

# 13

## Natural Allies: Wealth and Sovereign Environmental, Social, and Governance Frameworks

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### Main Messages

- Financial markets have started adopting sustainable development goals into mainstream discussions. Sovereign environmental, social, and governance (ESG) scores that guide sustainable finance have an ingrained income bias that potentially diverts capital flows toward richer countries at the expense of poorer countries.
- Comprehensive wealth data are uniquely suited to inform sovereign ESG because they (1) put a dollar value on natural assets, (2) adopt a forward-looking perspective, and (3) have a long history of curated data that are comparable across 23 years and 146 countries.
- The environmental pillar of sovereign ESG frameworks traditionally relies mostly on a resource's environmental materiality (for example, forest cover) and less on its economic materiality (for example, forest wealth). As wealth measurement exceeds a mere stock-taking exercise and reflects the resource's long-term economic benefits, it can complement environmental indicators for decision-makers.
- The adoption of wealth data has been constrained by their five-year frequency and late availability. This edition of *The Changing Wealth of Nations* (CWON) updates the frequency to annual and increases the potential applications of the data.

## Financial Markets and Sovereign ESG Frameworks

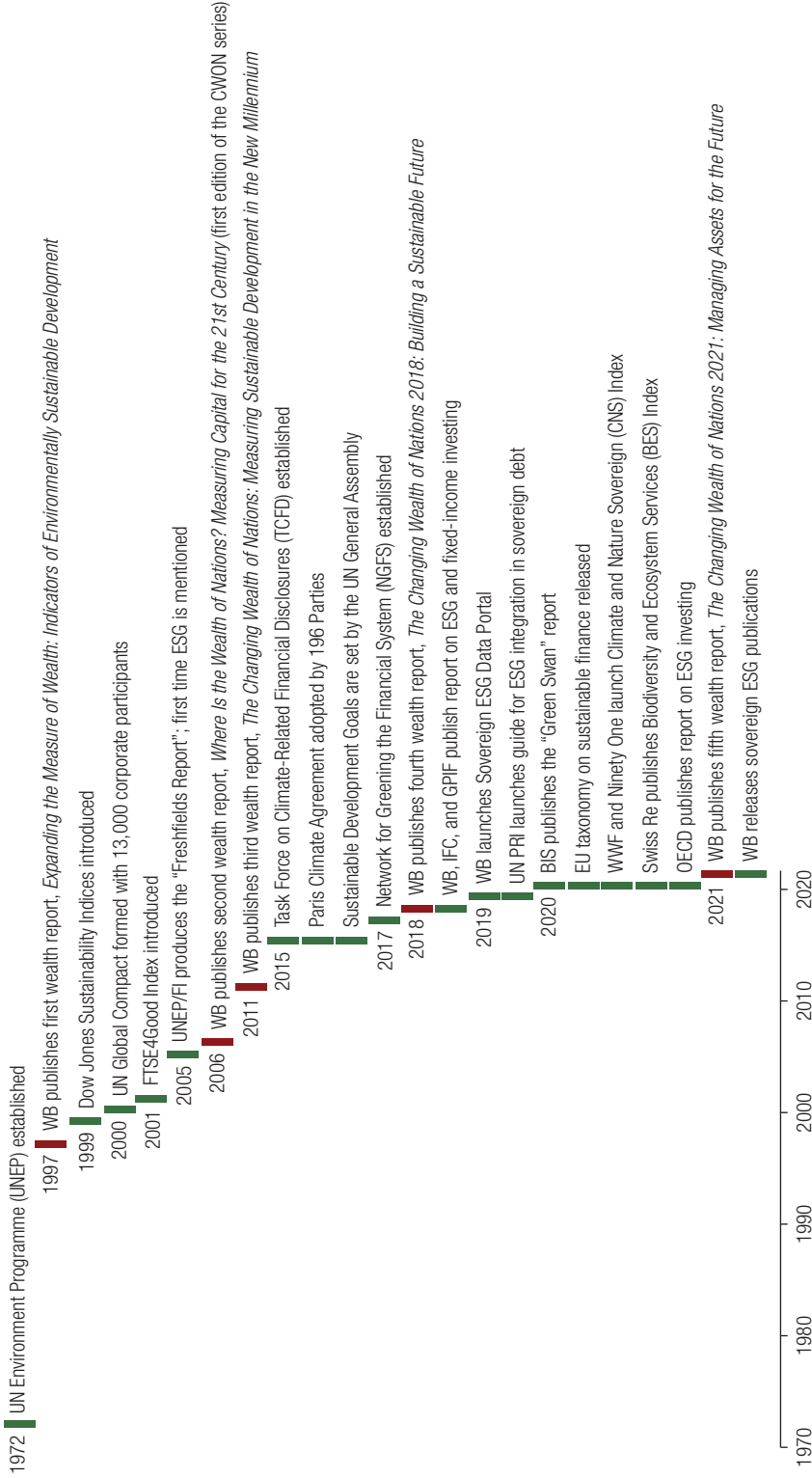
Driven by investor demand and regulatory requirements, financial markets are undergoing a paradigm shift that moves sustainable finance from the periphery to the center of financial discussions (Boitreaud et al. 2020). The introduction of the United Nations Sustainable Development Goals (SDGs) and the Paris Declaration on Climate Change in 2015 have helped galvanize the societal shift to ensure a sustainable future. The pace of ESG integration,<sup>1</sup> which has become the most prevalent form of sustainable finance, has accelerated over recent years. The International Monetary Fund, Network for Greening the Financial System, Organisation for Economic Co-operation and Development, World Bank, and many public, academic, and financial institutions and organizations have been extensively documenting how these changes affect the evolving financial ecosystem and investment decisions across different asset classes.

