%	34.3%
Asset 3	8.9%	29.3%	3.9%	42.1%
Total				100%

	MIN. VAR.	MARKET	ESG-TANG	TOTAL
Asset 1	8.8%	14.1%	1.5%	24.3%
Asset 2	11.7%	18.8%	3.3%	33.8%
Asset 3	14.6%	23.5%	3.8%	41.9%
Total				100%

Source: Authors' calculations.

Note: The top table assumes and ESG score of 3.0 for asset 1, the bottom one 3.5.

Another family of models based on vector autoregressive (VAR) models has been proposed to include ESG factors into the asset allocation decision. LaPlante, Rubstov, and Shen (2019) explore the impact of climate change for different asset classes, including stocks, bonds, alternatives, and a list of green assets with low-carbon emissions. They study the time-varying risk-return trade-offs using a factor-based VAR model with climate risk as an additional state variable. They show that “pessimistic” investors will include green assets in their strategic asset allocation.

Fender and McMorrow (2019) investigates the diversification from an allocation in green bonds for a reserve manager. They use a dynamic Nelson-Siegel term structure model with the assumption that green and conventional bond returns are the same. They find a demand for green bonds along the efficient frontier. However, given the statistical similarities of green and conventional bonds, the results are likely sensitive to a small change in the historical dataset used for the VAR estimation and the underlying assumptions.

4.4. Transparency and reporting

Transparency and reporting are fundamental elements of a sustainable investment strategy. They are part of the Principles of Responsible Investment and NGFS members’ commitments (see Section 2.3).

Reporting has two objectives. First, it allows decision makers to monitor progress and measure the impact of the policies. Second, it informs external stakeholders about the efforts that the organization is making on sustainable investment.

Regarding metrics that reserve managers could use for transparency, reports from fixed-income ESG funds are helpful. These reports typically include ESG metrics for both the portfolio and its benchmark. Some commonly used metrics are:

- ESG score
- Average ESG rating or rating breakdown
- Carbon intensity
- Allocation to green, social, and sustainability bonds
- Exposure to controversial sectors (e.g., nuclear weapons, tobacco, and coal)
- Percentage of the portfolio aligned with the Paris Agreement

Furthermore, some investors require information on more specific indicators from companies, for example, water consumption (environmental), the number of jobs created (social), or board diversity (governance). These investors usually have more ambitious ESG goals in their investment policies and have a more diversified investment portfolio.

Providing information for both the portfolio and the benchmark is critical. Besides the election of asset classes, investment guidelines limit the scope for ESG implementation. For example, as shown in Section 2.5, the minimum credit ratings

can be an obstacle to expanding the list of eligible issuers. Consequently, reporting ESG metrics relative to the benchmark shows how portfolio managers implement these strategies while complying with their investment guidelines. Moreover, these metrics show trends over time, which is particularly important for investors like central banks that are more likely to implement ESG investing gradually.

Producing any of these metrics is difficult because of data limitations. The starting point for impact reporting is the information provided by issuers. Some issuers offer qualitative and quantitative data in their impact reports. However, certain issuers do not publish impact reports or do not include all necessary data for the analysis. On the qualitative side, issuers' impact reports often contain a list of projects, descriptions of their characteristics, and details on how they contribute to ESG objectives (see Figure 20).

Figure 20 Example of Impact Reporting on a Specific Project (KfW)

WIND FARM BENDORF OERSDORF PROJECT EXAMPLE FINANCED UNDER THE “RENEWABLE ENERGIES – STANDARD” PROGRAMME



LOCATION	GERMANY, SCHLESWIG-HOLSTEIN DISTRICT RENDSBURG-ECKERNFÖRDE
Completion	2014
Calculated annual production capacity	approx. 39mn KW/h electricity
Supply area	11,000 households
Estimated GHG reductions	32,379 tons GHG p. a. (CO ₂ -equivalents)
Total project costs	EUR 27.9mn (thereof KfW funds: EUR 21.0mn)

Source: KfW.

On the quantitative side, issuers may provide CO₂ tons of GHG emission reduction per annum, annual water savings, EUR or GWh savings in energy (e.g., fossil fuel costs), or the number of jobs created. Table 15 provides an example for five issuers. An important consideration is that issuers may use different methodologies to produce a particular metric and so may not be equivalent.

