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# Finance

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# Chapter 20: Finance

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## Abstract

Public law has attempted to mobilise finance for climate change activities for decades, but the needs of countries are greater than available public financing. Recognising this, the Paris Agreement seeks to incentivise private actors to make climate investments and reduce climate risks. Governments have sought to achieve the "climate alignment" goal of Paris Agreement by correcting market failures in financial markets, in the hope this will channel private funds towards climate activities. Primarily policymakers have done so through instruments such as climate risk disclosure mandates and green taxonomies. This Chapter argues that these incumbent efforts focus narrowly on addressing information-based market failures, and fail to account for the full range of other problems that inhibit private climate investment and risk management. Further, it argues that these information-based regulatory approaches create new forms of carbon and climate risk "leakage", with the consequence that the costs of climate alignment are pushed from private actors onto the public. This Chapter puts forward legal mechanisms which might arrest this carbon and climate risk leakage problem.

## Key words

Climate finance; sustainable finance; climate law; law and finance; private law

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## 1. Introduction

The international climate regime has sought to mobilise public financial flows to climate activities for decades.[1] But these public financial flows have fallen short. The Climate Policy Initiative (CPI) estimates that the gap between current financial flows and those needed to meet the goals of the Paris Agreement—to limit the global temperature increase to 1.5°C above pre-industrial levels—stands at US$5.93 trillion annually.[2] While public financial flows have been increasing over the years—a trend that almost certainly looks to be reversed at the time of writing[3]—the climate regime has gradually expanded its sources. Indeed, one of the Paris Agreement's central objectives is to make ". . . finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".[4] This broad "climate alignment" goal is intended to capture private sources of finance.[5] To be sure, private climate financing has increased in recent years, but a closer look at the data reveal that much of this growth comes from households in relation to domestic investment, rather than financial institutions.[6] As such, private finance flows by institutions and other non-household actors in advanced economies will need to increase to meet this need.[7]

On its face, an increase in climate investment and climate risk management is in the interest of private financial system actors, at least over the long term. Not only is there money to be made from investing in some of the new green technologies which will underpin transitions to the economy as a result of climate change, but ongoing investment in high emitting technologies is contributing to climate-related physical,

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[1] Public finance has been a part of the climate regime since the 1992 United Nations Framework Convention on Climate Change, see below Section 2 of this Chapter.

[2] Baysa Naran and others, 'Global Landscape of Climate Finance 2024: Insights for COP29' (Climate Policy Initiative October 2024) 9, 43.

[3] At the time of writing, several donor countries have announced reduction in their foreign aid commitments, see, for example, 'Putting America First In International Environmental Agreements' (*The White House*, 20 January 2025) <https://www.whitehouse.gov/presidential-actions/2025/01/putting-america-first-in-international-environmental-agreements/> accessed 25 March 2025; 'Reevaluating And Realigning United States Foreign Aid' (*The White House*, 21 January 2025) <https://www.whitehouse.gov/presidential-actions/2025/01/reevaluating-and-realigning-united-states-foreign-aid/> accessed 25 March 2025; and Philip Loft and Philip Brien, 'UK to Reduce Aid to 0.3% of Gross National Income from 2025' (*UK Parliament*, 28 February 2025) <https://commonslibrary.parliament.uk/uk-to-reduce-aid-to-0-3-of-gross-national-income-from-2027/> accessed 26 March 2025.

[4] United Nations Framework Convention on Climate Change (UNFCCC), Decision 1/CP.21, 'Adoption of the Paris Agreement' (UN Doc FCCC/CP/2015/10/Add.1, 29 January 2016) Art 2.1(c) (Paris Agreement).

[5] The term "climate alignment" is increasingly being used in policy documents and discussions to refer to Paris Agreement Art 2.1(c), see for example: OECD, *OECD Review on Aligning Finance with Climate Goals: Assessing Progress to Net Zero and Preventing Greenwashing* (OECD Publishing 2024) <https://www.oecd.org/en/publications/oecd-review-on-aligning-finance-with-climate-goals_b9b7ce49-en.html> accessed 1 April 2025.

[6] Baysa Naran and others (n 2) 28, 40; Barbara Buchner and others, 'Global Landscape of Climate Finance 2023' (Climate Policy Initiative November 2023) 19.

[7] Barbara Buchner and others (n 6) 19–20.

transition, and liability risks. Dirty investment drives up emissions, which in turn, are leading to increasing severity of climate impacts, higher levels of vulnerability in the real economy, and climate-related financial risks for financial actors.[8] Under any of the "long-tail" damages scenarios estimated by climate economic models, this could well lead to large-scale financial system shocks and losses.[9] Despite this, the financial system is plagued by market and regulatory failures that undermine the ability of financial actors to coordinate, act over longer time periods, and account for public goods. Hence the need for the climate-alignment goal, in the first place.

National policymakers, regulators, and investors have started to try and address the barriers to climate-aligned financial flows, but not under the banner of the Paris Agreement. Instead, under the guise of the so-called sustainable finance or environment, social, and governance (ESG) investment agenda, which has long had a "climate-first" focus, governments have widely adopted climate disclosure laws[10], sustainability taxonomies, green bond standards, and regulatory tools like climate risk stress tests. These regulatory instruments are all largely aimed at correcting information deficits and asymmetries among firms, investors, and regulators in public financial markets. The regulatory interventions rest on the assumption that if market actors are provided with more complete and comparable climate-related information, they will efficiently allocate capital and avoid climate risks in a way which align the financial system more closely to the Paris Agreement goals.

Regulatory measures to date have addressed the genuine and much needed information gaps about climate change within financial markets. However, such measures are also producing unintended outcomes which are at odds with the Paris Agreement goals. Rational financial decision-making is not just resulting in firms and investors reducing carbon liabilities and climate risks. Instead, actors are also increasingly shifting high-carbon assets and climate-related risks to entities outside of the emerging climate-information ecosystem, including to actors who have the least capacity to respond to such liabilities and risks. This "leakage" of carbon liabilities and climate risks offends a fundamental notion under international climate law to address the distributional inequities arising because of climate change.

Achieving climate alignment requires broad reforms across domestic and international private law, which is an endeavour beyond this Chapter's scope but addressed elsewhere in this Handbook. Here, I focus on how private lawyers can confront the "leakage" arising from the climate information regime, which is a necessary condition if financial markets are to support climate alignment meaningfully. Drawing on emerging

[8] Madison Condon, 'Market Myopia's Climate Bubble' (2022) 2022 Utah L Rev 63.
[9] See generally, Gernot Wagner and Martin L Weitzman, *Climate Shock: The Economic Consequences of a Hotter Planet* (Princeton University Press 2015).
[10] See Virginia Harper Ho, Chapter 23 of this Handbook; Maria Eduardo Lessa and Mariana Pargendler, Chapter 19 of this Handbook.

literature in corporate law, contract, and financial regulation, I show that existing legal tools primarily aim to deter firms from shifting carbon liability and climate risk. This Chapter extends that conversation on "risk shifters", exploring how law might also incentivise these firms to retire dirty assets. Because firms cannot easily capture the public gains of closing high-emissions assets or reducing systemic climate risks, they underinvest in these positive externalities. I suggest that targeted instruments such as tax credits or transferable credits could help correct this misalignment.

I also consider how private law can shape the incentives of carbon and climate risk "recipients". All parties—risk shifters, recipients, and governments—stand to gain from avoiding this transfer. To improve coordination, I argue for more transparent disclosure of climate risk shifting and suggest that performance-based contracts, including sustainability-linked insurance contracts, could help to reduce climate risks in a smoother way that reduces the inequities of sharp finance withdrawal.

These mechanisms are not sufficient to achieve full climate alignment on their own. However, if information-based financial markets are to contribute meaningfully to climate goals, correcting these distortions is a necessary starting point.

