CLIMATE POLICY

Climate risk assessments must engage with the law

Legal actions determine the allocation and magnitude of climate-related financial risk exposures.

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Climate-related financial risk is the dominant frame through which many companies, investors, and regulators engage with climate change. We argue that developments in legal action mean that the basis for these assessments, which focus on physical and transition risks (*1*), is no longer accurate. Accounting for the legal system substantially alters the distribution of climate-related risk between firms, governments, and the public. Drawing on analysis of climate litigation, regulatory enforcement, and other legal action, we propose a framework that accounts for how legal action shifts or amplifies physical and transition risk exposures and creates additional climate risk exposures. We then preview five qualitative and quantitative approaches that can be applied to assess the implications of legal action for firms' climate-related risk exposure.

The financial implications of climate change are widely recognized. Policy responses include mandating that firms evaluate and disclose climate risk and central bank stress tests on asset values under climate change scenarios. Climate-risk assessments underpinning such policies focus on physical risks—expected financial losses from climate change impacts on assets—and transition risks—legislative, regulatory, technological, market, and reputation-related drivers of emission reductions and adaptation that introduce financial risk for non-aligned firms.

Rising physical and transition risks, coupled with a perceived lack of urgency in addressing their drivers, has led climate-related litigation and regulatory enforcement action to proliferate: more than 2,485 climate lawsuits were filed worldwide since 2015 (*2*) (Fig. 1). The objectives of the claims, brought in over 52 national jurisdictions, encompass enforcement or strengthening of emission-reduction commitments and policies, challenging construction or operation of high-emissions assets, and penalizing inadequate due diligence, management, or disclosure of financial risks, which may alter transition risk. Other legal actions seek to hold firms financially responsible for adaptation costs or losses caused by their emissions. Litigation can also stymie climate action by challenging governments' climate policies or increasing their costs through compensation claims. An illustrative sample of cases are summarized in Table S1.

Legal developments other than litigation may also alter firms' climate risk exposure; for instance, an agreement similar to the master settlement agreed with the tobacco industry ($159bn paid to US states to April 2023 (*3*)) could involve large financial transfers from emitters to compensate for physical risks and impacts.

Litigation against corporations and financial institutions is in its early stages. For the cases that pose the largest financial risk, successes have been limited to date, and for damages claims, most are still pending. This may change as greater risks from climate change materialize, case numbers grow, and evidence of climate change evolves. However, existing climate risk assessments do not account for the effect of litigation and regulatory enforcement action in full.

LEGAL RISK IN CLIMATE RISK ASSESSMENTS

The relevance of legal action to climate risk is widely accepted. In 2015, Mark Carney, then Governor of the Bank of England, described "liability risks" as a distinct climate-risk category, noting that such risks will "increase as the science and evidence of climate change hardens" [(*4*), p. 10]. That abstract acknowledgement has only barely begun to enter technical analyses, let alone policy. Regulators are starting to develop methods that account for climate-related legal risk, but such approaches remain in their infancy (*5*).

The International Sustainability Standards Board (ISSB), established in 2021 to develop internationally accepted standards on climate risk, considers legal risk as a part of transition risk. The Network for Greening the Financial System (NGFS), a network of central banks working on climate risk scenario analysis, considers legal risks as subsets of physical and transition risk (*5*). In contrast to their extensive treatment of physical and transition risks, these bodies provide little or no detail on how to evaluate climate-related legal risk, suggesting its operationalization is at best peripheral in practice.

Policy frameworks that recognize climate-related legal risk as a separate category also offer limited methodological clarity. Mandatory climate risk disclosure policies for firms in Australia, Canada, the EU, and New Zealand recognize "liability risks" as a distinct category, as do prudential supervision regimes applying to EU banks and insurers, but they do not explicate how firms should evaluate this risk. Some jurisdictions' guidance merely notes that firms subjected to ongoing climate litigation should disclose the associated risks when they are likely to affect a company's financial performance. In the rare instances where detailed guidance is provided, it takes a narrow view of legal impact. For example, the Bank of England's Climate Biennial Exploratory Scenario (CBES), the first climate stress test to systematically incorporate legal risk, focused on litigation impacts on insurance claim payouts (*6*).

The state of the academic literature is similarly embryonic. Studies consider categories of (possible) cases against financial institutions and associated risks (*7*), the role of legal action as a transmission channel for physical and transition risk (*6*), or how litigation and concerns about liability might incentivize investment in adaptation (*8*). However, existing literature does not assess the implications of legal action for climate-risk exposures comprehensively. Consequently, existing assessments inaccurately represent the effect of legal action on the distribution and scale of firms' climate risk exposure.

