CHAPTER 22

ESG

"Sustainable" Investing and the Risk of Infrastructural Lock-In

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1 Introduction

During the 2021 United Nations (UN) Climate Change Conference (COP26) in Glasgow, US Treasury Secretary Janet Yellen (2021, para. 2) in her keynote speech remarked that addressing climate change will require nothing less than "the wholesale transformation of our carbon-intensive economies," estimating the costs for this transition "between $100 and $150 *trillion* over the next three decades." Mitigating climate change will thus require "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development," as stated in the Paris Agreement (UN, 2015). As a result, various kinds of sustainable finance have grown rapidly after 2015. But whether this allegedly "sustainable" way of investing can actually fulfill this monumental task depends very much on the concrete business schemes and investment practices that are adopted. As this chapter illustrates, this is ultimately determined by the specific infrastructural arrangements – notably environmental, social, and governance (ESG) data, ratings, and indices – that underpin sustainable finance.

According to the European Union (EU) (2023, para. 1), sustainable finance, in its very broad sense, "refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects."[1] From its beginnings as a niche phenomenon at the beginning of the 2000s, ESG has turned into a much-debated trend in recent years (Pollman, 2022). However, ESG is both highly contested and its true size is unclear, with estimates ranging from about $700 billion to $30,000 billion (Fichtner, Jaspert, and Petry, 2023b). This astounding disorientation regarding the actual structure of the business field creates a sphere of confusion that makes ESG prone to greenwashing.[2]

In this chapter, we conceptualize ESG as the infrastructure that underpins "sustainable" investing.[3] We argue that ESG constitutes a particular set of market devices – data,

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ratings, and indices – that define the logic, structure, and outcomes of sustainable investing. Having historically emerged as market-driven private standards for governing how to invest "sustainably," we demonstrate how a small set of private actors defines the infrastructural arrangements that guide ESG investing. As a consequence, a preference for a market-friendly and one-sided conception of sustainability exclusively focused on risks to investors' portfolios ("single materiality") was implemented by the actors that defined standards. This setup of ESG creates what we call an "infrastructural lock-in," whereby this particular conception of "sustainable" investing – which is not utilizing all available transmission mechanisms to actively advance sustainability (Fichtner, Jaspert, and Petry, 2023a) – becomes the baseline and the common standard for "sustainable" finance. Market-driven standards of private governance, we argue, ultimately shaped supposedly sustainable investment practices into a form that is inherently not significantly advancing sustainability. By investigating the infrastructure of ESG, we shed light on the crucial question to what extent ESG can play a meaningful role in the much-needed green transition (see also Seabrooke and Stenström, this volume) – and how regulation could remedy some of the crucial shortcomings of ESG investing.

This chapter is structured as follows. Section 2 discusses ESG in terms of a sociotechnical infrastructure for sustainable investing as well as its potential (non)impacts for sustainability. Section 3 then provides a brief historical overview how ESG investing developed, illustrating its emergence as market-driven private standards for defining sustainable investing. Section 4 discusses the resulting structure of the market for ESG which is highly concentrated among a few firms. Drawing on the distinction between single- and double-materiality conceptions of ESG, Section 5 then illustrates how this setup creates an "infrastructural lock-in" as ESG in its contemporary form does not seek to create positive sustainable impact. Section 6 concludes and highlights further avenues of research.

2 ESG as the Sociotechnical Infrastructure of Sustainable Investing

For every market, certain sociotechnical infrastructures need to be in place to enable transactions in the first place (Bowker and Star, 1999). In other words, particular "social, cultural, and technical conditions" make markets possible (MacKenzie, 2006, p. 13). But while infrastructures are an enabling factor, they also determine constraints and mark the boundaries of what is possible. As Caliskan (2020, p. 542) has stressed, "the study of socio-technical infrastructures plays a crucial role in making sense of economic action and agency, because they *structure possible fields of action* in identifiable ways." Infrastructures are not necessarily deterministic but generally shape the room for what is possible – and what is not. Infrastructures therefore potentially lock-in certain practices and courses of action while making the pursuit of alternatives less likely.[4] In the case of sustainable finance, the infrastructure that underlies ESG investing defines how "sustainable" investing is being conducted and what counts as such. ESG data, ratings, and indices – in this very sense – function both as important market devices that enable sustainable investing while simultaneously determining the limits of what sustainability impact ESG can achieve.

