A CLIMATE AND BIODIVERSITY RISKS TOOLKIT FOR FINANCIAL SUPERVISORS

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TORONTOCENTRE
Global Leadership in Financial Supervision

In partnership with Canada

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INTRODUCTION [1]

Climate and biodiversity-related risks to financial institutions [2] , financial stability, investors, and financial inclusion are increasing. These risks are therefore becoming increasingly important to whether financial supervisors – across all sectors – can meet their mandates and objectives for the safety and soundness of supervised firms, financial stability, consumer and investor protection, and financial inclusion.

Financial supervisors' understanding of climate-related risks has broadened and deepened in recent years. Increasing attention is also beginning to be paid to the implications for financial supervisors of biodiversity risks arising from the loss of habitats and species, the loss of genetic diversity within and between species, and the loss of ecosystems.

This Toronto Centre Toolkit is designed for financial supervisors in emerging markets and developing economies, who are considering how best to respond to climate and biodiversity-related risks, or who have made progress in this area but want to check that they have covered the right topics and are headed in the right direction.

The main objective of this Toolkit is to build supervisory capacity in factoring climate and biodiversity-related risks into the assessment of the risks facing financial institutions and of financial stability more generally; the assessment of areas where consumer or investor protection may be needed, including through standards of disclosure to enable investors and consumers to make well-informed decisions; and addressing the impact of climate change and biodiversity loss on financial inclusion.

Work on climate-related risks to the financial sector is generally more advanced than on biodiversity-related risks, including in terms of disclosures, metrics, definitions and analytical approaches. However, biodiversity-related risks to financial institutions, financial stability, consumers and investors, and financial inclusion may turn out to be more important than climate-related risks for some countries and for some financial institutions. Climate and biodiversity-related risks may also interact as more or less equal partners in a damaging way. So it is important that supervisors - and the firms they supervise - consider both risks.

Moreover, it is efficient to consider both risks together because the impacts of both risks can be

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1. This Toronto Centre Toolkit was prepared by Clive Briault. It replaces an earlier version published in September 2021. Please address any questions about this Toolkit to publications@torontocentre.org

2. In this Toolkit, references to financial institutions and supervised firms include pension plans.

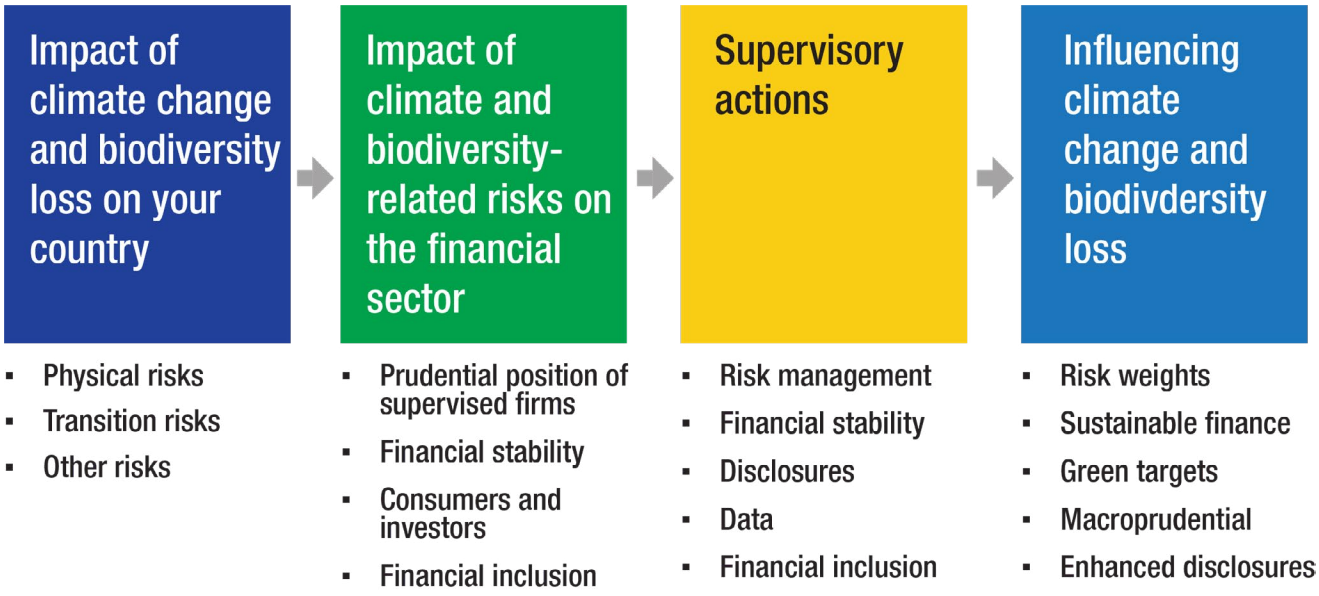
considered within the same physical and transition risk transmission mechanisms framework.