Global risk perception has evolved significantly over the past decade, with the top five risks being dominated by environmental and societal concerns: (1) extreme weather conditions, (2) climate action failure, (3) human-made environmental damage, (4) infectious diseases, and (5) biodiversity loss (WEF 2020). Dasgupta (2021) frames the loss of natural capital as part of a global asset management problem—one that humanity has been mismanaging. Grasping its immediate implications is challenging because the consequences play out decades into the future. Wealth accounting helps bridge this gap for decision-makers because its main purpose is to express a country's long-term sustainable growth potential in present terms. Similar to how a healthy corporate balance sheet is the precondition for a steady stream of future cash flows, a country requires a healthy balance sheet to ensure sustainable economic development in the future. Neglecting wealth in favor of growth likely exacerbates the long-term consequences of short-term gains.

Evolving over the past decade, ESG investing has started to shift from “purpose neutral” to “purposeful” (J.P. Morgan 2020), from “value” to “values” (Eccles and Stroehle 2018), and from a perspective of ESG not only as another input into financial decision-making but also as an output (Gratcheva, Gurhy, Emery, et al. 2021), thereby aligning this investment approach with the concept of sustainable development. Market participants are increasingly accepting that the way to mitigate ESG risks in emerging markets in the long run is by fostering sustainable growth outcomes. This ongoing evolution of the financial industry toward a greater focus on development outcomes is fueling the growing demand for sustainable finance and more sustainable investment frameworks and practices. Figure 13.1 illustrates the key milestones in sovereign ESG evolution.

Despite significant progress in ESG integration, analytics, and data for equities and corporate bonds, the development of ESG for sovereign bonds—the largest asset class—is still in the growth stage. In 2019, the total outstanding value of global bond markets amounted to US\$106 trillion, exceeding global stock market capitalization of US\$95 trillion and US\$21 trillion in bonds issued, compared with US\$541 billion in new

**FIGURE 13.1** Timeline of Significant ESG Catalysts and Enablers



Source: World Bank.

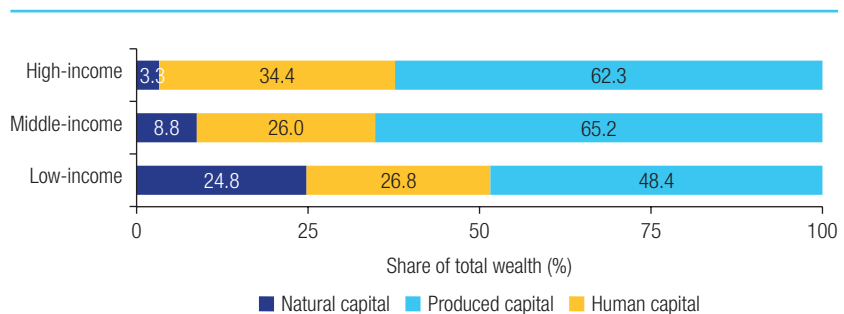
Note: ESG finds its roots in early environmental efforts but has gained attention and momentum in recent years. BIS = Bank for International Settlements; CWON = *The Changing Wealth of Nations*; ESG = environmental, social, and governance; EU = European Union; GPF = Government Pension Investment Fund; IFC = International Finance Corporation; OECD = Organisation for Economic Co-operation and Development; UN = United Nations; UNEP/FI = United Nations Environment Programme Finance Initiative; WB = World Bank; WWF = World Wide Fund for Nature.

equity (SIFMA 2019). The sovereign ESG landscape has started to change with notable developments across the industry over the past couple of years. While the recent focus has been on the growth of green-, social-, and sustainability-related bonds, these bonds constitute only a small fraction of the sovereign bond universe; they amount to just US\$108 billion. For African countries, only US\$817 million of US\$1 trillion in all African sovereign bonds belong to this emerging category. The industry has started to integrate ESG factors into the investment process for conventional sovereign bonds in an effort to reflect sustainability preferences across the entire sovereign bond asset class.

The 2020 pandemic became a strong reminder for the pivotal role sovereigns play in coordinating sustainable development and building resilience globally and nationally. Sovereigns are the key stakeholders in setting national policies—including in public health, environmental, and sustainable infrastructure investment—that drive the country’s development and its response to crises. They are also the key to shaping international agreements, such as the Paris Climate Agreement and SDGs. Thus, investors are increasingly focusing on investment opportunities that not only meet their risk and return objectives but also contribute to measurable sustainable outcomes. This approach of balancing financial materiality and environmental materiality—the so-called dual materiality—is defining the evolution of sustainable finance going forward (Gratcheva, Gurhy, Emery, et al. 2021).

Sovereign ESG scores are highly correlated with gross national income, which overemphasizes produced capital over other forms of capital (Gratcheva, Emery, and Wang 2020). Figure 13.2 provides a breakdown of total wealth into natural, produced, and human capital. Due to the ingrained income bias, which is explained in box 13.1 later in this chapter, current ESG scores favor rich countries and therefore possibly divert funding away from lower-income countries, where capital is needed to meet the SDGs, the nationally determined contributions of the Paris Agreement,

**FIGURE 13.2** Wealth Composition, by Income Group, 2018



Source: World Bank staff calculations.