The remainder of the Chapter is set out as follows. Section 2 discusses the climate-alignment objective of the Paris Agreement and the key private law mechanisms advanced towards this end under the guise of the "sustainable finance" agenda. I highlight how these private law instruments have predominantly focused on addressing information-based market failures. In Section 3, I argue that this narrow focus on information has created perverse incentives for investors to shift, rather than reduce, carbon liabilities and climate risks leading to leakage. In Section 4, I build on the existing legal scholarship and propose mechanisms that limit carbon and climate risk leakage, before concluding in Section 5.

## 2. How the Private Law Response to Climate Alignment Has Been Shaped by the Sustainable Finance Agenda

Finance as a theme has been central to the international climate regime since the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the first global treaty to focus on the emerging threat of global warming. However, in its early development, finance was primarily considered within the domain of public-to-public transfers.[11] It was not until the late 2000s that the Conference of the Parties (COP) of the

[11] The UNFCCC requires its developed country parties to supply "new and additional financial resources" for developing countries to formulate and implement climate-related policies. It further requires developed countries to "assist the developing country Parties that are particularly vulnerable" in meeting the costs of adapting to the adverse effects of climate change. UNFCCC (9 May 1992) 1771 UNTS 107 arts 4.3 and 4.4.

UNFCCC started to explicitly call for the provision of non-public sources of finance.[12] This call crystalised in the US$100 billion finance goal which included a request for finance from a "variety of sources, public and private, bilateral and multilateral, including alternative sources".[13] The COP decisions reflect the historical emphasis of the UNFCCC framework, which points to public and private finance as a way of compensating parties for the distributional inequalities of climate change.

## 2.1 The Paris Climate-Alignment Goal

The Paris Agreement codified these COP decisions into a treaty calling for ongoing support to developing countries from a "wide variety of sources".[14] Indeed, the New Collective Quantified Goal agreed pursuant to the Paris Agreement at COP 29 in 2024 explicitly calls for mobilising at least US$1.3 trillion per year by 2035,[15] with developed countries "taking the lead, of [providing finance to developing countries of] at least USD 300 billion per year by 2035".[16]

Importantly, aside from these historical quantified finance provisions in the UNFCCC regime, the Paris Agreement also includes an overarching goal in Article 2.1(c): to make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".[17] Sitting in the objective clause of the Agreement, the "climate-alignment" goal is puzzling. It refers neither to the standard terms used in historical climate finance provisions, nor to its providers and recipients. Instead, it adopts new terminology such as finance "flows", "consistent", and "pathway" that is not further defined. The way the climate-alignment objective interacts with other provisions, particularly Article 9, of the Paris Agreement has been the subject of some—although, surprisingly limited—academic discussion.[18]

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[12] The Bali Action Plan called for "[i]mproved access to adequate, predictable and sustainable financial resources and financial and technical support, and the provision of new and additional resources, including official and concessional funding for developing country Parties". UNFCCC, 'Report of the Conference of the Parties on its Thirteenth Session, Held in Bali from 3 to 15 December 2007: Action Taken by the Conference of the Parties' at its Thirteenth Session' (Addendum, FCCC/CP/2007/6/Add.1, United Nations 14 March 2008) 5.

[13] UNFCCC, 'Report of the Conference of the Parties on its Seventeenth Session, Held in Durban from 28 November to 11 December 2011: Action Taken by the Conference of the Parties at its Seventeenth Session' (Addendum, FCCC/CP/2011/9/Add.1, United Nations 15 March 2012) 23, [130].

[14] Paris Agreement (n 4), art 9.3.

[15] UNFCCC, 'Decision -/CMA.6: New Collective Quantified Goal on Climate Change' (Advance unedited version) [7].

[16] ibid [8].

[17] Paris Agreement (n 4) art 2(1)(c).

[18] Alexander Zahar, 'The Paris Agreement and the Gradual Development of a Law on Climate Finance' (2016) 6 Climate Law 75; Alexander Zahar, 'The Paris Agreement and the Gradual Development of a Law on Climate Finance' <https://brill.com/view/journals/clla/6/1-2/article-p75_5.xml> accessed 4 February 2025; Luis H Zamarioli and others, 'The Climate Consistency Goal and the Transformation of Global Finance' (2021) 11 Nature Climate Change 578; Megan Bowman, 'Polaris and Pluralism: Presenting a Legal Analytical Framework for Climate Finance' (2023) 17 Carbon & Climate Law Review 3.

There are two opposing views in the literature on the climate-alignment objective. On the one hand, some argue that the objective clause is subjugated to other articles—particularly Articles 4 and 9—and can only refer to aligning finance flows from developed to developing countries.[19] Others suggest that the chapeau in the clause—which refers to all parties—would suggest that it is meant to apply more broadly than just developed to developing finance flows.[20] The latter broader interpretation seems to be confirmed by historical analysis of negotiating texts, and qualitative interviews with negotiators who suggest that the purpose of the clause is "to make all finance flows (and capital stocks) consistent with the agreement's mitigation and adaptation objectives".[21] This implies that the article is "not only about the provision of finance but also about advancing regulation such as for fixing market imperfections, setting directions and creating enabling environments".[22] This view seems to also be supported by ongoing discussions at the UNFCCC at the time of writing.[23]

In sum, Article 2.1(c) of the Paris Agreement calls for a holistic approach to financial flows, to better attract climate finance beyond traditional public sector actors, and including, among others, private actors. Parties call for such flows to support vulnerable and developing countries. To do this effectively requires efforts on the part of governments and private actors to better align their incentives for climate-related investment activities.

## 2.2 Sustainable finance and information-based market failures

Governments and private actors have already taken some steps to try and address the incentive problems related to climate alignment. But their motivation for doing so has not only been driven by the UNFCCC process, but also by longer running efforts to realign the financial system in a way that accounts for the sustainable development agenda; what has come to be known more colloquially as the ESG investing or sustainable finance agenda. It is important to understand the origins of these sustainable finance efforts, as these have shaped the focus and direction of most private law climate-alignment efforts to date, at least in liberal market economies.

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[19] Zahar (n 18).
[20] Bowman (n 18); Zamarioli and others (n 18); Shelagh Whitley and others, 'Making Finance Consistent with Climate Goals: Insights for Operationalising Article 2.1c of the UNFCCC Paris Agreement' (ODI, WRI, RMI, E3G 2018).
[21] Zamarioli and others (n 18).
[22] ibid 581.
[23] 'First Workshop under the Sharm El-Sheikh Dialogue on Article 2, Paragraph 1(c) of the Paris Agreement and Its Complementarity with Article 9' (*United Nations Climate Change*) <https://unfccc.int/event/first-workshop-under-the-sharm-el-sheikh-dialogue-on-article-2-paragraph-1c-of-the-paris-agreement> accessed 27 March 2025; UNFCCC, 'First Work in 2024 Under the Sherm el-Sheikh Dialogue on the Scope of Article 2, paragraph 1(c), of the Paris Agreement and its Complementarity with Article 9, of the Paris Agreement (Summary Report, SES/2024/WA1/SummaryReport, United Nations 9 August 2024) [27]–[29].