Table 15 Summary of Information Provided by Issuers Through Their Impact Reporting

ISSUER	ISSUER INDUSTRY	CO2	WATER	ENERGY	BENEFIT ON PEOPLE	OTHER	NOTES	
KFW	BANK	1,894,484 tons of GHG emissions reduction		100, 075,824 EUR of savings on energy imports to Germany and fossil fuel costs per annum	37, 585 jobs created and/or secured per year	193,140,989 EUR of savings in external costs per annum	Impact of Green Bonds issuances 2014	
		1,271 tons of GHG emission reduction per annum		67, 155 EUR of savings on energy imports to Germany and fossil fuel costs per annum	25 jobs created and/or secured	129, 606 of savings in external costs per annum	Impact of EUR 1 million investment	
European Investment Bank	SUPRA-NATIONAL	770 tons CO2 equivalent GHG emissions saved/ avoided per annum		0.87 GWh average energy (heat and electricity) saved er year		0.48 MW additional electrical capacity installed; 0.04 MW additional head capacity installed	per EUR 1m of the recipient loan disbursement	
IBRD	SUPRA-NATIONAL	Green Bond and Sustainable Development Bond impact reporting segmented project-by-project						
		Net GHG emissions reduced by 12.5 million tCO ₂ eq. annually	3.8 million people provided with access to improved water sources	Projected energy or fuel savings of 2.09*10 ⁷ MWh / 7.53*10 ¹⁰ MJ	3.1 million people benefitted from job-focused interventions	2,514 MW of energy generation capacity constructed or rehabilitated	Sustainable Development Bonds & Green Bonds Impact Report 2020	
IDA	SUPRA-NATIONAL	Sustainable Development Bond impact reporting provided in the Results Measurement System (RMS) Report ⁵⁴						
		Net GHG emissions reduced by 28.4 million tCO ₂ eq. annually	31.6 million people provided with access to improved water sources	Projected energy or fuel savings of 5.79*10 ⁹ MJ	58.8 million people benefitted from social safety net programs	26.2 million people provided with new or improved electricity service	IDA18 Results Measurement System Report October 2020	

⁵⁴ Results reported below are “Tier 2” results from the IDA18 RMS and correspond to cumulative results achieved by IDA-supported projects during FY18, FY19, and FY20

ISSUER	ISSUER INDUSTRY	CO2	WATER	ENERGY	BENEFIT ON PEOPLE	OTHER	NOTES
Asian Development Bank	SUPRA-NATIONAL	Green bond impact reporting segmented project-by-project and/or country level					
NRW.Bank	BANK	Avoid GHG emissions of 3.4 million tons over 10-year term of Green Bond		8.4% mitigation (renewable energy, energy efficiency, green buildings and clean transport)			Report dated in 2016
		260 t of CO2 annually saved	16% adaptation: River Restoration				Green Bond 2019-2-per EUR 1 million
Kommuninvest I Sverige	GOVT REGIONAL	610, 596 tCO2 Annual GHG emissions savings	173.0 tones per year reduced nitrogen emissions from water and waste water facilities	2.9 TWh annual renewable energy generation		40.5 GWh energy savings in green buildings	Green Bonds Impact Report 2019
		Of the above 572, 901 tCO2 avoided emissions	349, 727 increase in person equivalents (p.e.) supplied by water and wastewater facilities			Of the above, 33.6 GWh avoided energy use	
		and 37,695 tCO2 reduced emissions		110.8 GWh energy savings from energy efficiency projects		and 6.9 GWh reduced energy use	

Source: KfW, EIB, ADB, NRW Bank, Kommuninvest.

Due to the lack of standardization of impact reporting, the aggregation of impact measures at the portfolio level must rely on a set of additional assumptions.⁵⁵ Appendix 5 provides the detailed numbers at the issuer level. Interestingly, and in the same spirit as the SDG index, some institutional investors have also chosen to report their portfolios' impact on SDGs.

Examples of public sustainability reporting at central banks

The Central Bank of the Netherlands, the Hong Kong Monetary Authority, and the Bank of Finland, the three central banks signatory to the UNPRI, provide publicly available information on responsible investment. In such publications, central banks include their beliefs, principles, and critical points in their implementation process. Currently, UNPRI signatories do not have an obligation to disclose their policy publicly.⁵⁶ Consequently, the respective central banks incorporate different information in the Annual Reports (see Appendix 2 and 3).