Note: This figure shows how natural capital’s share of total wealth drops as countries climb the development ladder. It is replaced by the growing importance of produced capital, which is highly correlated with gross domestic product. For this figure, net foreign assets are excluded from the calculation of total wealth.

and other development needs. Not only could the ingrained income bias serve as an explanation for the lack of impact ESG investors seek, what is more troubling is that ESG investing may unintentionally harm sustainable development. Measuring a nation's wealth more comprehensively is necessary to start overcoming these biases.

Access to capital markets plays an important role in countries' development by providing an important channel of financing for the real economy, national infrastructure, and social and other needs. The ability of countries to raise funds on favorable terms depends on a number of factors, recently on the market participants' application of sovereign ESG scores to assess the country's long-term sustainability and creditworthiness (Gratcheva, Gurhy, Skarnulis, et al. 2021). Although the scores have been used predominately in the context of sovereign bonds, they are not tied to a specific instrument. Instead, sovereign ESG scores help inform a country's overall risk and investment profile (Gratcheva, Gurhy, Emery, et al. 2021). The wealth accounting data serve as a valuable foundation on which these profiles can be formed, even for countries with less developed markets, thanks to their wide and consistent coverage of 146 countries.

## Wealth on a Country's Balance Sheet

Gross domestic product (GDP) as a measure of economic well-being or living standards has long been criticized. As natural capital and ecosystem services have gained momentum in current policy discussions, the shortcomings of GDP have become more and more apparent. Not only is GDP inadequate for providing a complete picture of an economy's situation and prospects (Coyle et al. 2019), it also does not reflect the depletion of subsoil assets, loss of species abundance, or agricultural damage resulting from extreme weather events. Furthermore, GDP does not account for positive environmental policies such as reforestation efforts, the adoption of organic agriculture, or preservation of biodiversity and endangered species.

Exploiting natural resources for short-term economic gains comes at the cost of long-term sustainable growth potential. Resource-dependent economies may experience short-term growth boosts by relying on natural resource rents. If these rents are not reinvested into other types of capital, the country's economy may fall victim to the natural resource curse or the Dutch disease (Gylfason 2001; van der Ploeg 2011; Venables 2016). However, these long-term consequences remain unquantified, as decision-makers lack an adequate monetary assessment of what is lost in terms of future rents. According to Joseph Stiglitz, winner of the Nobel Prize for Economics, "it's like grading a corporation based on one day's cash flow and forgetting to depreciate assets and other costs" (Stiglitz 2006). This calls for a measure of a country's assets that not only takes stock of current agricultural land in square kilometers but also conveys the potential "lifetime earnings" of the land in dollar amounts.

Wealth accounting quantifies the lifetime earnings of a country's assets in monetary terms. The wealth methodology provides a robust, quantitative framework for thinking about sustainability in terms of

natural, produced, and human capital. For instance, human capital is calculated as the discounted expected lifetime earnings of a population. A similar rationale applies to the valuation of natural resources. A country's fossil fuel wealth is calculated as the discounted value of future resource rents until this nonrenewable resource is depleted. Renewable resources, such as forests or agricultural land, distinguish themselves in that their discounting horizon depends on the rate of extraction versus replacement. For instance, forest capital is a function of (inflation-adjusted) unit rents, production quantities, and the difference between deforestation and reforestation or afforestation rates. In principle, renewable resources can produce rents in perpetuity.

## Addressing Sovereign ESG Challenges

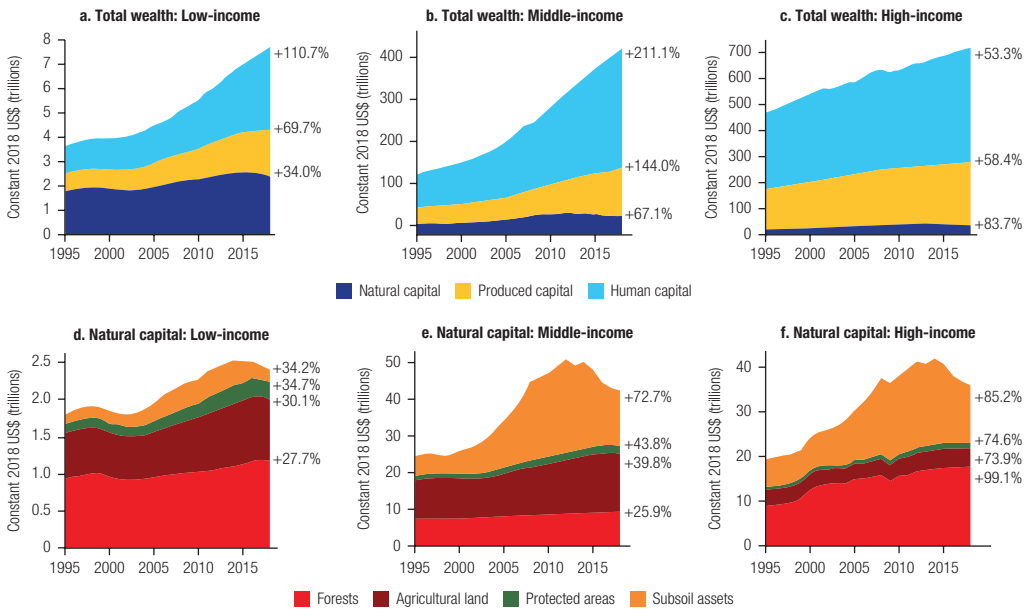
Application of sovereign ESG scores produced by ESG providers does not necessarily meet the intended goal of incorporating sustainability objectives within the investment process.<sup>2,3</sup> This section outlines three challenges that affect various sovereign ESG scores and discusses how wealth data are a well-suited remedy.