MAGNITUDE AND ALLOCATION

A more systematic account of climate-related legal risk challenges the dominant logic of climate risk assessment that equates ownership of assets exposed to physical and transition risks with financial exposure to those risks (*9*). Instead, legal action may shift risk to other

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entities and alter the magnitude of these risks.

Successful litigation would redirect costs incurred due to climate change (including of adaptation measures) to GHG emitters (*Lliuya v. RWE, People of the State of California v. Big Oil*). Such claims would (partially) internalize firms' externalities, transferring physical risk exposure to large emitters, potentially supplemented by punitive damages. Recent cases sought to pass costs of defending such lawsuits onto insurers (*Aloha Petroleum v. AIG*). Other cases aim to hold fossil-fuel companies liable for climate change impacts resulting from misleading or deceptive actions that stymied climate policy, for instance by creating uncertainty about climate science (*Connecticut v. Exxon Mobil Corp.*). These cases would internalize costs of deception or political lobbying. Lawsuits have not yet held corporate emitters liable for impacts of their activities, but developments in attribution (*10*) and social science research improve their likelihood of success.

Legal action may also insulate firms from transition risk exposure. Transition risk assessments typically presume that climate change mitigation policies introduce costs to asset owners, for instance by causing asset stranding. However, firms' transition risks may shift to governments if legal entitlements to compensation exist for policy-induced asset stranding. For instance, the Energy Charter Treaty (ECT), an international agreement to facilitate energy investment and trade, includes protections for incumbent energy investments (*11*). In 2021, RWE initiated arbitration proceedings against the Dutch government under the ECT (*RWE AG and RWE Eemshaven Holding II BV v. Kingdom of the Netherlands*), seeking €1.4 billion in compensation for a ban on operating coal-fired power stations from 2030. In 2022, Rockhopper Exploration plc was granted €190 million in compensation from the Italian government under ECT arbitration proceedings. It is estimated that oil and gas investors may seek over $340 billion in legal claims due to governments' climate policies (*11*). Existing contracts (like power purchase agreements) and creative use of corporate law (like strategic insolvency to avoid tort liability (*12*)) may also protect parties from transition risk or liability.

Legal action can raise transition risk by accelerating mitigation and asset stranding through strengthened firm or state climate policies, enforcing existing policy, and translating domestic or international climate policy into duties for companies (*Milieudefensie v. Shell*) (Table S1). These effects will be most pronounced for the firms least aligned with domestic or international climate policy. Legal action thus amplifies transition risks and accelerates their manifestation, for instance by assets becoming stranded. This increases the present value of these risks, which are otherwise contingent on uncertain and often protracted policy implementation, by reducing the effects of discounting.

Individual firms may be exposed to amplified risks directly, but the possibility of legal action can also raise risk perception and borrowing costs. Successful litigation against one firm can set precedents or demonstrate the success of a legal strategy, raising (perceived) risks for similarly situated firms in the same jurisdiction. Legal action can also amplify transition risk by rendering voluntary commitments legally binding. Signatories of the Glasgow Financial Alliance for Net Zero cited this as a reason to loosen their commitments (*13*). Legal challenges to government policy or regulation may affect firms' transition risk exposure indirectly by triggering policy changes (*Neubauer et al. v. Germany*) such as reduced fossil fuel subsidies, enhanced emission standards, or more stringent disclosure requirements.

Climate-related legal actions also introduce financial risks that are not directly related to firms' underlying transition and physical risk exposure. These additional risks derive primarily from obligations to manage risks or emissions, or from regulatory requirements to disclose climate risk and not to make inadequate or misleading statements about risk management, investment policies (e.g., 'greenwashing'), and Paris-alignment of business plans.

Firms could face such liability regardless of the size of their emissions footprint or physical or transition risk exposures. US banks BNY Mellon and Goldman Sachs agreed with the Securities and Exchange Commission (SEC) to pay $1.5 and $4 million fines, respectively, after the SEC concluded the banks' communications about their ESG investment policies were misleading. Similar enforcement action hit German asset manager DWS, where an ongoing investigation resulted in the resignation of its CEO. While these risks are growing in importance, they have had modest financial consequences for the firms affected to date.

DEVELOPING ASSESSMENTS

Not accounting for the law in climate risk evaluations is increasingly untenable. Nevertheless, a recent survey of central banks indicated most struggle with assessments of climate-related legal risk: 93% of respondents did not yet quantify its impact (*5*).

Firms' climate-related legal exposures are contingent on legal action and outcomes which, in turn, depend on available legal causes of action, the likelihoods that a case is brought and is successful, the remedy sought, and the likelihood of effective enforcement. Moreover, exposures vary between actors: high-emitting firms may be targeted by liability claims and indirectly experience consequences of challenges to government policy, banks may be scrutinized for investment and risk-management decisions. Uncertainty in each of these areas may appear to create an intractable constraint on assessments and quantification of contingent liabilities of climate-related legal risk. Indirect risk exposures, for example by holding securities in a firm targeted by climate litigation or affected by new legal precedents, further complicates assessments.