While reporting is a specific requirement for UNPRI signatories, non-signatories have now also started to provide transparency on some of their portfolios' ESG metrics. One example is the Banque de France. In March 2018, the French Central Bank implemented a responsible investment charter, which fell within its corporate social responsibility (CSR) Charter (see Responsible Investment Charter of the Banque de France in Appendix 4). In addition to presenting the Principles, the charter reinforces the Banque de France's decision to deepen analysis and formalize the inclusion of ESG factors in its investment decisions as part of its fiduciary responsibility as an investor. Moreover, the Banque de France stresses its commitment to publishing appropriate nonfinancial information, including environmental matrices. The Charter comprises three commitments for its assets,⁵⁷ including the pension portfolio and excluding assets held for the monetary functions for the Eurosystem:

55 To solve this problem, the World Bank published the guide "Green Bond Proceeds Management & Reporting." <https://pubdocs.worldbank.org/en/768111536944473808/WBGreen-Bond-Proceeds-Management-and-Reporting-Guide.pdf>.

56 The importance of reporting is reflected in the UNPRI's potential new minimum requirements, which will be announced in July 2021. Some of the potential new requirements include making policy publicly available, requiring engagement and voting in listed equities, and internal verification or audit of data (UNPRI 2021).

57 As of December 2019, the own fund portfolios represented EUR 22 billion.

1. Enhance the inclusion of Environmental, Social, and Governance (ESG) factors in investment decisions.
2. Improve the measures and the development of the contribution of asset portfolios to the environmental transition.
3. Report on the progress made in reaching objectives and replicate the best practices of other institutional investors. This commitment includes two items: First, implement and steadily improve an annual report that incorporates best practices, and second, keep abreast of developments in responsible investment.

In 2020, the Banque de France issued its 2019 Responsible Investment Report built on three pillars:

Pillar 1: Align investment strategy with France's climate commitments to achieve carbon neutrality by 2050.

Pillar 2: Include extra-financial criteria in its asset management.

Pillar 3: Exercise its voting rights to promote better recognition of ESG issues by the companies in which it invests.

The Banque de France publishes its annual Responsible Investment Report, separate from and in addition to its annual report, which provides a comprehensive account of its responsible investment strategy. The Banque de France monitors indicators for the three pillars for both equities and bonds. As displayed in Table 16, many indicators are reported for equities, while very few are available for bonds.

Table 16 Indicators Monitored by the Banque de France

CHANGES IN THE INDICATORS MONI- TORED AS PART OF THE RESPONSIBLE INVESTMENT STRATEGY BETWEEN 2018 AND 2019		PENSION FUNDS		OWN FUNDS	
		EQUITIES	BONDS ^a	EQUITIES	BONDS ^a
Pillar 1	2°C alignment	=	na	++	na
	Carbon footprint per EUR million invested	++	=	++	-
	Carbon footprint per unit of revenue	+	=	++	=
	Weighted average carbon intensity	=	=	++	=
	Investment in green bonds	=		++	
	Investment in EET-dedicated funds ^b	=		++	
	Green share	-	na	++	na
	Exposure to physical risks	=	=	=	=
	Exposure to transition risk: brown share	+	na	++	na
Pillar 2	Average ESG ^c score	+	=	=	+
	Health and safety indicator	=	na	=	na
	Nondiscrimination indicator	+	na	=	na
Pillar 3	General meeting attendance rate	++			

Source: Banque de France

Notes:

na = not available.

a. This covers sovereign bonds issued or explicitly warranted by states, representing 94.1% of the bond component. The metrics above are not calculated for certain assets of the bond components: supranational bonds and some public companies' bonds (which represent 5.4% of the bond components and 2.6% of the Portfolios) because of a lack of data, and more marginally, corporate bonds (which represent 0.6% of the bond components and 0.3% of the Portfolios).

b. EET = energy and ecological transition.

c. ESG = environmental, social, and governance criteria.

+/- corresponds to an improvement/deterioration between +5%/-5% and +20%/-20%.

++/-- corresponds to an improvement deterioration of more than +20%/-20%.

4.5 Engaging external managers for ESG strategies

One additional question for reserve managers to consider in implementing ESG investment approaches is whether to use external managers. This section discusses the implications of managing ESG investing internally and then explains the advantages and disadvantages of using external managers.

Although the internal reserve management staff is less likely to have experience with ESG, implementing the strategy in-house will help staff develop and build the necessary know-how.

Concerning investing in impact bonds, portfolio management teams with several years of experience in fixed-income instruments should be excellently placed to start investing in impact bonds if they are already not doing so. Moreover, reserve portfolios already have significant exposure to supnationals and agencies that tend to have ESG scores. From a financial perspective, green, social, and sustainability-labeled bonds are plain-vanilla bonds. Therefore, portfolio managers would not need any additional investment expertise to buy them. A gradual implementation of this strategy does not entail any significant change to the investment process.