The concept of ESG, the forerunner to sustainable finance, emerged in the early 2000s.[24] During this era, and under the leadership of then-Secretary General Kofi Annan, the United Nations (UN) sought to build stronger relationships with investors, which they saw as pivotal for delivering the UN's Sustainable Development Goals—the social and economic development goals then guiding the UN's agenda. In 2003, the UN Environment Programme had established a Finance Initiative (UNEP-FI) that formed a working group of twelve asset management firms to explore the materiality of "Social, Environmental, and Corporate Governance Issues" for equity pricing.[25] And in 2005, the UN Global Compact published a report which captured some of the work of the UNEP-FI working group titled "Who Cares Wins", in which the ESG moniker was first used and through which the term came to reach a mass audience.[26]

This link between sustainable investments and a reduction in risks—or, in the language of the report, the "contribut[ion] to more stable and predictable markets"—was a hallmark of the sustainable investing movement that followed.[27] To operationalise the Who Cares Wins report, the UN Principles of Responsible Investment (UN-PRI) network was formed in 2005, promoting six mutually agreed principles, such as: "Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes . . . . Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest".[28]

As these principles make clear, the focus of sustainable investing was about creating standardised approaches for market participants to disclose sustainability information with a view to allow such participants to incorporate the information into their

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[24] Elizabeth Pollman, 'The Making and Meaning of ESG' (2024) 14 Harv Bus L Rev 403; 414; Elliot Wilson, 'The United Nations Free-Thinkers Who Coined the Term "ESG" and Changed the World' (*Euromoney*, 1 October 2021) <https://www.euromoney.com/article/294dqz2h1pqywgbyh3zls/esg/the-united-nations-free-thinkers-who-coined-the-term-esg-and-changed-the-world> accessed 27 March 2025; Thierry Roncalli, *Handbook of Sustainable Finance* (2022).

[25] United Nations Environment Programme Finance Initiative, 'The Materiality of Social, Environmental and Corporate Governance Issues to Equity Pricing' (CEO Briefing, August 2004) 2.

[26] In the words of the report,

> Ultimately, successful investment depends on a vibrant economy, which depends on a healthy civil society, which is ultimately dependent on a sustainable planet. In the long-term, therefore, investment markets have a clear self-interest in contributing to better management of environmental and social impacts in a way that contributes to the sustainable development of global society. A better inclusion of environmental, social and corporate governance (ESG) factors in investment decisions will ultimately contribute to more stable and predictable markets, which is in the interest of all market actors.

United Nations Global Compact, 'Who Cares Wins: Connecting Financial Markets to a Changing World' (Final Report, 2005), 3.

[27] Pollman (n 244) 417–423.

[28] 'What Are the Principles for Responsible Investment?' (*Principles for Responsible Investment*) <https://www.unpri.org/about-us/what-are-the-principles-for-responsible-investment> accessed 26 March 2025.

investment decision-making. In this way, the movement was built on top of orthodox thinking about the "informational efficiency" of the capital markets. [29]

In the informational efficiency view of the capital markets, rational investors, acting in their own self-interest, quickly absorb new information about financial assets and this drives their buying and selling activity.[30] But to enable these efficient financial markets, material information that could affect the price of assets should not be held back by misplaced incentive structures of investors or firms.[31] To this end, a legitimate source of intervention in the capital markets is to address information asymmetries, where one party in a transaction has more or better information than the other, or informational deficiencies, which can limit the efficient pricing of financial assets and thus the efficiency of the market. [32]

The sustainable finance agenda thus focuses heavily on correcting the informational shortcomings of financial markets. The foundational approach to ESG investing was for investors and companies to voluntarily provide sustainability information to each other. The movement's founders deliberately eschewed discussion of reforming financial institutions themselves, as this might have been unpopular with the founders and undermined their "insider" strategy. [33] This proved to be a sound strategic choice. Although the sustainable finance agenda and ESG have recently faced a significant backlash, at its peak it was a more than US$120 trillion industry, with more than half of all the world's institutional capital managed by investors committed to the UN PRI principles.[34]

Given this level of industry endorsement, the principles became the cornerstone of sustainable finance regulations. And the growth of such regulation has been significant. The UN PRI estimates that there are over 1000 sustainable finance regulations enacted by governments, a more than 10-fold increase over 20 years.[35] This includes instruments such as:

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[29] This "efficient capital market hypothesis" is most famously explained in Eugene F Fama, 'Efficient Capital Markets: A Review of Theory and Empirical Work' (1970) 25 Journal of Finance (JF) 383.
[30] ibid.
[31] Ronald J Gilson and Reinier H Kraakman, 'The Mechanisms of Market Efficiency' (1984) 70 Va L Rev 549.
[32] See, for example, Joseph E Stiglitz and Andrew Weiss, 'Credit Rationing in Markets with Imperfect Information' (1981) 71 The American Economic Review 393.
[33] One of the key architects of ESG, James Gifford, characterised his strategy as a "get more bees with honey" strategy: Elliot Wilson (n 244); see also James Marlay, 'From the Wilderness to the UN – How One Australian Influence the World of Investing' (*Livewire*, 24 May 2022) <https://www.livewiremarkets.com/wires/from-the-wilderness-to-the-un-how-one-australian-influenced-the-world-of-investing>.
[34] Principles for Responsible Investment, 'Principles for Responsible Investment: Annual Report 2024' (Annual Report, 2024) 5.
[35] Hazell Ransome, 'Regulation Database Update: The Unstoppable Rise of RI Policy' (*Principles for Responsible Investment*, 17 March 2021) <https://www.unpri.org/pri-blog/regulation-database-update-the-unstoppable-rise-of-ri-policy/7352.article> accessed 27 March 2025. See also Virginia Harper Ho, Chapter 23 of this Handbook.

- Mandatory or Voluntary Climate Risk Disclosure: Climate disclosure instruments require or encourage companies or investors to correct information asymmetries or deficiencies by analysing and then disclosing to the market details on their climate-related transition risk and physical risk exposures.[36] While some scholars argue that financial markets already price in these types of risks and thus no additional government intervention is justified,[37] many scholars in law and finance have argued that—through mandatory and standardised climate risk metrics—markets will be better able to price climate risks efficiently, mitigating the mispricing that can result from hidden information.[38]
- Sustainable Finance Taxonomies: A taxonomy acts as a legal "dictionary" that defines whether financial instruments qualify as environmentally sustainable.[39] By establishing clear technical criteria for what counts as "green" (e.g. significant contribution to climate mitigation, no significant harm to other objectives), they reduce ambiguity about sustainability definitions.[40] This provides a floor on the quality of green financial products, but is also used to prevent "greenwashing"—ensuring that only projects meeting transparent standards can be marketed as sustainable.[41]
- Green Labels and Certifications: Regulators and industry bodies have also developed green labelling schemes to convey ESG information in a simple,

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[36] Madison Condon and others, 'Mandating Disclosure of Climate-Related Financial Risk' (2020) 23 New York University Journal of Legislation and Public Policy 745. See, for example, *Treasury Laws Amendment (Financial Market Infrastructure and Other Measures) Act 2024* (Cth) (Aus); The Enhancement and Standardization of Climate-Related Disclosures for Investors, 89 Fed Reg 21668 (March 6, 2024) (US); Companies (Strategic Report) (Climate-related Financial Disclosure) Regulations 2022 (UK); Hong Kong Exchange, *Rules and Guidance*, Appendix C1 (HK); 'Sustainability Reporting - Singapore Exchange (SGX)' <https://www.sgx.com/sustainable-finance/sustainability-reporting> accessed 26 March 2025 (SG).

[37] Paul G Mahoney and Julia D Mahoney, 'The New Separation of Ownership and Control: Institutional Investors and ESG' (2021) 2021 Colum Bus L Rev <https://journals.library.columbia.edu/index.php/CBLR/article/view/8639> accessed 25 March 2025.

[38] Condon and others (n39); John Armour, Luca Enriques, and Thom Wetzer, 'Mandatory Corporate Climate Disclosures: Now, But How?' (2021) 2021 Colum Bus L Rev <https://journals.library.columbia.edu/index.php/CBLR/article/view/9106> accessed 9 June 2025.