Importantly, these financial infrastructures are inherently political as they modify the distribution of power and capabilities within marketplaces (Pardo-Guerra, 2019). Bernards and Campbell-Verduyn (2019, p. 783), for instance, argue that financial infrastructures "can confer, extend and enable new forms of governance" and that "contemporary forms of hybrid public/private governance and corporate power often depend on control over key financial infrastructures." Similarly, Pinzur (this volume) notes that financial infrastructures are always embedded in asymmetric relations of dependency and discretion which exist between the operators of infrastructures and their users. Whoever controls financial infrastructures therefore has significant power to shape markets and their socioeconomic outcomes.

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It is thus important to analyze "the hardwiring of technical operations into financial practices and regulations" (Dimmelmeier, 2020, p. 2). As a result, by setting the rules of the game for sustainable investing the operators of financial infrastructures have a large degree of power to shape financial markets, their dynamics, and outcomes (Genito, 2019; Petry, 2021). Who defines ESG – the data, ratings, and indices that set the parameters for sustainable investing – hence matters for what the material impact of these investments actually is.

Thus, in order to better understand the impact that ESG has as the sociotechnical infrastructure for sustainable finance, we need to analyze how its particular characteristics have emerged. As we illustrate in the following sections, ESG has developed as market-driven standards for the private governance of investment practices. This genesis of ESG has given rise to the implementation of a very *narrow understanding of sustainability* into financial market practices shaped by the notion of *single materiality* (see Section 5). Importantly, by setting the de facto standards for sustainable investing, ESG data, ratings, and indices thus created an *infrastructural lock-in* that has established a persistent benchmark for practitioners, investors, and regulators about how "sustainable" investing should be conducted. Crucially, this market-driven approach to ESG does not effectively utilize potential transmission mechanisms to create sustainable impact in the "real" economy.

3 A Short History of ESG

While ESG has become mostly synonymous with "sustainable" investing, its importance as a financial infrastructural device for facilitating sustainable investing is a relatively recent phenomenon. The historical development from a niche phenomenon to the de facto standard for sustainable investing can be divided into three stages (see Busch et al., 2021).

The earliest precursors of ESG investing are found in attempts by religious groups, including Quakers and Methodists, to avoid investing in "sin stocks" such as gambling and tobacco (Liu, 2020). Similarly, in the 1970s and 1980s, investors from Europe and North America sought to avoid investment in companies active in South Africa to support the anti-apartheid movement – marking the first sequence of modern ESG investment approaches. In the United States, that is, proponents of "socially responsible investing" excluded producers of chemical weapons used in the Vietnam War from their portfolios (Liu, 2020). The full or partial exclusion of specific firms or whole industries (e.g., coal or tar sands) is one key origin of ESG. Referred to as "negative screening," this practice is still an integral part of ESG (Deutsche Bundesbank, 2019; Kölbel et al., 2020). This phase of "sustainable" investing, which relies exclusively on avoiding exposure to unethical firms, has been labeled "Sustainable Finance 1.0" (Busch et al., 2021).

In 2004, the term ESG itself was introduced in a report by the UN Global Compact (Pollman, 2022). This first notion was followed by the development of the UN Principles for Responsible Investment (PRI) in 2006. Arguably, these roots mark the beginning of the "Sustainable Finance 2.0" era which was characterized by the development of ESG investing from a niche phenomenon into a mainstream investment approach (Busch et al., 2021). The first creation of ESG exchange traded funds (ETFs) in the early 2000s signaled the start of this new phase.[5] The UNPRI established a framework defining some basic requirements, particularly regarding transparency. They did not, however, provide specific standards. As a result, a number of private firms developed a plethora of ESG ratings, data, and indices as tools for asset owners and asset managers seeking to pursue "sustainable" investment approaches. As has been repeatedly observed in market-driven processes, the ESG industry began to consolidate into a small group of big firms with high market power (Escrig-Olmedo et al., 2019; Dimmelmeier, 2020). The so-called Sustainable Finance 2.0 period was characterized by the primary aim to manage the financial risks of investors' portfolios.