No single approach can assess legal risk comprehensively and the suitability of different methods depends on the source and nature of risk in question, the particular legal arrangements of each jurisdiction, and the nature of the claim and the remedy provided. To illustrate how legal action can be accounted for in climate risk assessment, we propose five complementary approaches for evaluating firms' exposures, each with its strengths and shortcomings.

Market impacts of legal judgments can be retrospectively analyzed, for example by assessing stock price movements around climate litigation events. Such market movements represent the market's best estimate of the financial consequences of legal action. Analyses that focus on market movements side-step the need to understand how risk materializes and provide a baseline indication of the impact of climate litigation on firm value. However, the approach should be adopted cautiously. Event studies are context-specific so their findings may extrapolate poorly to other firms, jurisdictions, and causes of action, especially given rapidly evolving climate litigation strategies, legal precedents, and societal expectations.

Estimates of climate impacts, based on the social cost of carbon or on the attribution of specific impacts, can be used to quantitatively estimate legal risk associated with efforts to hold defendants liable for climate change. A back-of-the-envelope analysis using the social cost of carbon indicates that Chevron's emissions to 2010 produce a potential liability of over $8.5 trillion (see supplementary materials). Alternatively, attribution analyses indicate firms' contributions to specific climate-related disasters. Under this approach, Shell would have an annual liability of $0.55bn if held liable for their contribution to two events with attributable losses equal to those of Hurricane Harvey (see supplementary materials). Both approaches are rooted in scientific analysis and legal judgment, relating, respectively, to estimates of the proportion of a firm's externality that legal action might internalize and the number of disasters for which legal action will hold

firms liable. Punitive damages are also possible; these estimates may be a lower bound.

The financial impacts of legal action that mandates accelerated mitigation can be assessed using sector-specific or technology-specific marginal abatement cost estimates. This approach estimates the costs of firms' transitions with, and without, specific legal decisions. The likelihood of success of these claims, on which this quantitative analysis is contingent, depends on the existence of obligations to follow a specific sectoral or firm-level transition pathway. These have not been explicitly articulated in many countries, but Article 15 of the EU's proposed Corporate Sustainability Due Diligence Directive could require firm-level transition plans and would harden legal expectations around the speed of firms' transitions. Without explicit obligations, judicial evaluation of the alignment of firms' transition plans with legal duties depends on judges' interpretations of national and international law (*14*). The judgment in *Milieudefensie v. Shell* hinged on novel interpretations of firm-level transition requirements implied by international law, illustrating that judicial interpretation can evolve quickly and unpredictably, complicating *ex ante* risk assessments.

Qualitative assessments of climate-related legal risk could evaluate implications of developing judicial doctrine and precedent, legislation, and scientific advances, and trends in litigation outcomes to characterize risks faced by specific firms. Such analyses elucidate the distribution and magnitude of climate-related legal risks across firms and scenarios, facilitating risk management (*5*), for example within an investment portfolio, and inform and contextualize quantitative assessment approaches.

MOVING FORWARD

The emergence of unexpected new interpretations of open legal norms and the rapid evolution of legislative practice that alters rights and obligations means that variations in climate-related legal risk assessments are to be expected. These differences can form the backbone of legal transition scenarios, much in the same way that climate risk analysts already use physical and transition risk scenarios.

Designing legal transition scenarios, an approach that is new to the legal and climate risk professions, raises complex and novel questions regarding individual doctrinal and legislative developments, how representative scenarios can be developed at the jurisdictional level, and how to integrate legal and climate transition scenarios. Such scenarios would also need to capture, as with physical and transition risks, non-linear changes, including dramatic shifts in legal paradigms that could substantially change risk exposures as future legal outcomes diverge from those seen to date. Legal outcomes may also vary between jurisdictions. Nonetheless, such an approach would embed legal risk analysis at the heart of climate transition scenario analysis. In its CBES exercise, the Bank of England was the first to ask insurers to quantify financial impacts of hypothetical legal cases, an early use of scenario-based approaches.

Policymakers, investors, and firm managers have accepted the need to understand climate risk exposures. Doing so diligently will require more engagement with the law through interdisciplinary research that couples legal imagination with financial analysis and climate science. Else, we will continue to fly blind in our treatment of climate risk.

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Supplementary materials
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Fig. 1: Climate-related legal action is on the rise globally. Data from the Sabin Center for Climate Change Law's Global Climate Change Litigation Database, available at: http://climate-casechart.com/; analysis by the authors. The data are current to November 20, 2023.