### Challenge 1: Lack of Economic Materiality

Sovereign ESG assessments or sovereign ESG scores that rely only on raw environmental data potentially underestimate the economic materiality of environmental factors. The same plot of forest land matters relatively less to a high-income country, whose economy relies more on human capital and produced capital, than it does to a country whose economy depends heavily on timber goods or international tourism (see figure 13.2 and figure 13.3). ESG scores that use only quantities as inputs, such as percentage of forest cover, likely understate the economic materiality of the resource. To illustrate this point further, consider nonrenewable resources such as oil or minerals. The valuation of such assets is the product of the remaining quantity and its market price. Yet renewable resources, such as forests or agricultural land, are usually incorporated only in non-economic units.

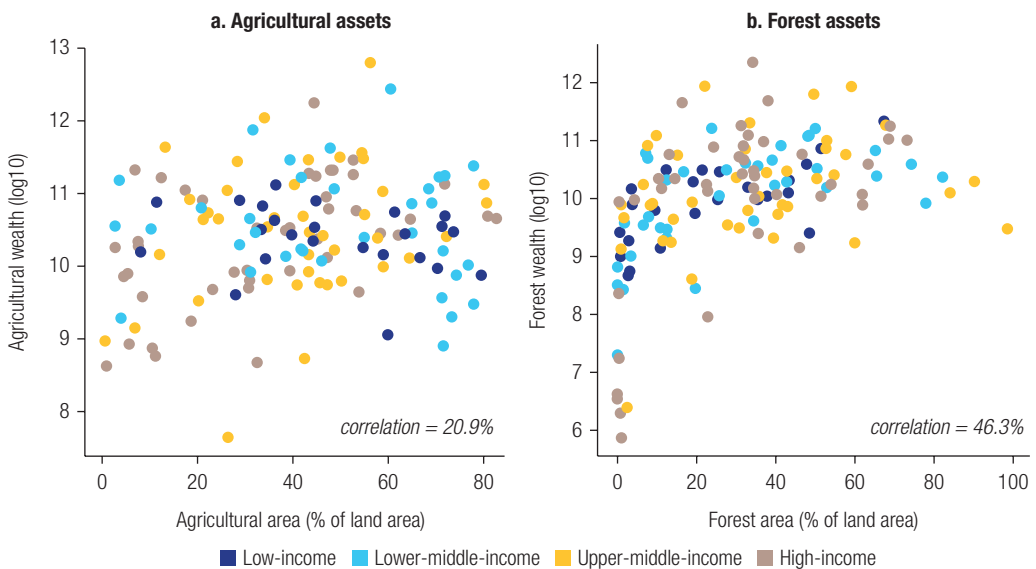
Environmental materiality does not imply economic materiality. Figure 13.4 illustrates this discrepancy. The horizontal axes depict the environmental data, that is, agricultural and forest areas as percentages of total land area. The vertical axes show the corresponding wealth variables, which represent assets on a country's balance sheets. The figure covers 146 countries with data from 2016. The low correlations show that the economic valuation of agricultural wealth is largely unrelated to its geographic size. This also holds true for forest assets but to a lesser degree. Wealth data, therefore, contain additional information that is not captured in raw environmental data. Because wealth accounts are constructed to measure economic materiality and long-term sustainable growth potential, sovereign ESG methodologies would benefit from including them in addition to the underlying environmental metrics.

**FIGURE 13.3** Development of Wealth Accounts, by Income Group, 1995–2018



Source: World Bank staff calculations.

**FIGURE 13.4** Environmental Materiality versus Economic Materiality in Agricultural and Forest Assets



Source: World Bank staff calculations from Sovereign ESG Data Portal.

Note: The horizontal axes show environmental variables, while the vertical axes show their wealth counterparts (log10 transformation).

## Challenge 2: Ingrained Income Bias

Although sovereign ESG integration has brought into focus the issue of sovereign sustainability, current ESG frameworks face fundamental challenges that limit their sustainability impact. While the growth of ESG integration across all segments of capital markets to incorporate nonfinancial considerations is driven by an interest in aligning investments with sustainability objectives, it is worth examining the direction of capital flows as a result of ESG integration. Figure B13.1.1 in box 13.1 clearly shows a common theme: the higher a country scores on national income, the higher the country scores on the ESG spectrum. This finding has profound implications. Investors who are interested in promoting sustainable growth through ESG investment may find themselves potentially aggravating existing funding gaps and wealth disparities for lower-income countries. Since “higher is better” in the ESG domain, a sovereign ESG investor faces possibly perverse investment incentives.

Further investigation finds that sovereign ESG scores are strongly income biased. Higher ESG scores are correlated with higher prosperity. In fact, the relationship in figure B13.1.1 is dominated by the levels of development and income, as about 90 percent of sovereign ESG scores are explained by the country’s national income (Gratcheva, Emery, and Wang 2020). Prosperous countries score higher on all three ESG dimensions, simply because they are prosperous. Richer countries have higher environmental scores because they have the capacity to designate and enforce national parks or put large swaths of land under conservation. More important, the same countries will score high on the social and governance dimensions because strong institutions and higher participation in the labor force are the preconditions for growth. Higher ESG scores are, therefore, not necessarily the best indicator for sustainable growth. More problematic, this bias is ingrained. A country that finds itself in the bottom-left corner of figure B13.1.1 has little chance to move toward the top-right in the short run. The level of development is the result of decades and centuries of economic growth, and no short-term efforts will significantly impact a country’s location in figure B13.1.1.