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These risks were understood as stemming from ESG factors. The ultimate goal was to avoid these risks, protecting investor portfolios in order to maximize financial gains. Retail investors and institutional asset owners alike increasingly invested in "mass market" ESG funds reallocating ever-larger amounts of capital. Between 2006 and 2015, the PRI-linked investments of asset owners grew from $2 trillion to $13.2 trillion.[6]

According to Busch et al. (2021), the 2015 Paris Agreement marks the transition toward "Sustainable Finance 3.0." The advent of the UN Sustainable Development Goals and the increasingly discussed urgency to keep global warming below +2.0°C induced a stronger focus on the real-world impact of sustainable finance.[7] "Impact" can be defined as positive effects on the ESG practices of firms in the portfolios of ESG funds. Since the Paris Agreement, PRI-linked investments surged even further to $29.2 trillion (2021) – "sustainable" investing driven by the ESG infrastructure became an important force within the global financial system.

However, as the following sections demonstrate, the emergence of ESG as private standards for financial governance has resulted in a configuration through which a particularly narrow understanding of sustainability was locked into the infrastructural devices that inform "sustainable" investment.

4 Resulting Market Structures and ESG's Impact Potential

If we want to assess the impact of ESG we need to look at the potential channels of impact the funds may exercise and understand which actors actually decide which channels are being used. In essence, there are two mechanisms ESG funds can use in order to exert influence on corporations and create impact: capital allocation (i.e., which companies to include in or exclude, also known as divestment or "exit"), created through the steering capacities of their portfolio (Rohleder, Wilkens, and Zink, 2022), and shareholder engagement (also referred to as "voice"), which consists of direct engagements with the top management of investee firms as well as the shareholder voting behavior of funds at the annual general meetings of the portfolio companies. So far, the vast majority of ESG funds have not systemically adopted these potential mechanisms to create an impact regarding sustainability issues (see Griffin, 2021; de Groot, Koning, and van Winkel, 2021; Golland et al., 2022).

We argue that this is the case because, since the early 2000s, ESG investing was shaped by a burgeoning private industry for ESG market tools which consolidated into a handful of globally dominant firms (European Commission, 2020; Harty and Tor, 2020; ESMA, 2022). They provide quintessential information (data) on the ESG performance of individual firms (ratings) and define groups or "baskets" of firms that are considered "sustainable" (indices). These assessments and categorizations have become authoritative to every market participant navigating the world of ESG investing. They have become a taken for granted baseline that informs how actors calculate, act, and trade (see Pinzur, this volume).

The ESG index industry is characterized by a particularly concentrated market structure, where one firm – MSCI – has emerged as the dominant provider of ESG indices. Partially, this is because MSCI is one of the very few fully integrated firms providing ESG ratings and data as well as indices. As Simpson, Rathi, and Kishan (2021, para. 4) noted, "no single company is more critical to Wall Street's new profit engine [i.e., ESG investments] than MSCI, which dominates a foundational yet unregulated piece of the business." This business model creates strong synergistic network effects through its provision of complementary infrastructural devices necessary for ESG investing to function (Petry, 2021). First-mover advantage via acquisitions, combined with large economies of scale and scope and a market-compatible approach paved the way for MSCI's success. By deciding which stocks and bonds are included in ESG funds via its indices, MSCI effectively defines what counts as ESG investing and

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thus emerged as a new kind of "focal institution" in this issue area (Büthe and Mattli, 2011). According to JP Morgan, "MSCI has earned its position because they have become a proven compounder with leading offerings in indexing and unmatched scale and longevity in ESG data." Commenting on MSCI's role in ESG, the investment bank further argued: "we are not aware of any businesses with data assets that can match MSCI's combination of history and scale in research, data, and analytics or in indices" (Gordon, 2023). More than merely leading the market, MSCI is de facto setting global ESG investing standards.