Similarly, internal risk management processes do not need any further enhancement. Impact bonds from eligible issuers have the same credit and market risk as those already in the portfolios. Therefore, existing risk management and performance measurement tools should be appropriate for expanding into impact bonds of currently eligible issuers.

However, generating reports that provide details on the impact of such investments requires additional expertise. Risk management units typically have processes for producing portfolio reports. These processes need enhancements to include a set of appropriate ESG indicators, as explained in Section 4.4. As previously described, the team in charge of reporting needs to implement metrics based on publicly available information or outsource the collection of information to well-known ESG data providers. Also, the reports should include a disclosure of the assumptions used to derive those metrics.

The alternative to pursuing an in-house strategy is to hire a specialized external manager. The most important advantages of using external managers for responsible investment are:

- *Expertise managing ESG portfolios with multiple clients.* The largest external asset management firms have accumulated a lot of experience and expertise in ESG investing. As a result, they are familiar with the most recent market developments and requests from different types of clients, especially from those more advanced in ESG implementation. External managers are beneficial for equity and corporate bond portfolios. The central bank's internal capabilities tend to be weaker in those areas, and the skill to overweight and underweight specific names or sectors is essential. By contrast, impact investing in the SSA space may not require those sophisticated investment capabilities.

- *ESG reporting capabilities.* Asset management firms active in ESG investing have developed reports to respond to various information requests from sophisticated investors. Some of these reports include portfolio-level data like the average ESG score and specific variables such as decreasing water consumption at the company level. Building these reports from scratch may be more challenging for a central bank.
- *Active management.* Running relatively large tracking errors, often above 100 basis points, is standard for external managers even on the fixed-income side. They often use currency and duration deviations from the benchmark to generate returns. The firms that can overperform the benchmark consistently help improve reserve portfolio return. In the ESG space, investors often use traditional benchmarks for ESG strategies because ESG benchmarks may include exposures that are less liquid and thus more difficult to replicate. Active management is a useful skill because it provides portfolio managers more flexibility to generate excess returns. It is especially beneficial for portfolios that already allow currency and duration deviations from the benchmark.
- *Independent ESG ratings.* Although external managers use ratings from specialized providers (e.g., MSCI, Sustainalytics), they usually create their own rating or scoring methodologies to deal with different providers' inconsistencies. This capacity is handy for active management and for investing in equities and corporate bonds. However, it is difficult to judge whether the methodologies developed by external managers are superior to those of rating agencies or other providers because they are seldom publicly available.
- *Ability to expand into asset classes where central banks are not active.* Because of the expertise in multiple asset classes, external managers can apply ESG frameworks to instruments that the central banks have limited experience with, maybe because these asset classes were only recently added to the list of eligible asset classes. Once again, corporate bonds and equities are a case in point. If central banks, in line with their investment guidelines, decide to include corporate bonds, external managers can add value. For instruments that the portfolio management team already trades, such as SSA, the added value from adding external managers' expertise is lower.

Despite the benefits discussed above, hiring external managers for a sustainable strategy has disadvantages. The most important shortcomings are:

- *Operational burden.* Selecting, monitoring, and deciding when to terminate an external manager creates a significant operational burden and must be adequately resourced. Objective selection of a manager requires careful analysis and evaluation of RFP responses that often run to the hundreds of pages. This typically resource-intensive process usually takes several months. It includes decisions on the ex-ante definition of the benchmark, the investment guidelines, and the scoring process.
- Moreover, once hired, *fiduciary duty requires constant monitoring of portfolios*, including a regular review of the manager's compliance with investment guidelines and an extensive analysis of performance and risk reports. The operational burden also encompasses legal due diligence. Although many

central banks have experience with investment management agreements, the teams may need to assess whether they have the resources to take on these new responsibilities.

- *The use of the full range of capabilities will be limited if only investing in internally eligible asset classes.* Credit risk is much higher for private businesses than for sovereigns, supranational, or agencies. Therefore, if sustainable bond strategies do not include corporate bonds or equities, it will be difficult to leverage external managers' enhanced credit risk analysis, reporting, and active management.
- *Impact reporting methodologies are still under development.* In consultation with supranational entities, in 2019 ICMA published a framework for impact reporting for green bond issuers. Although this framework is the first step, measuring impact at the portfolio level is still challenging for investors. This framework is voluntary, and issuers may follow different reporting practices. In addition, it is demanding to aggregate ESG data for the portfolio. As a result, there are no standards, and external managers use different methodologies to create these reports. Following a particular institution's process might be challenging because methods can change as the ESG practice evolves.