This structural challenge in the sovereign ESG scores calls for income adjustment, which is not trivial. Gratcheva, Emery, and Wang (2020) describe methods of income adjusting that have been popularized by industry practitioners and point out some of their shortcomings. This chapter advocates looking at recent wealth developments instead of focusing on the level of wealth (see box 13.2). Rather than comparing across countries, as in figure B13.1.1, the suggestion is to look within countries. ESG scores based on this approach are unaffected by the ingrained income bias because it compares countries with themselves at an earlier point in time. Countries’ environmental performances are assessed on a level playing field and recent environmental efforts come to the fore. This approach does not invalidate existing sovereign ESG scores but presents a complementary picture.

Income adjustment through recent environmental performance requires time variation. To assess the effects of recent environmental

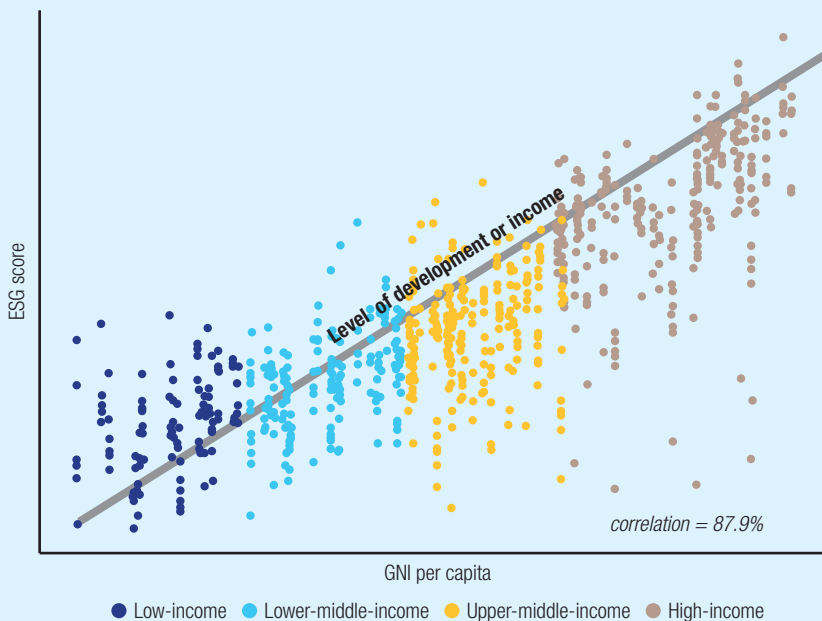


### BOX 13.1 What Is Ingrained Income Bias?

Several studies (Boitreaud et al. 2020; Gratcheva, Emery, and Wang 2020) document that countries scoring high on environmental, social, and/or governance (ESG) scores also tend to rank high in income and development levels (figure B13.1.1). This is not surprising, because high labor participation, political stability, rule of law, access to electricity, carbon dioxide emissions, and forest depletion rates do not exist in a vacuum. These indicators are inputs and outputs of long-term growth and development. This phenomenon—the ingrained income bias—is not limited to ESG scores; it is ingrained in any type of cross-country analysis that compares development-related indicators. In econometric terms, these types of analyses suffer from endogeneity, or specifically, omitted variable bias (Wang 2021). Not accounting for the ingrained income bias leads to two important consequences:

1. The *income bias* leads to perverse investment outcomes. Tilting investment portfolios toward higher ESG scores likely steers funding flows away from lower-income countries and toward richer countries, effectively rewarding them for their prosperity.
2. The *ingrainedness* leads to disheartening policy incentives. Policy efforts in the short run are unlikely to affect a country's development or income level, which are the result of decades or centuries of economic development.

**FIGURE B13.1.1** Sovereign ESG Scores and the Ingrained Income Bias



Source: World Bank staff calculations.

Note: The vertical axis depicts the (normalized) environmental, social, and governance (ESG) scores of six leading sovereign ESG providers, where higher values indicate better ESG performance. The horizontal axis shows the (normalized) gross national income (GNI) per capita for all 133 countries in 2017. The term *ESG providers* refers to companies that provide ESG scores for incorporation into investment decisions. ESG providers differ from credit rating agencies, as the latter have an explicit mandate to assess an entity's ability to repay its debt.

### BOX 13.2 Wealth Data and Sovereign Bonds

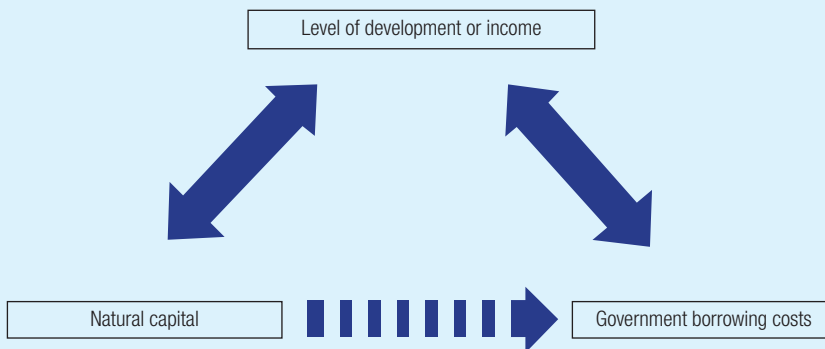
Gratcheva, Gurhy, and Wang (2021) and Wang (2021) examine the role of natural capital in sovereign bond yields using a cross-section of 37 countries, comprising 20 A-rated countries (average long-term debt rating between AAA and A–) and 17 B-rated countries (ratings between BBB+ and BB–) between January 2009 and December 2018.<sup>a</sup>

The authors estimate the effect of 1 percent growth in natural capital on the 10-year bond yield from two perspectives. When comparing bond yields with natural capital across countries, a positive association emerges: countries that are richer in natural capital tend to have higher borrowing costs. While this could be explained through the natural resource curse<sup>b</sup> or long-term growth arguments,<sup>c</sup> the authors strongly caution against drawing any conclusions based on pure cross-country analyses due to the ingrained income bias (see figure B13.1.1 in box 13.1).