[39] Nathan de Arriba-Sellier, 'Sustainable Finance: Green Taxonomies as Instruments of System Change?' in Josephine van Zeben and Chris Hilson (eds), *A Research Agenda for Environmental* (2025) <https://www.elgaronline.com/edcollchap-oa/book/9781035324408/book-part-9781035324408-19.xml> accessed 20 February 2025. Most countries are still in the process of developing their taxonomy, see, for example, Australian Sustainable Finance Institute and Australian Government, *Developing an Australian Sustainable Finance Taxonomy – Initial Phase* (Grant Report for Treasury, 30 June 2024) (Aus); HM Treasury, *UK Green Taxonomy* (Consultation, November 2024) (UK); Monetary Authority of Singapore, *Singapore-Asia Taxonomy for Sustainable Finance: 2023 Edition)* December 2023) (SG); Hong Kong Monetary Authority, *Hong Kong Taxonomy for Sustainable Finance* (3 May 2024) (HK).

[40] Arriba-Sellier (n 39).

[41] Amanda Shanor and Sarah E Light, 'Greenwashing and the First Amendment' (2022) 122 Colum L Rev 2033; Sebastian Steuer and Tobias H Tröger, 'The Role of Disclosure in Green Finance' (2022) 8 Journal of Financial Regulation 1.

> credible manner.[42] Labels for financial products like green bonds and sustainable investment funds serve as shorthand indicators that a product meets certain ESG standards, helping to bridge the information gap between product providers and investors. In theory, a green label reduces search costs and uncertainty for investors who want to allocate capital to sustainable assets—they can rely on the label rather than performing complex due diligence on each product's ESG attributes.[43]

Governments around the world are starting to adopt these information-correcting regulatory approaches. Recent data suggest that around half of the sustainable finance regulatory instruments now on the books of governments around the world are focused on corporations or investors making sustainability and climate disclosures to the market.[44] Governments—at least, developed countries—are also using these regulatory instruments to demonstrate their commitment to climate alignment under the Paris Agreement. For example, under the Paris Agreement, developed countries are required to submit biennial communications under Article 9.5, outlining projected levels of climate finance they intend to provide or which they have "mobilised".[45] Such reports—although not directly focused on Article 2.1 (c) —often include references to it, and include references to climate disclosure obligations, green taxonomies, and labelling rules, among others.[46]

To be sure, not all sustainable finance regulation and regulatory actions to date have been in the form of capital markets regulation seeking to correct information-based market failures. Central banks and prudential regulators, for instance, have also played

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[42] See, for example, Australian Treasury and the Australian Office of Financial Management, *Australian Government Green Bond Framework* (December 2023) (Aus); Regulation (EU) 2023/2631 of the European Green Bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds [2023] OJ L (EU); Ministry of Finance Singapore, *Singapore Green Bond Framework* (January 2025) (SG).

[43] Michael Eckhart, 'Financial Regulations and ESG Investing: Looking Back and Forward' in Daniel C Esty and Todd Cort (eds) *Values at Work: Sustainable Investing and ESG Reporting* (Palgrave Macmillan Cham, 2021) 220.

[44] Ransome (n 35); see also, Emma Lecavalier and others, '2024 Oxford Climate Policy Monitor' (University of Oxford 2025) 18.

[45] Paris Agreement (n 4) art 9.5 requires biennial reporting of progress towards arts 9.1 and 9.3.

[46] Countries mostly report public law steps towards climate alignment in these reports, such as fossil fuel subsidy removal. But some report on steps towards climate alignment. See for example, Government of Canada, *Canada's Biennial Communication on Climate Finance 2024* (UNFCCC 2024) 4–5, 9–10 <https://unfccc.int/sites/default/files/resource/Canada_BC9.5_2024_EN.pdf> accessed 1 April 2025 (discusses sustainable finance efforts, including the establishment of the Sustainable Finance Action Council and support for climate-related financial disclosures (see esp. paras 17–18, 39–41); and Council of the European Union, *European Union Biennial Communication on Climate Finance 2024* (UNFCCC 2024) 8–9, 13 <https://unfccc.int/sites/default/files/resource/EU_BC9.5_2024.pdf> accessed 1 April 2025 (describes implementation of the EU Sustainable Finance Disclosure Regulation (SFDR) and its relevance to Article 2.1(c) alignment (see paras 21–24, 37)).

an increasingly important role in sustainable finance regulatory architecture.[47] Climate stress tests, for instance, serve to reveal the sensitivity of financial institutions' portfolios to plausible climate scenarios, allowing regulators to understand the concentration and amplification of climate risk across the financial system, an issue unlikely to be detected by decentralised market actors. In this way, these measures are about protecting financial stability by producing ex-ante information for regulators about future climate risk at the level of financial systems.

Some financial regulatory measures move beyond mere information sharing between market participants and regulators. Central banks, for example, can actively seek to incentivise financial actors to make more green investments: The European Central Bank announced in 2022 that it would incorporate climate change considerations into the Eurosystem's purchases of corporate sector securities. To this end, the Eurosystem tilted its corporate bond purchases to favour green bonds in its primary market bidding behaviour.[48] Also, in some rare cases, governments have signalled that they are willing to directly address the barriers to increased sustainability-related investment arising from the way financial institutions themselves are regulated.[49] Indeed, sustainable finance regulatory efforts outside of liberal market economies do sometimes have a greater willingness to focus on addressing other market failures. For example, in 2022, the China Banking and Insurance Regulatory Commission issued guidelines requiring banks and insurance institutions to be guided by the state's pollution prevention and carbon neutrality goals, to ensure a gradual and orderly reduction in the carbon intensity of their asset portfolios, with the eventual aim of achieving carbon neutrality.[50]

Clearly, not all efforts towards climate alignment to date are focused on correcting information-based market failures. However, my claim in this Section is that the balance of regulatory efforts, at least in liberal market economies, has been towards this end. This emphasis on information correction as the regulatory "tool of choice" is significant, because such approaches are having unintended consequences which could make the Paris Agreement climate-alignment goal harder to achieve.

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[47] Christina Skinner, 'Central Banks and Climate Change' (2021) 74 Vand L Rev 1301; Mercy Berman DeMenno, 'Environmental Sustainability and Financial Stability: Can Macroprudential Stress Testing Measure and Mitigate Climate-Related Systemic Financial Risk?' (2023) 24 Journal of Banking Regulation 445.

[48] European Central Bank, 'Frequently Asked Questions on Incorporating Climate Change Considerations into Corporate Bond Purchases' (8 January 2025) <https://www.ecb.europa.eu/mopo/implement/app/html/ecb.faq_cspp_climate_change.en.html> accessed 26 March 2025.

[49] Australian Treasury, *Sustainable Finance Strategy* (Consultation Paper, November 2023) 28–30.

[50] China Banking and Insurance Regulatory Commission [2022] No 15 (Notice of the China Banking and Insurance Regulatory Commission on Printing and Distributing Green Finance Guidelines for the Banking and Insurance Industry) arts 12, 16.

## 3. How Information Correcting Regulation Can Undermine Climate Alignment Through "Leakage"

Private law scholars are not blind to the limits of information as a means of achieving climate alignment. Indeed, scholars have argued that the organisational structure of financial intermediaries,[51] the incentives of "green gatekeepers",[52] and the limits of shareholder lawsuits,[53] among others, limit the extent to which information can result in more climate-supporting action in the economy. Part of the reason is that climate change is not just a financial markets problem, and does not only derive from information failures, but instead from collective action problems and other incentive problems at multiple levels which lead to unpriced negative externalities.[54] This range of problems and potential legal solutions are addressed in other Chapters of this Handbook; in this Chapter, I focus on addressing the emerging problems in relation to the climate information system. I contend that as the growing climate information regulatory systems start to expand, these are also leading to leakage of carbon and climate risks which undermine the purpose of the climate-alignment goal.