Conclusions

The term ESG still lacks a uniform definition, and ESG investing is still evolving. Today, investors use five main approaches when adopting ESG: positive to negative screening, a tilting or screening of the portfolio by identifying best-in-class issuers, integrating financial material factors into the investment process, impact investing, and/or engagement strategies. They often use one or more investment approaches.

ESG investing was first developed and applied in the equity space. It is still evolving in the fixed-income space. As this primer highlights, implementing the traditional ESG investment approaches for a high grade fixed-income portfolio mainly consisting of developed market sovereign bonds is currently challenging. Our analysis indicates that incorporating financially material ESG factors into investment risk analysis and investing opportunistically into sovereign impact bonds may be the best approach.

For reserve managers specifically, any ESG investment strategy incorporated into the reserve management framework should align with institutional objectives and apply to the existing set of eligible asset classes. Each central bank must decide whether and what ESG investment approach is consistent with its institutional objectives. Here, as the highest governance authorities, central bank boards are in the best position to decide. Including the motivations for ESG in the investment policy provides more robust guidance to the investment committee and the reserve management staff. Additionally, in line with best practice, decisions on which ESG approaches to implement must be separated from selecting eligible asset classes. Central banks' decisions on the appropriate eligible asset classes for their reserve management operations should be guided by the institution's risk tolerance and reserve adequacy. Therefore, including corporates, equities,

or alternative investments in the asset allocation should be based on the central bank's risk tolerance, reserve adequacy, and operational capabilities, but it should not be driven by the desire to facilitate an approach to ESG investing.

Consequently, the opportunities to adopt ESG approaches depend on the bank's current investment policy and strategic asset allocation. Diversifying reserves into corporates or even equities increases the scope of reserve staff to implement a broader set of ESG investment approaches. For the institutions that only invest in traditional asset classes, like government and SSA bonds, implementing ESG is more complicated. In this case, the best alternative is to gradually build sustainable bond portfolios with a combination of impact bonds and unlabeled bonds from selected issuers. However, that approach, which several central banks already follow, faces the challenges of still tiny market capitalization and low turnover of thematic bonds.

In the short term, central banks can start following standard market practices like monitoring ESG scores and building impact reports. ESG scores can be useful for strengthening the risk management framework. Moreover, central banks can use these scores to assess their level of ESG implementation, both in absolute terms and relative to the benchmark. Finally, building impact reports can improve understanding of ESG investing for internal and external stakeholders.



APPENDICES

Appendix 1: Construction of ESG scores

ESG scores can be constructed as a weighted sum of sub-scores for each component (environmental, social and governance pillars). Appendix 1 shows the methodology to produce ESG ratings. For example, the aggregated S_i for the issuer i , or the company i , can be decomposed as follows:

$$S_i = w_E \cdot S_i^E + w_S \cdot S_i^S + w_G \cdot S_i^G,$$

with

- S_i^E the environmental sub-score for the issuer i ,
- S_i^S the social sub-score for the issuer i ,
- S_i^G the governance sub-score for the issuer i ,
- $i=1, \dots, N$ with N the number of issuers,

76

and w_E , w_S and w_G their respective weights. In order to get comparable scores, these weights are often kept constant. However, due to possible bias, one could decide to use different weights in the case of sovereigns (e.g. by level of income of countries: low, middle and high) or corporates (e.g. by sector). Sub-scores are normalized: they are built so that they range within the same interval (e.g. [0,1], [0,100], [-1,1]). Therefore, aggregated scores are normalized too, under the condition that the sum of the respective weights equals one:

$$w_E + w_S + w_G = 1.$$

Each sub-score can be built using macroeconomic (for sovereigns) or financial (for corporates) variables. For example, one can use the World Bank Sovereign ESG Data to build an environmental score for country or issuer i :

$$S_i^E = \sum_{j=1}^J w_{Ej} \cdot Z_{ij}^E$$

for $i=1, \dots, N$ and J the number of variables used to build the sub-score, Z_{ij}^E the normalized variable (macroeconomic or financial) for country or issuer i such that

$$Z_{ij}^E = \frac{X_{ij}^E - \min_i X_{ij}^E}{\max_i X_{ij}^E - \min_i X_{ij}^E}$$

that will ensure a normalization between 0 and 1. The condition $\sum_{j=1}^J w_{Ej} = 1$ will extend the normalization at the sub-score level. The social and governance sub-scores S_i^S and S_i^G can be built using the same methodology.