Instead, the authors advocate the within-country perspective, which measures the effect of *recent* environmental performance on *recent* changes in bond yields (see figure B13.2.1). This brings countries onto a level playing field and largely removes the ingrained income bias. After adopting the appropriate statistical framework, the authors find a negative relationship: as a country grows richer in natural capital, borrowing costs tend to drop. This finding is robust against the inclusion of various macrofinancial controls, wealth variables, and common bond factors.

After decomposing natural capital into renewables and nonrenewables, the authors find that growth in renewables lowers borrowing costs mostly in B-rated countries. A-rated countries are largely unaffected. This is likely because it is economically worthwhile to invest in these resources, such as agricultural and forest wealth, for countries that rely more on these resources for growth. Protected areas, which expanded predominantly in A-rated countries, are more likely luxury investments, because they are costly and nonproductive. Growth in this type of renewables would hypothetically raise borrowing costs in B-rated countries because they have the highest opportunity costs in terms of foregone agricultural or forest rents.

**FIGURE B13.2.1** Hidden Role of Development and Income



Source: World Bank.

Note: The effect of natural capital on bond yields (dashed arrow) is likely biased due to the unobserved level of development or income. Without accounting for the ingrained income bias (see box 13.1), cross-country analyses may lead to erroneous conclusions.

- Sovereign bond yields are often considered as a proxy for the cost of borrowing for governments. Lower bond yields therefore reflect more favorable financing conditions for countries.
- The natural resource curse refers to the widely studied empirical phenomenon in which countries that are rich in natural resources often experience lower-than-expected growth.
- As part of the long-term growth framework, Dasgupta and Heal (1974), Solow (1974), and Stiglitz (1974) discuss the essential role natural resources play in economic growth. In a growing economy, inflation erodes the purchasing power of money. Thus, bond investors demand higher yields on their investment as a compensation.

policies, a sufficiently long history of relevant indicators is necessary. The latest iteration of the wealth data presented in this book offers annual records between 1995 and 2018 and covers 146 countries. The 23 years of data lay a reliable foundation from which to assess recent performance. The main benefit of these data is the use of a consistent methodology over time. Frequent revisions in sovereign ESG methodologies have led to major shifts in country scores and consequently in ESG-related index products. The solid methodological framework also lends itself to be extended in the temporal and spatial dimensions (see box 13.3).

### Challenge 3: Inconsistent Environmental Scores

Due to the dominating effect of the ingrained income bias, the social and governance scores are largely in agreement. However, the environmental scores are widely dispersed. Gratcheva, Emery, and Wang (2020) compare sovereign ESG scores across leading ESG providers and find that the social and governance scores have average pairwise correlations with each other of 85 and 71 percent, respectively. For the environmental scores, in contrast, the average correlation between ESG providers is 42 percent, ranging between -14 and 88 percent. The disagreement in the environmental pillar can be ascribed to the challenging data landscape and lack of consensus about what environmental performance means. Wealth data, especially natural capital and its components, are well suited to address both challenges.

#### BOX 13.3 Extending Wealth Data with Satellite Imagery and Machine Learning

WWF and World Bank (2020) describe the potential of spatial finance for environmental, social, and governance (ESG) investing and its appeal to financial markets. Remotely sensed data with higher temporal and spatial resolution can augment the relevance of wealth data. Their objective and globally consistent nature makes earth observation data an attractive choice for improving existing data sets. The wealth data are constructed on a well-founded economic framework that lends itself to extensions.