There are two interrelated firm behaviours arising from the climate information measures to date which lead to leakage: namely, carbon and climate risk shifting. What I refer to as carbon liability shifting is given various names in the extant legal scholarship: "brown-spinning",[55] "carbon shedding",[56] or "climate-driven asset partitioning".[57] This refers to a range of corporate law strategies to divest direct ownership—but not necessarily control—over an asset that has high emissions, usually in an attempt to evade requests for climate information or carbon prices imposed by an investor or regulator or partner. Where carbon liability shifting relates to responsibility for emissions, climate risk shifting refers to the responsibility that firms have for climate-related financial risks. Climate risk shifting arises where firms divest themselves from assets due to their exposure to physical or transition risks. In some cases, firms may divest themselves of carbon intensive assets to avoid transition risks,

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[51] Roberto Tallarita, 'The Limits of Portfolio Primacy' (2023) 76 Vand L Rev 511; Tom Gosling, 'Universal Owners and Climate Change' (2025) 11 Journal of Financial Regulation 1.
[52] Luca Enriques, Alessandro Romano, and Andrew Tuch, 'Green Gatekeepers' (2024) 109 Minn L Rev 1.
[53] John Armour, Luca Enriques, and Thom Wetzer, 'Green Pills: Making Corporate Climate Commitments Credible' (2023) 65 Ariz L Rev 285, 312. See also, Diane Strauss and Aisha I Saad, 'Can Investors Rely on Corporate Sustainability Commitments?' in Daniel C Esty and Todd Cort (eds) *Values at Work: Sustainable Investing and ESG Reporting* (Palgrave Macmillan Cham 2020) 195–96.
[54] Nadia Ameli and others, 'Climate Finance and Disclosure for Institutional Investors: Why Transparency Is Not Enough' (2020) 160 Climatic Change 565.
[55] Alperen A Gözlügöl and Wolf-Georg Ringe, 'Net-Zero Transition and Divestments of Carbon-Intensive Assets' (2022) 56 UC Davis L Rev 1963.
[56] Tracy D Hester, 'Spinning Off Carbon: Corporate Restructuring in a Climate Bankrupt World' 32 NYU Envtl LJl 339.
[57] John Armour, Luca Enriques, and Thom Wetzer, 'Dark and Dirty Assets: Greening Climate-Driven Asset Partitioning' (14 June 2022) <https://blogs.law.ox.ac.uk/business-law-blog/blog/2022/06/dark-and-dirty-assets-greening-climate-driven-asset-partitioning> accessed 28 March 2025.

in which case they may be pursuing both carbon liability and climate risk shifting. But often, climate risk shifting occurs where financial institutions increase the costs of capital or "retreat" from a market, owing to rising climate risks. I discuss both processes in turn.

## 3.1 Carbon liability shifting

One of the primary pathways through which climate information might result in climate alignment is by investors stewarding high emissions companies towards a lower emissions pathway through shareholder engagement or litigation. The problem with the logic of this pathway is that companies presently have options available to them other than disclosing their high emissions; namely, they can shift their emissions from entities within the emerging climate-information system, to those outside it, such as state-owned enterprises (SOEs), private unlisted companies, or subsidiaries which are not caught by the system.[58] For instance, ConocoPhillips, a prominent high emissions firm in the United States, documented a substantial reduction of approximately 22 percent in its emissions during the year 2017. The primary driver of this decline was attributed to ConocoPhillips divesting certain oil and gas assets to Hilcorp Energy, which has been identified as the preeminent methane emitter in the United States and is supported by the considerable resources of the private equity firm, Carlyle. [59]

The problem arises because the climate financial information system, which is being developed, and which focuses primarily on publicly traded companies, is exceedingly narrow. The world's most emissions-intensive firms operate outside the boundaries of the public financial markets and the accompanying climate information system.[60] Notably, SOEs, in which governments are controlling shareholders, are the most significant firms when it comes to fossil fuel supply, owning most of the world's oil, gas, and coal supply, and they play a significant role on the demand side of the energy system too.[61] However, SOEs often sit outside the ambit of disclosure requirements.[62] In other words, one of the most important firm types from a climate perspective is not captured by the climate information system.

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[58] Gözlügöl and Ringe, 'Net-Zero Transition and Divestments of Carbon-Intensive Assets' (n 55).
[59] Alperen Gözlügöl and Wolf-Georg Ringe, 'Private Companies, Brown-Spinning, and Climate-Related Disclosures in the U.S.' (*The Harvard Law School Forum on Corporate Governance*, 14 April 2022) <https://corpgov.law.harvard.edu/2022/04/14/private-companies-brown-spinning-and-climate-related-disclosures-in-the-u-s/> accessed 29 March 2025.
[60] Roberto Tallarita, 'The Limits of Portfolio Primacy' (2023) 76 Vand L Rev 511.
[61] Arjuna Dibley, 'When Does "Leviathan" Innovate? A Legal Theory of Clean Technological Change at Government-Owned Electric Utilities' (2023) 47 Harv Envtl L Rev 135.; see also Ernest Lim, Chapter 18 of this Handbook.
[62] Of course, some SOEs are connected to capital markets, see, for example, Arjuna Dibley, 'Confronting Carbon in the State Sector: Why Engaging SOEs Is Critical for the Climate Challenge' (*ECGI Blog*, 20 June 2023) <https://www.ecgi.global/publications/blog/confronting-carbon-in-the-state-sector-why-engaging-soes-is-critical-for-the> accessed 2 March 2025.

The effect of this omission is that climate information requirements and investor action have contributed to carbon asset shifting, rather than writing off or phasing down such assets. I come back to approaches to respond to this behaviour below. But before doing so, it is important to consider how this phenomenon also applies with respect to climate risks.

## 3.2 Climate risk shifting

Investors are reacting to the new information environment also by shifting climate risk, not just carbon liabilities, off their balance sheet. Often, this "risk shifting" pushes climate risks from financial institutions, with greater bargaining power in a contract, to their former customers.[63] The private law literature highlights at least two arenas where such climate risk-shifting is already occurring in financial markets.[64]

First, in respect of commercial housing insurance markets, as the climate risk information environment becomes richer, insurers are better able to understand the risk exposure of their insured assets, and in some cases this is leading to what Nevitt and Pappas refer to as "insurance retreat".[65] While the authors do not claim that this retreat flows directly from disclosure regulation, they do highlight how it is a consequence of insurance firms calculating physical risk impacts and removing insurance from areas where risks are too widespread and significant to allow risk pooling to effectively work. In a sense, this is exactly the benefit of insurance—to act as a risk transfer mechanism and send price signals to change incentives of those that are lifting premiums up for the pool. However, because global warming is a trend change to the climatic system (rather than a cyclical change) with wide impacts, it is leading to insurers removing insurance coverage entirely. The effect is that the climate risk previously carried by insurers is shifted to pre-existing property owners who either face "increased risk of disaster losses or financial losses from exiting the market".[66]

Similarly, existing research has demonstrated how climate risk information is resulting in risk shifting in sovereign lending markets. A small group of—mostly—large institutional investors lend money to countries through the acquisition of country

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[63] Annie Brett, 'Rethinking Environmental Disclosure' (2024) 112 Cal L Rev 1535, 1583.

[64] As the climate information environment becomes more developed, it is likely that this type of climate risk shifting and financial retreat will appear in other parts of the financial system, such as housing mortgage markets. See, for example, Adele Fontana and others, 'From Flood to Fire: Is Physical Climate Risk Taken into Account in Banks' Residential Mortgage Rates?' (2025) European Central Bank Research Paper Series No. 2025/3036 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5176497> accessed 31 March 2025.

[65] Mark Nevitt and Michael Pappas, 'Climate Risk, Insurance Retreat, and State Response' (2024) 58 Georgia Law Review 1603; Belinda Storey and others, 'Insurance Retreat in Residential Properties from Future Sea Level Rise in Aotearoa New Zealand' (2022) CESifo Working Paper No. 10017 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4257216> accessed 31 March 2025; Robert R M Verchick and Lynsey Johnson, 'When Retreat is the Best Option: Flood Insurance after Biggert-Waters and Other Climate Change Puzzles' (2014) 47 John Marshall L. Rev. 695.