This standard, however, does not endorse "additionality" (see Serafeim, 2023) – which means that no (or only very little) capital actually flows to "green" or "sustainable" projects that would not otherwise have been financed. This is the case because the vast majority of ESG funds are not active on the primary markets – where new capital is raised via the issuance of shares or bonds. Like conventional investment funds, ESG funds are predominantly active on the secondary market, where only already issued securities are traded. In essence, the majority of ESG funds today invest in a very similar way to conventional funds.

ESG investing as currently practiced by most asset managers is almost exclusively focused on managing ESG risks to investor portfolios and to achieve financial gains – but does not seriously engage with the corporations owned by the funds in order to enhance the sustainability of their business practices (Crona, Folke, and Galaz, 2021). ESG funds are situated at a prominent market position which could – in theory – be used to influence fossil fuel firms to change their business model and refrain from harmful environmental practices like fracking. They mostly refrain from doing so, however, as neither the forceful use of shareholder voting nor engagement with company management to advance sustainability are considered necessary elements of ESG and neither is capital allocation properly utilized in the majority of ESG funds.

For most lay observers this is probably very counterintuitive. We argue that this is the case because ESG funds mostly follow existing market patterns guided by the sociotechnical infrastructure provided by index providers, which results in an infrastructural lock-in. The underlying understanding of sustainability (or materiality) that was baked into investment decisions based on these ESG infrastructures is discussed in the following section.

5 Materiality of ESG Devices: Data, Ratings, and Indices

One consequence of the adoption of the market-driven and product-focused approach toward sustainable investing described in Section 3, is that ESG infrastructures have endorsed "single materiality" as *the* concept guiding their premises and understanding of sustainability. Single materiality is an accounting approach that aims to measure how climate change and other "market externalities" create risks that potentially influence the financial value of a corporation. In concrete terms, a single-materiality approach could consist of quantifying the water use of soft-drink makers or chemical companies and the risk they run because of potential water shortages – but only insofar as it poses a risk to their operating profit. It does not explicitly aim to account whether a corporations business practices create risks for the environment. In a similar vein, the environmental footprint (waste, etc.) of fast-food vendors could be assessed quantitatively – however, again, exclusively as a potentially material financial business risk. Single materiality is thus an approach that only accounts for how sustainability factors affect the financial value of a company. As Buller (2022, p. 166) put it, the primary question for single-materiality-oriented finance is "not what your portfolio can do for the climate crisis, but what the climate crisis will do to your portfolio."

In contrast, double materiality considers how companies affect societies and the environment. In doing so, this concept sets

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the ambitious aim to move beyond a pure market orientation and internalize nature and society into economic thinking and practices. This approach poses a fundamental rupture with current market (infra)structures and interests. Using a double-materiality approach would imply measuring all greenhouse gas emissions and other harmful business practices of a company and engaging the firm to adopt a path of reducing emissions and put a halt to harmful business practices in general. In other words, double-materiality-focused ESG investing would ask what fund portfolios can do to mitigate climate change and contribute to sustainability.

Consequently, we need to distinguish between ESG investing approaches that seek to create a positive sustainability impact by adopting and following a double-materiality approach and ESG as a profit-driven investment scheme informed by a single-materiality approach. In the former, the focus is shifted to the question of how individual firms can create significant positive impact with regard to sustainability issues; the latter entrenches financial risk and profitability as the driving motives for companies' actions. As ESG ratings and indices effectively steer sustainable investing (Fichtner, Jaspert, and Petry, 2023a), we need to scrutinize the dominant actors in the field and whether they adopt single- or double-materiality approaches.