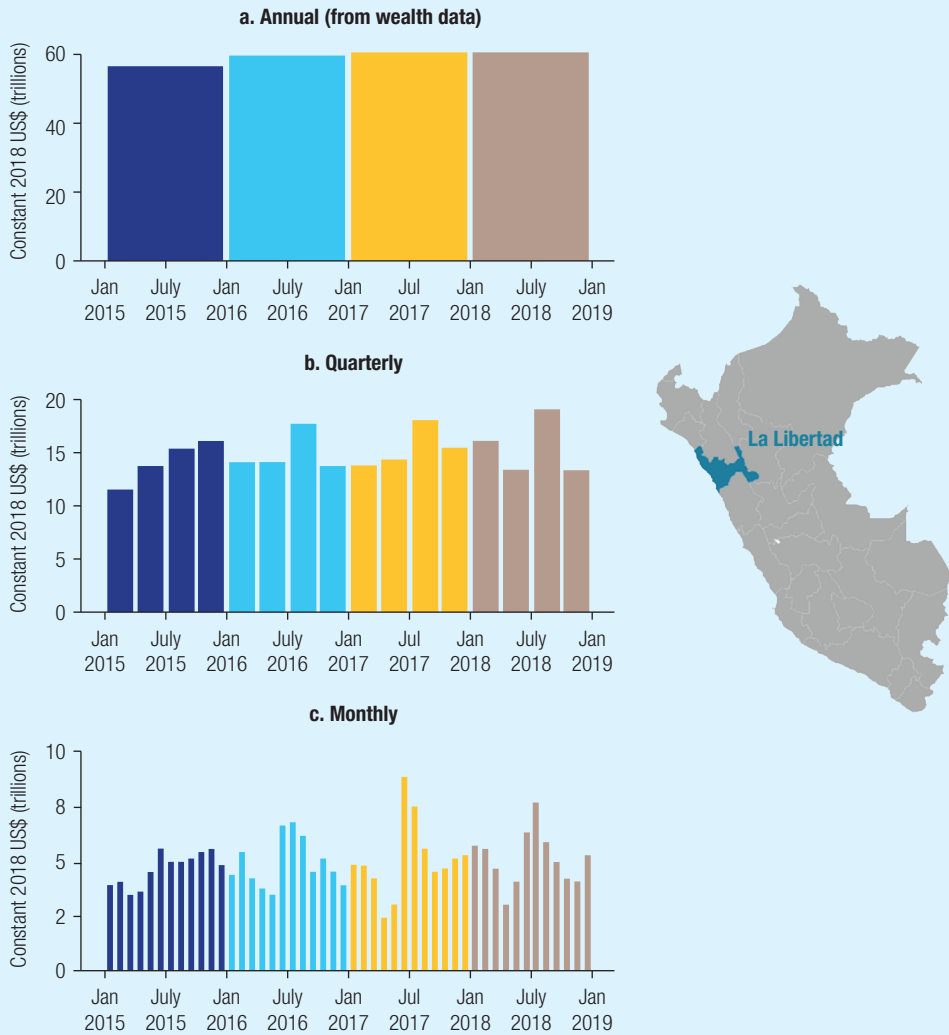
Statistical methods can introduce subannual variation and seasonal components into annual wealth data. This enables ESG scores to be based on momentum and recent performance. Measures such as year-on-year changes for every month and seasonal variations can shed light into otherwise neglected environmental degradations and improvements. Distributing country-level data over subnational entities allows ESG scores to incorporate regional discrepancies and trends. Extending the annual, country-level wealth data along spatial and temporal dimensions opens avenues for analyses that otherwise would not be possible.

Figure B13.3.1 depicts an example for how annual wealth data can be distributed over subannual frequencies and downscaled to subnational resolutions. The method is based on established benchmarking techniques (Di Fonzo and Marini 2012; Marini 2016). Machine learning and econometric methods have the ability to model relevant nonlinearities and make robust predictions for otherwise missing most recent values. These predictions are constructed with external validity and internal consistency in mind. Nonetheless, improving environmental indicators with new statistical methods raises novel challenges that require careful examination.

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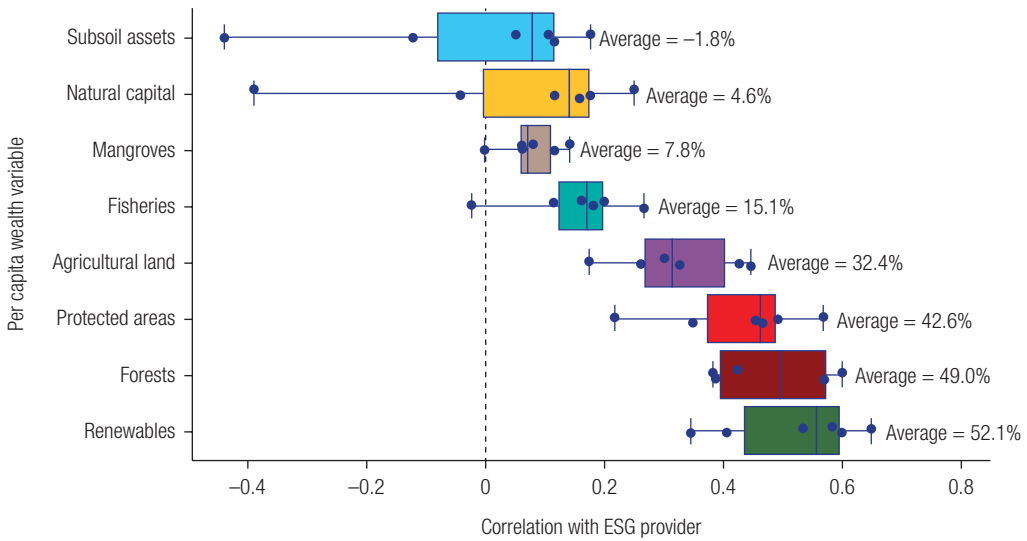
**BOX 13.3** Extending Wealth Data with Satellite Imagery and Machine Learning *(continued)*

**FIGURE B13.3.1** Extending Wealth Data along Temporal and Spatial Dimensions in La Libertad, Peru, 2015–19



Sources: European Space Agency, MIDAGRI (Ministry of Agriculture of Peru), BCRP (Central Reserve Bank of Peru), Instituto Geográfico Nacional; World Bank staff calculations.

Note: This figure illustrates how subannual numbers (quarterly or monthly) can be obtained from annual wealth statistics at the subnational level (first administrative level). The example here is calculated for La Libertad, in Peru, where annual cropland wealth is distributed throughout the year and country based on agricultural production data and agronomic satellite imagery. This benchmarking method ensures that the numbers are consistent: for example, quarterly numbers sum to annual numbers.

**FIGURE 13.5** Correlation of Environmental ESG Scores with Natural Capital Components

Source: World Bank staff calculations.

Note: The box plots show the correlations between per capita natural capital (components) and environmental scores of six leading ESG providers. Each dot represents one ESG provider, the boxes demarcate the quartiles, and the whiskers locate the lowest and highest correlations. The term *ESG providers* refers to companies that provide ESG scores for incorporation into investment decisions. ESG providers differ from credit rating agencies, as the latter have an explicit mandate to assess an entity's ability to repay its debt. ESG = environmental, social, and governance.