[66] Nevitt and Pappas (n 65) 1618.

issued bonds and notes. There has been a precipitous increase in sovereign lending over the past decade, particularly after the COVID-19 pandemic, as economically depressed countries looked to the debt market to fund social programmes during periods of low economic activity and thus reduced tax revenue collection.[67] While sovereign issuers initially did not appear to be accounting for climate risks when issuing such debt,[68] credit rating agencies and investors subject to climate risk information ecosystems started to price in climate risks.[69] More recently, this has led to sovereign climate risk accounting approaches which, perhaps inadvertently, penalise developing countries, as they favour the structure of high-income countries which have lower "emissions intensity" than lower-income countries.[70] The effect is that sovereign climate risk information is creating incentives for investors to remove or penalise developing countries through higher debt capital costs and "financing retreat" right at a time when they need more finance to pay for climate risks.[71]

These emerging carbon liability and climate risk shifting behaviours undermine the very objectives of the climate information system that is being developed. They also undermine the climate-alignment goal in other significant ways. By encouraging high carbon assets to move outside the financial system in which they may be managed, carbon liability shifting undermines the overarching Paris Agreement goal to reduce emissions. Similarly, the climate risk avoidance approaches discussed above in relation to insurance and sovereign markets exacerbate distributional conflicts and adaptation outcomes for the most vulnerable, including developing countries, and in this way undermine the fundamental adaptation objectives of the Paris Agreement.

## 3.3 Addressing the problems related to, not abandoning, climate information

Despite the criticisms levelled towards the climate information system and its ability to effectively further the Paris Agreement goals, it is too early to suggest that the approach be abandoned. There is some evidence to suggest that capital markets are starting to price in climate risks in a limited way, correlating with the rise of, even if not caused by, information disclosure rules.[72]

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[67] Asian Development Bank, *Climate Change and Sovereign Risk* (2020), <https://www.adb.org/publications/climate-change-and-sovereign-risk> accessed 23 June 2025.
[68] Arjuna Dibley, Thom Wetzer, and Cameron Hepburn, 'National COVID Debts: Climate Change Imperils Countries' Ability to Repay' (2021) 592 Nature 184.
[69] Gerhard Kling, Ulrich Volz, Victor Murinde, and Sibel Ayas, Kling, 'The Impact of Climate Vulnerability on Firms' Cost of Capital and Access to Finance' (2021) 137 World Development 105131.
[70] Arjuna Dibley and others, 'Biases in "Sustainable Finance" Metrics Could Hinder Lending to Those That Need It Most' (2024) 634 Nature 294.
[71] ibid.
[72] Patrick Bolton and Marcin Kacperczyk, 'Do Investors Care about Carbon Risk?' (National Bureau of Economic Research, April 2020) <https://www.nber.org/papers/w26968> accessed 5 July 2024.

Additionally, information failures about carbon and climate related risks continue to abound in the financial system, despite the extent of existing efforts.[73] Existing climate information may not account for the full extent of climate risk, leading to its underestimation.[74] For example, Condon highlights how fundamental simplifications in the process of integrated assessment models (IAMs), which are used by financial system actors, may be leading to underestimation of climate impacts.[75] There are also circumstances where relevant climate risk information is lacking altogether, leading to mispricing of climate risk by financial actors. For instance, in my own work with colleagues, we show how financial risks associated with climate change litigation and liability create potentially material financial risks, which remain systematically under analysed and reported and potentially under accounted in asset pricing.[76]

The fact that investors may be starting to respond to climate risk information, and the presence of ongoing informational gaps, suggest that it would be prudent to allow climate information systems to mature further. For these reasons, even legal and financial scholarship that is critical of the information-first approach also tends to suggest improving the system rather than abandoning it.[77] For example, Brett's analysis of a broad range of environmental disclosure regimes in the US argues that disclosure alone is often not impactful at driving behaviour change.[78] But information regimes are not inherently ineffective; what is needed are legal tools alongside information disclosure that change the incentives of regulated entities themselves—the theme of the next Section of this Chapter.[79]

## 4. Addressing carbon liability and climate risk shifting by moving beyond information-based market failures

The previous Section described how the emergence of climate-information regulation is driving some entities to engage in carbon liability and climate risk shifting behaviour.

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[73] Kreibiehl, S. and others, 'Chapter 15: Investment and Finance', *IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2023) 1580 <https://www.ipcc.ch/report/ar6/wg3/chapter/chapter-15/> accessed 19 March 2025.
[74] Irene Monasterolo and Luca de Angelis, 'Blind to Carbon Risk? An Analysis of Stock Market Reaction to the Paris Agreement' (2020) 170 Ecological Economics 106571.
[75] Madison Condon, 'Market Myopia's Climate Bubble' (2022) 2022 Utah L Rev 63. This is a point which has also been echoed by prominent climate economists, such as in Nicholas Stern, Joseph E Stiglitz, and Charlotte Taylor, 'The Economics of Immense Risk, Urgent Action and Radical Change: Towards New Approaches to the Economics of Climate Change' (National Bureau of Economic Research, February 2021) <https://www.nber.org/papers/w28472> accessed 19 March 2025.
[76] Thom Wetzer, Rupert Stuart-Smith, and Arjuna Dibley, 'Climate Risk Assessments Must Engage with the Law' (2024) 383 Science 152.
[77] Steuer and Tröger (n 41); Roberta Di Marco and others, 'Symbol or Substance? Scrutinizing the "Risk Transparency Premise" in Marketized Sustainable Finance: The Case of TCFD Reporting' (2023) 32 Business Strategy and the Environment 3027; Brett (n 63); Ameli and others (n 54).
[78] Brett (n 63) 1585.
[79] ibid 1589.

This behaviour allows carbon liabilities and the financial risks of climate impacts to "leak" out of the regulated financial system and onto other actors. This leakage is happening in areas where firms have the strongest incentives to shift their liabilities, either because they are facing immediate costs associated with high emissions assets or liabilities from already materialising financial risks, and relatively easy or low-cost pathways to offload such assets and liabilities. This Section considers the legal reforms that might increase the costs of this behaviour for both the "shifting", and the "recipient" entities.

## 4.1 Carbon liabilities

Existing scholarship has considered interventions to address the incentives of both "shifting" entities and, to a lesser extent, the "recipient" side, that might reduce carbon liability shifting.

With respect to the shifting entity, scholars have suggested making amendments to US corporate law to make it more challenging for entities to shift carbon liabilities. Hester, for instance, proposes that corporate regulators should develop a transparency framework which captures corporate restructuring activities related to carbon liabilities.[80] Practically, this means corporations would need to regularly disclose details of any spinoffs, bankruptcies, or asset transfers that relate to their carbon-intensive operations, giving regulators, investors and the public better knowledge about carbon transfers, and enabling the possibility of private or public law suits using existing law to prevent such transfers.[81]

In addition to transparency regimes, Hester also recommends amendments to legal frameworks to disincentivise carbon transfers. Drawing on the example of New Jersey's Industrial Site Recovery Act, where companies must either declare no hazardous discharges before transferring an asset or submit a cleanup plan with a bond, Hester suggests a similar approach with respect to carbon. That is, if a corporation falls within a carbon intensive sector, it would need to notify a regulator of its intent to dispose of an asset, and would be required to meet certain thresholds to show it can address carbon liability or it would need to post a bond to cover such liabilities.[82] In other words, the original owning company would be required to retain the carbon liability of its asset transfer.