The case of MSCI's ESG methodology approach is very instructive in this regard. Eccles, Lee, and Stroehle (2020) have conducted a historical case study of KLD and Innovest, two major ESG firms bought by MSCI in 2010. KLD pursued a values-driven approach to "sustainable" investing that scored companies on a five-point scale from "major strength" to "major weakness" in the categories of community relations, employee relations, the environment, the product, and treatment of women and marginalized groups. In the words of Eccles, Lee, and Stroehle (2020, p. 580), "KLD focused its ESG assessment specifically on the benefit or harm to the wider society and not on the financial benefit for investors." In other words, ESG data by KLD sought to capture what is referred to as double materiality. Crucially, KLD did not provide an aggregate quantitative score for rated corporations, which meant that users of its ESG data had to do their own final assessment and could not simply use the KLD data to "automatically" construct investment products. Innovest, in contrast, tried to develop a methodology "as quantitative as possible" by assessing over fifty individual performance indicators in five areas: strategic governance, emerging markets, products and services, human capital, and stakeholder capital (Eccles, Lee, and Stroehle, 2020, p. 581). Innovest's ESG assessments were relative and meant to be directly comparable with other firms (to produce "best-in-class" comparisons), the assessments by KLD were absolute (and thus arguably better at creating sustainability impact in the outside world). MSCI chose to continue with the financial value-oriented methodology of Innovest, while discontinuing the KLD approach that captured double materiality to a much greater extent.

The rationale was that the approach by Innovest was better suited to build products that could be sold to financial actors and, crucially, was also much easier to scale (Eccles, Lee, and Stroehle, 2020). Scaling is pivotal for financial firms as it allows them to spend money on creating an ESG rating, an ETF, or a stock index only once, and subsequently sell it to a potentially unlimited number of clients without incurring substantial additional costs. These considerations and processes within MSCI shape the current market structure for ESG ratings and effectively erase qualitative approaches seeking to adopt double-materiality conceptions. ESG ratings in their current form primarily capture single-materiality risk and largely fail to account for double materiality.

This leads to confusing, even misleading, results. In MSCI's ESG rating methodology, for instance, "water stress" is an important metric to calculate the environmental dimension of a company's ESG rating. In this category, Nestlé, the world's largest food and beverage company, is categorized as an ESG leader[8] – notwithstanding the fact that the company has been involved in

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countless scandals where it extracted, bottled, and sold drinking water for a huge profit while depriving local communities from Canada to Pakistan. In the apt words of Simpson, Rathi, and Krishan:

> *There's virtually no connection between MSCI's "better world" marketing and its methodology. That's because the ratings don't measure a company's impact on the Earth and society. In fact, they gauge the opposite: the potential impact of the world on the company and its shareholders. (Simpson, Rathi, and Krishan, 2021, para. 5)*

Next to ESG ratings, ESG indices play an important role as infrastructural devices in ESG investing (Fichtner, Jaspert, and Petry, 2023b). Since the 2008 financial crisis, stock indices (e.g., the S&P 500) have become much more important in global finance as they are effectively "steering capital" (Petry, Fichtner, and Heemskerk, 2021). Indices occupy a dominant position in the investment chain (see Arjaliès et al., 2017) of ESG, too: a small group of firms is crucial for the provision of relevant ESG indices. These include S&P Dow Jones Indices (part of S&P Global), FTSE Russell (part of the LSE Group), and Bloomberg. But one firm in particular dominates the market for ESG indices as well as for ESG ratings:[9] MSCI. Recent research found that MSCI has an astounding market share of 56% in ESG-relevant indices (Fichtner, Jaspert, and Petry, 2023a).

Thereby, ESG investing has been facilitated and "standardized" by this group of key ESG index providers. While ESG firms have not formally agreed to any market standards, as Fichtner, Jaspert, and Petry (2023a) have shown the majority of large ESG funds today nevertheless do not substantially deviate from conventional investment funds in regard of their capital allocation. A comparison of the holdings of the largest ESG ETF and the largest conventional ETF by BlackRock (the largest asset manager in ESG) provides an example of the striking similarities. Table 22.1 shows the ten largest firms in the portfolio of the (conventional) iShares Core S&P 500 ETF and the iShares ESG Aware MSCI USA ETF. In both funds, Apple, Microsoft, Amazon, Nvidia, and Alphabet (Google) constitute the largest constituents in the portfolio (with together well over 20%). The only top-ten firm from the conventional fund that is not also a top-ten holding in the ESG fund is Berkshire Hathaway. There is almost no difference between how conventional and ESG funds allocate capital.