Appendix 2: Bank of Finland, Responsible Investment Policy Outline⁵⁸

Sustainability programme

The Bank of Finland contributes to building a future that is socially and ecologically sustainable. Our sustainability work focuses on the promotion of sustainable growth, exercise of influence via information and management of climate risks.



The foundations of the Bank of Finland's sustainability lie in our core activities. The Bank's task is to contribute to ensuring price stability, the reliability of the financial system, and security and inclusion in the context of payment systems.

The Bank of Finland plays a role in building a society that is socially and ecologically sustainable. In our activities, we recognise the expectations of stakeholders and changes in the operating environment. The sustainability programme is focused on sustainable growth and the promotion of wellbeing, exercise of influence via information and cooperation, and management of climate risks.

We promote these themes by the following measures:

SUSTAINABLE GROWTH AND WELLBEING

- We maintain price stability.
- We ensure financial stability.
- We promote secure and inclusive payment systems.
- We support the EU's economic policies and objective of sustainable development.

⁵⁸ <https://www.suomenpankki.fi/en/bank-of-finland/sustainability/sustainability-programme/> as Annex 2

INFLUENTIAL INFORMATION AND COOPERATION

- We provide facts and research data for economic policy decision-making.
- We participate actively in social discourse and provide balanced information.
- We are a member of the scientific community.
- We promote financial literacy in Finland.

MANAGEMENT OF CLIMATE RISKS

- We invest responsibly.
- We operate in an efficient, economical and environmentally sustainable manner.
- We recognise climate risks in the monitoring of financial stability.
- We reduce the environmental impact of cash and currency supply.



78

Figure: The Bank of Finland's sustainability field.

The Bank of Finland's activities are guided with a view to sustainability, and the impacts of activities are assessed based on our sustainability objectives. Key sustainability indicators in the field of environmental responsibility are e.g. total emissions relative to operating expenses and commitment to the UN Principles for Responsible Investment.

The Bank of Finland caters for the wellbeing of its staff, providing opportunities for competence development and ensuring equal treatment. Key personnel indicators are reported in the Personnel Audit and Annual Report. The key HR sustainability indicators include the employee satisfaction index and the leadership index, as well as the proportion of the minority gender of superiors and the absentee rate.

Implementation of the sustainability programme is guided by the joint sustainability network of the Bank of Finland and the Financial Supervisory Authority, chaired by Deputy Governor Marja Nykänen. The network formulates best practices for the appropriate integration of various aspects of sustainability in the Bank's day-to-day activities.

Appendix 3: Hong Kong Monetary Authority, Responsible Investment Charter⁵⁹

Investment Policy Outline



HONG KONG MONETARY AUTHORITY
香港金融管理局

Responsible Investment

As the investment manager of the Exchange Fund, we believe that the concept of responsible investment (RI) is highly relevant to our investment work.

Our Beliefs

The HKMA sees RI as an investment approach that takes into account the impact of various environmental, social and governance (ESG) factors on the long-term investment returns and their sustainability.

We believe that, by putting an appropriate emphasis on RI and sustainable long-term economic performance, we can better achieve the investment objectives of the Exchange Fund, and reduce risks associated with ESG-related matters of our underlying investments. Our guiding principle is that priority will generally be given to ESG investments if long-term risk-adjusted return is comparable to other investments.

79

Our Principles

Where appropriate, we adopt the following RI principles in our investment process that underpins our beliefs as a responsible long-term investor:

Integration

We incorporate ESG factors into our investment analysis processes to identify risks and opportunities, as we believe that these factors can materially affect the long-term value of our investments. We select and appoint external managers that share our RI beliefs. We also communicate our RI beliefs to all our external managers and expect them to align in such a way that the overall sustainable long-term economic performance is attainable.

Active ownership

We exercise our shareholder rights for our public equity holding in a manner that helps safeguard the long-term value of our investments. We believe that responsible corporate behaviour in relation to ESG factors will help create shareholder value in the long term. We expect our asset managers to help us discharge our ownership responsibilities in the underlying investments by adopting active ownership through exercising voting rights and engaging with the corporates concerned.

⁵⁹ <https://www.hkma.gov.hk/eng/key-functions/reserves-management/responsible-investment/> as Annex 3

Collaboration

We seek to join hands with like-minded investors and regulators to promote good practices for managing investments for the long term.