Sidestepping Hester and others' politically contentious step of corporate law reform, Armour and colleagues make a similar suggestion but using existing law and contracts.[83] They suggest that a climate concerned investor could use securities laws

[80] Hester (n 56) 378.
[81] ibid 378–85.
[82] ibid 389–90.
[83] Armour, Enriques and Wetzer, 'Dark and Dirty Assets: Greening Climate-Driven Asset Partitioning' (n 57).

which require shareholder approval of certain transactions such as the Class 1 transactions rules in the UK. In the case of a firm seeking to dispose of a high carbon asset, the authors suggest that the climate conscious shareholder approve the transfer only with so-called "green pill" covenants or dual class share structures.[84] In both cases, the climate conscious investor can compel the shifting company to retain control over the high emissions asset and ultimately dispose of it.[85] Such "green pills" also have the effect of increasing transparency about firm commitment to climate goals.

These corporate and contractual proposals focus on encouraging the shifting firm to retain responsibility over the high carbon asset. The logic being that the shifting firm will come under pressure to phase down the asset from an investor or other source. However, these proposals do not consider what would enable or incentivise shifting firms to phase down or phase out such high carbon assets themselves. If shifting firms are not incentivised to deal with the high carbon asset themselves, then it is possible that those firms might use other strategic behaviour to escape their carbon liabilities, as coal firms have done in relation to their environmental liabilities in the US.[86]

Legal frameworks must evolve to enable firms to capture the positive externalities associated with the early retirement of carbon-intensive assets. In other words, legal mechanisms are needed to allow firms and investors to internalise the broader public benefits of emissions reductions. This is particularly important because, under prevailing corporate governance norms, firms are unlikely to retire productive assets—regardless of their emissions intensity—unless such action can be justified as advancing the financial interests of the company.[87] By structuring returns to reflect the public climate value of asset retirement, legal tools may help align emissions-reducing actions with fiduciary obligations.

Policymakers have begun to grapple with this challenge, though existing proposals remain contested. Consider, for example, the efforts underway to support the phaseout of coal-fired power plants (CFPPs). In some instances, replacing CFPPs with renewable energy can improve a firm's financial outlook over the medium to long term. In such cases, innovative contractual structures have been used to attract climate-focused

[84] Described more completely here: Armour, Enriques and Wetzer, 'Green Pills: Making Corporate Climate Commitments Credible' (n 53).
[85] John Armour, Luca Enriques, and Thom Wetzer, 'Dark and Dirty Assets: Greening Climate-Driven Asset Partitioning' (n 57).
[86] Joshua Macey and Jackson Salovaara, 'Bankruptcy as Bailout: Coal Company Insolvency and the Erosion of Federal Law' (2019) 71 Stan L Rev 879.
[87] Marcel Kahan and Edward Rock, 'Systemic Stewardship with Tradeoffs' (2023) 48 The Journal of Corporations Law 498.

investors willing to absorb near-term losses in exchange for longer-term gains.[88] Some electric utilities have issued low-cost bonds, backed by future electricity tariffs, to finance the early closure of coal plants.[89] However, these strategies often rely on investors who are comfortable receiving short-term returns from coal generation and tend to be more viable when the asset is already approaching the end of its useful life. They are significantly less effective for assets with substantial remaining productive capacity.

To address this gap, several governments—particularly in the US and Asia—have proposed the development of carbon offset crediting mechanisms to monetise the avoided emissions associated with early CFPP retirement.[90] These proposals involve the issuance of credits for so-called "Scope 4" emissions—emissions that would have occurred in the absence of an intervention—either at the project or jurisdictional level. Yet such approaches are fraught with difficulty. Counterfactual baselines are often speculative and inconsistent, emissions leakage can be hard to control, and the prospect of rewarding firms for closing assets they arguably might be required to close anyway raises significant moral hazard concerns.[91]

Despite, or perhaps because of, the problems in this area, this remains a promising area for further legal and policy innovation. Private law scholars could play a vital role in designing mechanisms that enable firms to exit carbon-intensive investments while satisfying legal and financial constraints. One potential avenue is the development of methodologies to quantify the avoided social cost of carbon and to link this to tax incentives for asset retirement.[92] Similarly, governments or third parties could establish clear, credible approaches to valuing the public benefits of emissions reductions to attract impact investors.[93] These early ideas remain underdeveloped and merit deeper theoretical and empirical investigation.

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[88] Shravan Bhat, Whitney Mann, and Alex Murray, 'Financing Mechanisms to Accelerate Managed Coal Power Phaseout' (Rocky Mountains Institute 2023) Working Paper <https://rmi.org/insight/metrics-and-mechanisms-to-finance-managed-coal-phaseout/.>.

[89] ibid.

[90] US State Department, Bezos Earth Fund, and The Rockerfeller Foundation, 'Energy Transition Accelerator: Core Framework' (Energy Transition Accelerator 2023) <https://www.etaccelerator.org/_files/ugd/17314c_ce8fabc2fce04e8cb29bdd3cc85f0f37.pdf> accessed 1 April 2025; Monetary Authority of Singapore (MAS), 'Transition Credits' <https://www.mas.gov.sg/development/sustainable-finance/transition-credits> accessed 2 April 2025.

[91] Kaya Axelsson and others, 'Is Impact out of Scope? A Call for Innovation in Climate Standards to Inspire Action across Companies' Spheres of Influence' (2024) 15 Carbon Management 2382995.

[92] There have been some macroeconomic analyses which have estimated significant savings from coal phase out and replacement with renewables when accounting for the social cost of carbon. See for example, Tobias Adrian, Patrick Bolton, and Alissa M. Kleinnijenhuis, 'The Great Carbon Arbitrage' (2022) WP/22/107 <https://www.imf.org/en/Publications/WP/Issues/2022/05/31/The-Great-Carbon-Arbitrage-518464> accessed 2 April 2025.

[93] Gosling (n 51).

Looking beyond shifting firms, scholars have also proposed steps to disincentivise "recipient" firms from receiving carbon assets. That is, they have proposed mechanisms which might disincentivise companies or investors from receiving high carbon assets. The literature primarily recommends doing so through more disclosure. Gözlugöl and Ringe and Phang and Chia respectively recommend that private companies and SOEs that receive dirty assets should be subject to equivalent climate-related disclosures as publicly listed firms and investors.[94] In fact, some efforts are already underway in practice to try and increase disclosures for both firm types.[95] The effect of these measures would be to "expand" the climate information regulatory space.

The idea behind expanding climate information requirements outside the incumbent system is that this might disincentivise recipient firms from taking on dirty assets. It may indeed be the case that such disclosures create disincentives for a select number of these firms, but it is not clear that the logic of disclosure, which was created based on publicly traded and competitive financial markets, easily translates to SOEs and privately held firms, which tend to be dominated by (government) block holders.

Consider an SOE, for instance. If it is wholly government owned, the decision to take on the dirty asset is likely to be influenced by the interests of its government controlling shareholder.[96] If the government block holder is less concerned about climate change, or is pursuing other geopolitical or energy security interests, they can often use corporate governance mechanisms to shape the decision of the firm about the acquisition of new assets, including through the board, direct reporting on firm strategy, and public financing, among others.[97] In this context, it is not clear that climate information will dissuade the block holder to change its interests on climate change. If the firm were partially privatised, or had significant exposure to the debt market, and such investors were climate conscious, then a disclosure obligation may allow these investors to shape the decision to take on the asset, but this is likely to be the exceptional case, and not the rule.