Table 22.1 Capital allocation of big conventional versus big ESG fund

iShares Core S&P 500 ETF		*iShares ESG Aware MSCI USA ETF*	
Firm name	*Portfolio weight(%)*	*Firm name*	*Portfolio weight(%)*
Apple	7.4	Apple	7.3
Microsoft	6.8	Microsoft	6.5
Amazon	2.9	Amazon	2.8
Nvidia	2.2	Nvidia	2.2
Alphabet Class A	2.1	Alphabet Class C	1.9
Alphabet Class C	1.9	Alphabet Class A	1.8
Berkshire Hathaway	1.7	Tesla	1.4
Meta Platforms	1.6	United Health	1.3
Tesla	1.4	Meta Platforms	1.3
UnitedHealth	1.3	Coca-Cola	1.1

Source: The authors based on www.ishares.com.

From a climate-change mitigation perspective, large fossil fuel firms are particularly relevant to consider. If we examine the iShares Core S&P 500 ETF, from the example in Table 22.1 more closely, we see that 4.17% of its portfolio is invested in oil and gas companies. In the allegedly "sustainable" ESG Aware MSCI USA ETF fund, the share of investment into fossil fuel companies is only marginally reduced to 4.14%. It hardly deviates. ExxonMobil has a portfolio weight of 1.23% in the conventional iShares fund and 1.01% in the ESG fund; for Chevron, the respective weightings are 0.77% and 0.70%, respectively.

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This is because the iShares ESG Aware MSCI USA ETF applies the so-called Broad ESG approach. Funds adopting this approach, generally speaking, hardly deviate from conventional, non-ESG funds in how they construct their portfolio and consequently are particularly prone to greenwashing. In contrast, so-called Light Green and Dark Green ESG funds, which tend more toward impact-generating approaches ("double materiality"), diverge from conventional funds to some degree. These, however, only account for a tiny share of the overall market. In 2021, 88% out of the 500 ESG largest funds marked can be classified as Broad ESG funds, whereas Light Green and Dark Green funds only accounted for 7% and 5% of the overall market (Fichtner, Jaspert, and Petry, 2023a). Thus, most ESG funds do not substantially deviate from conventional investment funds in their capital allocation. Moreover, the vast majority of ESG funds do not utilize the potential mechanisms of private engagements and shareholder voting to push for sustainability in the corporations in which they hold shares.

This is because – like ESG ratings – ESG index methodologies are based on a "single-materiality" conception of sustainability. Having emerged as market-driven, financial value-oriented standards for financial governance, ESG as the sociotechnical infrastructure that enables but simultaneously constrains what is considered "sustainable" investment has locked in a particular narrow conception of sustainability that informs the majority of current investment practices.

6 Conclusion

In this chapter we have argued that ESG is a privately developed sociotechnical financial infrastructure that underpins the functioning of "sustainable" investing. While primarily created for private investors, policymakers and regulators often attribute a central steering role and capacity to ESG investing in efforts to mitigate climate change. ESG funds manage large amounts of capital, thus having the potential to trigger far-reaching changes in the economy and push toward decarbonization. However, this potential is currently not utilized, because very few ESG funds are systematically utilizing potential transmission mechanisms to facilitate sustainable impacts. Neither do they use private engagements with management or shareholder voting to push for sustainable business practices; nor do most ESG funds substantially differ from conventional funds in their capital allocation. What we observe instead is an infrastructural lock-in of a particular understanding of sustainability that is based on a single-materiality approach. ESG investing in its current form, based on single materiality, is specifically not designed to manage broader societal and environmental risks, and definitely not to mitigate the climate crisis. Arguably, ESG has gained increasing acceptance among financial analysts and other financial practitioners because it offers them a powerful tool capable of integrating social and environmental developments into their calculations merely as market signals, while refraining from any normative attempt to influence ESG issues (Leins, 2020). In other words, the current form of ESG investing is convenient for investors and asset managers because it takes conventional investing as its baseline and only "tweaks" the capital allocation.