Our Implementation

We have been weaving ESG factors into our investment process for both public and private market investments:

Public market investments:

- We have required our external managers of Hong Kong equities and China active equities portfolios to comply with the Principles of Responsible Ownership issued by the Securities and Futures Commission in 2016 on a “comply-or-explain” basis. Our external managers of developed market equities portfolios need to adhere to generally accepted international ESG standards.
- We have included ESG factors in the selection, appointment and monitoring of our external managers.
- We have incorporated ESG factors in our credit risk analysis of our bond portfolio.
- We have invested in green bonds since 2015, amongst the early investors in this market. We will continue to grow the green bond portfolio by (i) direct investment or (ii) investing in green bond funds.
- We have invested in the Managed Co-Lending Portfolio Programme, which is run by the International Finance Corporation with a focus on sustainable projects in emerging markets.
- We have embarked on ESG-themed mandates in equities investment by adopting ESG equities index as benchmark for passive portfolio and will continue to engage active equities managers who apply ESG factors.

Private market investments:

- We have examined ESG policies and practices of our general partners as part of our due diligence of private market investments. ESG evaluation is conducted as a mandatory part of due diligence of all Long-Term Growth Portfolio investments.
- We continue to source projects with sustainable features, as we have done in the past. For instance, we have started investing in renewables since 2013 for direct/co-investments in energy sector.
- For our real estate portfolio, we have invested in (i) green buildings and (ii) warehouses with green and sustainable features. Green accreditation is included as a predominant factor for investment in buildings.

We also seek to collaborate with like-minded investors to promote ESG standards in investment process. In particular:

- We are a signatory of the United Nations-supported Principles for Responsible Investment (“PRI”), which is the world’s leading proponent of RI. Being a signatory, we expect to participate in the formulation of ESG best practices and to encourage other investors in embracing RI.
- We are a member of Focusing Capital on the Long Term (FCLTGlobal), which is a not-for-profit organisation that works to encourage a longer-term focus in business and investment decision-making through workshops and research studies. Being a member, we contribute to the workshops and discussion to promote long-termism.
- We are a supporter of the Task Force on Climate-related Financial Disclosures (TCFD), which has developed four recommendations on climate-related financial disclosures relating to governance, strategy, risk management and metrics and targets.
- We are a member of the Central Banks and Supervisors Network for Greening the Financial System (NGFS), whose members contribute to the development of environment and climate risk management in the financial sector, as well as to mobilise mainstream finance to support the transition towards a sustainable economy.

Appendix 4: Banque de France, Responsible Investment Charter⁶⁰



⁶⁰ Banque de France's 2019 Responsible Investment Report is also available at https://www.banque-france.fr/sites/default/files/media/2020/06/26/rapport-annuel-investissement-responsable_2019_en.pdf.



Responsible investment charter | page 2

1•

As an institution of the French Republic and a Eurosystem central bank, the Banque de France carries out a broad range of tasks for the benefit of the community. These tasks relate to monetary strategy, financial stability and the provision of services to the economy. The Banque de France thus helps to create a balanced and sustainable economy, by ensuring the public can have confidence in their currency and payment instruments, by safeguarding the stability of the financial system, which is fundamental for economic growth, by contributing to the sound financing of businesses and especially SMEs, and by assisting those who are overindebted or financially excluded.

The corporate social responsibility (CSR) of the Banque de France towards the public was reinforced via the adoption of its CSR Charter in December 2016. This Charter comprises 4 key commitments (educational and cultural, economic and civic, environmental, towards staff). These commitments are incorporated into its strategic "Ambitions for 2020" plan.

2•

The Banque de France's Responsible Investment Charter falls within this framework. It also reflects the Bank's aim to be exemplary in the inclusion of CSR in all its forms – economic, social and environmental – applied to its role of institutional investor. This covers the management of assets for which it has the full and sole responsibility, i.e. own funds and pension liabilities investment portfolios, excluding those it holds in the framework of the tasks entrusted to the European System of Central Banks by the Treaty on the Functioning of the European Union.

With the adoption of this Charter, the Banque de France is acting fully in line with the views expressed in its CSR Charter, with its fiduciary responsibility as a long-term investor, which is to be mindful of all types of risks that could have an impact on its asset returns, and with one of its tasks which is to safeguard financial stability, to which the mitigation of environmental risks contributes.