It is worth noting here that the question of why private firms and SOEs are willing and able to take on dirty assets, and how ownership affects such a decision, is an area

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[94] Gözlugöl and Ringe, 'Net-Zero Transition and Divestments of Carbon-Intensive Assets' (n 55); Rachel Phang and Yaru Chia, 'Sustainability and the Sunlight of Disclosure: ESG Disclosure in Three Asian Financial Centres' (2024) 33 Review of European, Comparative & International Environmental Law 209.
[95] See, for example, OECD, *Corporate Governance of State-owned Enterprises* (Report, 2024), and IPSASB, Climate Related Disclosures (Website, 2025) <https://www.ipsasb.org/consultations-projects/sustainability-climate-related-disclosures> accessed 12 March 2025; Institutional Investors Group on Climate Change, *Paris Aligned Investment Initiative: Net Zero Investment Framework for the Private Debt Industry* (Report, 23 March 2024).
[96] See Ernest Lim, Chapter 18 of this Handbook.
[97] Dibley, 'When Does "Leviathan" Innovate? A Legal Theory of Clean Technological Change at Government-Owned Electric Utilities' (n 61).

where more research is needed. However, it is likely that in firms where there is a government or private block holder, more disclosure will not act as a meaningful disincentive for the firm to take on a dirty asset. What is needed are reforms that shape the block holders' interests, not that of the firm. For example, with respect to SOEs, this might involve more targeted approaches to get the agencies or ministries with the legal mandate to act as shareholder for the state to understand the total portfolio climate risks of its SOEs, and how such risks pass back to the balance sheet of the government.[98] As credit ratings agencies increasingly incorporate climate risk analysis into how they set sovereign and corporate ratings, equipping governments with an understanding of their climate risk exposure can incentivise them to shift how they manage their SOEs.

## 4.2 Climate risk shifting

While the literature on legal responses to carbon liability shifting is growing, there has been comparatively less focus on managing climate risk-shifting. Yet the need for effective legal tools in this area is equally important. Existing proposals in the literature tend to concentrate on financial institutions—the entities most actively shifting risk—and, in particular, on mechanisms to compel or incentivise them to continue providing financial services to climate-exposed communities despite growing hazards.

As climate risks intensify with rising emissions, financial institutions are increasingly equipped with sophisticated tools for identifying and managing their exposure.[99] In response, many have begun to rely on existing contractual mechanisms to withdraw from high-risk markets. This retreat is largely voluntary, reflecting the foundational structure of private law, which is built on the principle of consensual participation. The challenge, therefore, lies in using legal mechanisms to counteract a process that is itself legally permitted, if not encouraged from a financial risk management point of view.

With this financial risk management perspective in mind, some scholars argue that financial institutions may be more likely to continue to provide financial services to high risk areas if some portion of their climate risk exposure is absorbed by the public sector—particularly in relation to ongoing products such as insurance.[100] Others go further, contending that the financial sector's retreat from climate-exposed areas will have significant distributional consequences, disproportionately affecting already vulnerable communities. This has led to the concept of "blue lining"—a form of

[98] There have been some steps in practice to this end. For example, analysis done in Colombia has shown how SOEs transition risk exposure creates significant financial liabilities in aggregate at the national level. Willis Tower Watson and Universidad de Los Andes, 'Understanding the Impact of a Low Carbon Transition on Colombia' (2023) <https://www.wtwco.com/en-gb/insights/2023/08/understanding-the-impact-of-a-low-carbon-transition-on-colombia> accessed 1 April 2025.
[99] Madison Condon, 'Climate Services: The Business of Physical Risk' (2023) 55 Ariz St LJ 147.
[100] Nevitt and Pappas (n 65).

exclusionary financial practice in which communities are effectively excluded on the basis of climate vulnerability.[101] To address this, some scholars propose mandatory obligations akin to fair lending laws in the US. For instance, Fenlock and colleagues suggest imposing a legal duty on insurers to provide equitable access to financial services in high-risk areas.[102]

While normatively compelling, these proposals raise difficult practical and legal questions. It is not clear, for example, if insurers should be required to remain in one market if doing so would require substantial premium increases in another market. More fundamentally, forcing financial institutions to remain engaged in high-risk areas may concentrate systemic climate risk within certain market segments, ultimately creating the potential for public spillovers that threaten financial stability. Thus, while short-term regulatory mandates may provide temporary relief, there is a longer-term need for legal instruments that reshape the incentives and behaviours of both financial risk shifters and recipients.

One possible approach that is being trialled by governments lies in promoting coordination between financial institutions, their clients, and governments.[103] Consider real estate insurance, for example. Insurance companies are retreating from high climate risk areas because the climate information regime is partially creating pressure for them to reduce their exposure to climate financial risks. In some cases, insurers may be able to reduce their risk profile if their clients' risk exposure was reduced—such as through investments in flood-proofing or fire-resilient infrastructure. In other cases, meaningful risk reduction would require government intervention or support in addition to steps that real estate owners could take.

While such approaches require a combination of public and private law mechanisms, private laws could be used to manage the relationship between insurer and client. Drawing on a model like a sustainability linked bond, a sustainability linked insurance contract could adjust premiums by conditioning favourable premium terms on measurable adaptation actions.[104] Indeed, at the time of this Chapter's writing, the first

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[101] Brooklyn Montgomery and Monica Palmeira, 'Bluelining: Climate Financial Discrimination on the Horizon' (The Greenlining Institute 2023).
[102] Maria Frausto, 'Is Bluelining the "New" Redlining? How Insurance Discrimination Deepens Climate Disparities' (*Center for International Environmental Law*, 9 August 2024) <https://www.ciel.org/bluelining-insurance-discrimination-climate-crisis/> accessed 31 March 2025.
[103] The Australian Government's National Emergency Management Agency launched a Hazards Insurance Partnership in 2023, based on this logic. See, National Emergency Management Agency, 'Hazards Insurance Partnership' (8 Sept 2024) <https://www.nema.gov.au/our-work/resilience/hazards-insurance-partnership> accessed 23 June 2025.
[104] Massimo Mariani and others, 'Sustainability-Linked Bonds, Corporate Commitment and the Cost of Debt' (2025) 74 Research in International Business and Finance 102658.

sustainability linked insurance contract had just been issued.[105] This approach would allow financial institutions to remain engaged while encouraging recipients to reduce their own exposure to physical climate risks. However, there are natural limits to such a model. It may not work well in areas where real estate owners have limited access to finance. Also, once the recipient has done all that is reasonably within their control, continued exposure may remain high due to structural or geographic vulnerabilities. However, a contract of this nature may at least provide time before the financial institution "retreats", allowing asset owners greater time to transition.

## 5. Conclusions

This Chapter has argued that the predominant approach that governments are taking for addressing climate alignment in financial markets has been to address climate-related information deficits and asymmetries. However, because investors are still faced with a range of other market and regulatory failures limiting their ability to pursue climate alignment, this Chapter shows that in some cases financial institutions are not minimising carbon liabilities and climate risks. Instead, they appear to be pushing such liabilities and risks beyond the reach of the emerging climate-information regulatory perimeter. The effect of some of these actions, is that climate liabilities and risks are "leaking" off the balance sheets of private firms and into the hands of the public, including in developing countries and communities, offending the basic distributional goals of the Paris Agreement.

This Chapter has put forward some ways that private law can respond to these immediate emerging consequences of carbon and climate risk shifting, including corporate law and contractual and regulatory instruments. While these approaches alone will not result in climate alignment, they are necessary preconditions to prevent financial market actors from cheating the climate information system that is being developed. In the long term, to get closer to achieving climate alignment, scholars and practitioners need to deepen their focus beyond addressing information-based market failures in financial markets and focus more on how to tackle financial institution and corporate incentives which are limiting climate investment and risk management. Only then can financial flows begin to support, rather than frustrate, the broader aims of the climate regime.

[105] 'Swiss Captive Pilots First Sustainability-Linked Insurance' (*Commercial Risk*, 22 November 2024) <https://www.commercialriskonline.com/swiss-captive-sbb-pilots-first-ever-sustainability-linked-insurance-contract/> accessed 2 April 2025.