Existing sovereign ESG scores reflect mostly renewable natural capital and are almost uncorrelated with nonrenewables. Figure 13.5 shows how the environmental scores of the six ESG providers studied in Gratcheva, Emery, and Wang (2020) are correlated with natural capital and its components. It turns out that when ESG providers construct their environmental pillars, they seem to focus comparatively more on renewable natural capital (52.1 percent average correlation) and its components: forests (49.0 percent), protected areas (42.6 percent), and agricultural land (32.4 percent). Subsoil assets, which contain nonrenewable fossil fuels and mineral assets, are almost uncorrelated with environmental scores (-1.8 percent). Thus, renewable natural capital already seems to capture the essence of what ESG providers consider to be environmental. This paves the way for wealth data to feature more prominently in ESG scores going forward.

## Overcoming Wealth Data Constraints

Despite its suitability for informing sovereign ESG methodologies, wealth data have not been widely adopted by ESG providers. Wealth accounting and sovereign ESG share common goals for sustainable development. Due to their economic materiality, forward-looking perspective, and long

history of consistently curated data, the wealth data also help to resolve the discussed challenges of current sovereign ESG scores. However, at the time of writing, only one of the seven major sovereign ESG providers examined has explicitly built its methodology around wealth data (Gratcheva, Emery, and Wang 2020).

A central hindrance to the incorporation of wealth data is their low frequency and high time-to-market. The release of the previous wealth report (Lange, Wodon, and Carey 2018) provided wealth data until 2014 at a five-year frequency. Conversations with practitioners revealed that data lags are one of the main obstacles for ESG providers. Social and governance pillar data had a three-year median lag, while environmental pillar data had a five-year median lag (Boitreaud et al. 2020). This data environment prompts users to apply imputation and interpolation methods to fill in missing data. Answering the call of practitioners, this newest iteration of the CWON extends these data until 2018 and increases the data frequency to annual. Although this still constitutes a data lag of three years, the annual frequency should greatly improve the data set's relevance for financial markets.

Advances in geospatial data pave the path for further improvements. With the recent developments in remote-sensing technologies, satellite imagery has become more accessible to the wider public. This data source has already been applied in various settings to quantify and verify environmental practices (WWF and World Bank 2020). The objective and globally consistent nature of earth observation data makes it an attractive choice for improving the existing data sets. Depending on the indicator, weather conditions, and geography, satellite mapping services can deliver reliable updates for up to weekly frequency. The European Space Agency is working to gather data on relevant environmental indicators for wealth data (ESA 2020).

Machine-learning methods can leverage geospatial data to improve existing wealth data. Statistical methods can be employed to downscale established wealth data to more relevant units. While wealth data can be spatially disaggregated over states and municipalities, the main benefit of machine-learning methods is to augment the temporal dimension. A promising application is to nowcast the most recent values that are otherwise missing.<sup>4</sup> Using the same toolbox, higher frequency earth observation data can also calculate quarterly or monthly wealth data from their annual figures. This introduces seasonal patterns, quantifies short-term impacts of disasters, and allows a timelier monitoring of deforestation trends or land degradation.

## Conclusion

The philosophy behind wealth accounting largely overlaps with the goals of sovereign ESG scores and can help address some of the latter's shortcomings. Wealth data help to address three challenges of the current sovereign ESG scores. First, current environmental scores tend to focus on

environmental materiality. However, the size of cropland in hectares alone may not be informative enough for policy makers. The wealth approach assigns an economically meaningful value that complements the raw environmental numbers. Second, current ESG scores are affected by the ingrained income bias, leading to possibly perverse investment incentives. The long history of wealth data allows practitioners to overcome the ingrained income bias by making it possible to focus on recent developments in environmental performance. Third, low correlations among the environmental scores of major ESG providers indicate a lack of consensus about what these scores should measure. Nonetheless, they seem to agree that renewable natural capital is part of the answer. A more explicit incorporation of natural capital may help to inform the development of future environmental scores.

Despite its suitable nature and promise for addressing the market's growing demand for high-quality environmental data, wealth accounting has not been fully utilized because of data constraints. The economic materiality, forward-looking perspective, and long history of consistently curated data suggest a close relationship between wealth data and sovereign ESG scores. However, the low frequency and high time-to-market of the wealth data have been a bottleneck to its wider adoption. This edition of the CWON introduces wealth data that addresses this bottleneck by raising the five-year update interval to annual. To foster the adoption of wealth data by financial market practitioners, the European Space Agency and various teams in the World Bank are working to increase the frequency of the data to subannual levels, lower the time-to-market, and scale the resolution up from countries to subnational entities. Key to this effort is the transparent combination of new remote-sensing data sources, robust statistical methods, and open dialogue with domain experts.

## Notes

1. ESG integration is the practice of incorporating ESG-related information into investment decisions to help enhance risk-adjusted returns, regardless of whether a strategy has a sustainable mandate.
2. ESG scores are also sometimes called ESG ratings. This chapter uses “sovereign ESG scores” to distinguish them from “sovereign credit ratings,” which measure the sovereign's creditworthiness. Sovereign ESG scores have emerged to complement assessment of sovereign creditworthiness.
3. The term *ESG providers* refers to companies that provide ESG scores for incorporation into investment decisions. ESG providers differ from credit rating agencies, as the latter have an explicit mandate to assess an entity's ability to repay its debt.
4. *Nowcasting* refers to predictions for the present or near future of variables that are usually updated on a lower frequency. Nowcasting is often used to obtain monthly GDP figures because official statistics are updated only quarterly.

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