3•

As per its fiduciary responsibility as an investor, the Banque de France strives to implement an own funds asset management strategy consisting in ensuring regular growth in their value over the long term and mitigating any associated risks. In this respect, the Banque de France decided to deepen the analysis and formalise the inclusion of Environmental, Social and Governance (ESG) factors in its investment decisions. Indeed, experience and academic studies show that these factors may have an impact on the risks and performance of investments. As an experiment, it has been already incorporating for several years ESG criteria in its own company ratings system.

4•

The Banque de France is committed to publishing appropriate non-financial information, in particular regarding the impact of environmental changes. Article 173-VI of the Energy Transition Act adopted on 17 August 2015 in France constitutes, from this point of view, a reference at the international level.

5•

The Banque de France supports the objectives of the international community such as the Sustainable Development Goals adopted by the United Nations in 2015 and the 10 principles of the United Nations Global Compact of 2000. It is committed to contributing to the global response in order to comply with the Paris Climate Agreement of 2015.

Through this charter, it is committed to complying with the four general principles that guide the inclusion of ESG criteria in appropriate ways for each financial asset class.

- *Respect of human and civil rights as defined in the Universal Declaration of Human Rights:* the Banque de France shall neither invest in the public and quasi-public debt of a very risky country nor in a company registered in any such country. In this respect, the Bank does not invest in companies that do not respect the Ottawa (1999) and Oslo (2010) Conventions. These conventions prohibit the use, stockpiling, production and transfer of anti-personnel mines and cluster bombs;



Responsible investment charter | page 3

- *Respect of regulations governing anti-money laundering and counter-terrorist financing, corruption and tax havens (embargoes, Non-Cooperative Countries and Territories (NCCT) regarding Tax Information Exchange Agreements, Financial Action Task Force (FATF);*
- *Respect of the principles of the International Labor Organization (ILO), notably respect of the freedom of association and right to collective bargaining, the elimination of forced and compulsory labour for children and discrimination in employment and occupation;*
- *Initiatives to protect the environment, the energy and environmental transition, initiatives aimed at reducing climatic change or adapting to it (such as the Charter for public investment in support of climate action). In this framework, the Banque de France does not invest in mining companies and coal-based energy producers that derive more than 20% of their revenues from thermal coal.*

Lastly, the Banque de France does not invest in instruments that promote agricultural commodity speculation.

6•

The Banque de France's Responsible Investment Charter thus reiterates and broadens its existing commitments in terms of the incorporation of environmental, social and governance criteria into its management of financial assets. It defines three commitments and nine associated implementing actions to be rolled out gradually over time.

The Banque de France shall report specifically on the progress made each year in implementing this Charter.

Appendix 5: Example of Detailed Quantitative Impact Reporting from the Information Provided by Issuers

ISSUER	IMPACT (units may vary with each issuer's own reporting convention)			
	CO2 emission (tons) reduction/ savings per annum	SIZE (EUR bn)	CO2 emission (tons) reduction/ savings per annum per Euro 1 million*	CO2 emission (tons) reduction/ savings per annum per USD 1 million
Caisse des Depots et CON	172,000	0.5	344.0	399.0
CPPIB Capital Inc	4,080,000	2.5	1575.3	1827.3
EUROFIMA	159,095	1.0	159.1	184.6
European BK Recon & Dev	5,000,000	7.8	641.0	743.6
European Investment Bank	289,000	3.7	770.0	893.2
Hong Kong	55,000	0.4	127.9	148.4
International Bank for Reconstruction and Development	6,281,636	3.3	1903.5	2208.1
KFW	189,484	1.5	1271.0	1474.4
Kommunalbanken AS	50,938	1.5	34.2	39.7
Kommunekredit	665,000	1.7	380.0	440.8
Kommuninvest Sverige	610,596	3.9	156.6	181.6
Kuntarahoit US OYJ	29,472	1.5	20.1	23.3
Neder Financierings-Maat	711,002	0.4	1653.5	1918.1
Neder Waterschapsbank	357,000	4.7	76.0	88.1
New S Wales Treasury CRP	2,800,000	1.8	1555.6	1804.4
Nordic Investment Bank	57,000	4.2	13.6	15.7
NRW. Bank	2,886,000	11.1	260.0	301.6

Source: Impact report from issuers. The numbers for the CO2 emission (tons) reduction/savings per annum and the size were obtained using publicly available impact reports from the issuers. For IBRD, staff calculations were used. The number of outstanding bonds and the associated methodologies used to calculate emissions may not be the same across issuers.

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