Only a small number of financial firms have shaped the historical development of ESG investing. Arguably the most important firm has been MSCI, whose dominant market position in ESG data, ratings, and indices has enabled it to shape the underlying infrastructure of ESG. This has resulted in de facto market standards that define what is considered as sustainable investing based exclusively on single-materiality risk assessments. These ESG standards are an example of "market-based" private regulation, in which firms "establish their preferred technologies or practices as the de facto standard through market dominance or other strategies" (Büthe and Mattli, 2011, p. 14; see also Green, 2010, 2014). The outcome of this constellation is, as we have shown, an *infrastructural*

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lock-in of single-materiality sustainability conceptions into investment practices.

Analyzing sustainable finance through the lens of a sociotechnical infrastructure bears the advantage of making the possible long-term consequences of the current lock-in visible. If an approach to "sustainable" investment which hardly has any effect of steering capital into decarbonization is getting locked in, it significantly reduces the role of private financial markets to advance the green transition. While others have focused on the lock-in through carbon-emitting infrastructures (Seto et al., 2016), our focus on carbon-financing infrastructures adds a novel perspective for analyzing potential pathways toward a sustainable future.

Based on our analysis in this chapter, we argue that if ESG is supposed to play any meaningful role in the "the wholesale transformation of our carbon-intensive economies," as demanded by US Treasury Secretary Janet Yellen, regulators have to make sure that ESG funds follow a double-materiality logic that actually creates a positive sustainable impact. Defining the use of capital allocation, private engagements, and shareholder voting to advance sustainability as essential elements of all ESG funds could potentially overcome the lock-in of the current form of ESG investing, which has very little impact and thus is not making finance flows consistent with a pathway toward a decarbonized economy.

Notes

1. While sustainable finance also includes green bonds and sustainability-linked loans, ESG is the largest segment and the focus of this chapter.
2. We understand greenwashing as projecting a public image of environmental responsibility that is not met by actual business practices.
3. We define financial infrastructures as the sociotechnical "systems through which basic but crucial enabling functions are carried out, but that tend to be taken for granted and assumed" (Bernard and Campbell-Verduyn, 2019, p. 776).
4. Seto et al. (2016) discuss infrastructures as one potential source for the lock-in of carbon-intensive emissions pathways; while they focus on how physical infrastructures such as internal combustion engines, pipelines, or power plants engage in and support carbon emission, our focus is on the financial infrastructures that fund carbon emissions (see also Petry, 2023).
5. ETFs are investment funds that are continuously traded and that often track a whole stock market index instead of only a limited number of firms (see Braun 2016, 2021; Fichtner, Heemskerk, and Garcia-Bernardo, 2017; Fichtner and Heemskerk, 2020).
6. As noted, quantifying sustainable investing is very difficult; therefore, this data should not be taken at face value but is rather displayed to indicate the increase of sustainable investments; source: www.unpri.org/about-us/about-the-pri.
7. For the emerging literature on the potential impact of sustainable finance, see Busch et al., 2021; Caldecott et al., 2022; Fichtner, Jaspert, and Petry, 2023a, 2023b; Kölbel et al., 2020; Wilkens, Rohleder, and Zink, 2022.
8. MSCI ESG Ratings & Climate Search Tool: Nestle S.A., category: "how well is the company managing the ESG issues that could affect it financially"; www.msci.com/our-solutions/esg-investing/esg-ratings-climate-search-tool/issuer/nestle-sa/IID000000002144386.
9. Two other important ESG rating providers are Sustainalytics (part of Morningstar) and ISS ESG (part of Deutsche Börse).

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