This Toolkit addresses four broad questions corresponding to the steps that a supervisory authority should take when addressing climate and biodiversity-related risks to its supervisory objectives.

For each question, the Toolkit provides an overview of the key issues for a supervisory authority and a list of key resources to enable supervisors to explore each issue in more detail:

1. What might be the impact of climate change and biodiversity loss on your country?
2. What might be the impact of climate and biodiversity-related risks on financial institutions, on financial stability, and on users of financial products and services in your country?
3. What supervisory actions should be taken in response to climate and biodiversity-related risks?
4. Can and should supervisors do anything to influence climate change and biodiversity?

OUTLINE OF THE TOOLKIT



Toronto Centre is a centre of excellence on climate and biodiversity-related risks to the financial sector, bringing together a range of assistance to supervisory authorities, including Toronto Centre Notes; international, regional and country programs; a climate-risk related simulation exercise; virtual supervisory guidance assistance to individual supervisory authorities; webinars and podcasts; and a Community of Practice on climate change and biodiversity loss for interested supervisors.

THE IMPACT OF CLIMATE CHANGE AND BIODIVERSITY LOSS ON YOUR COUNTRY

Supervisors need to understand how climate change and biodiversity loss might affect their country and its economy, as a starting point for considering the potential impacts on the financial sector.

Climate change and biodiversity loss are similar in the sense that both are already occurring, with damaging consequences; are also of a long-term, uncertain, potentially far-reaching severe and potentially irreversible nature; may exhibit non-linearities, tipping points and "cliff effects"; and could be (and in some countries already are) of systemic importance to economies and to financial sectors.

Climate change is one of the main drivers of the biodiversity loss so, to some extent, biodiversity-related risks are a sub-set of climate-related risks. Biodiversity loss is another transmission mechanism through which climate-related risks may have an impact on people, the economy, and the financial sector. Moreover, biodiversity loss can cause climate change – for example through the loss of carbon-absorbing ecosystems - and this inter-relationship can result in mutually reinforcing downward spirals. Climate change and biodiversity loss are therefore best considered together.

However, biodiversity loss can also be caused by other factors, such as changes in land use and land degradation, deforestation, pollution, the use of fertilisers and pesticides, and the introduction of invasive species.

There is a high probability that a combination of physical and transition risks from climate change and biodiversity loss will materialize in the future and will interact in complex ways, resulting in unpredictable environmental, geopolitical, social, economic and financial sector dynamics.

The nature and consequences of climate change and biodiversity loss will differ across countries. Key

vulnerabilities at a national level typically include changes to the physical environment, the transition to a low-carbon and more biodiverse economy, and other impacts of climate change and biodiversity loss. The nature of these vulnerabilities will depend in part on the magnitude of the climate change and biodiversity loss, and in part on national dependence on the industries likely to be most affected, such as fossil fuels, agriculture, fishing and tourism.

In many cases the impacts of climate and biodiversity-related risks on an economy will be significantly affected by the wider public policy response to these risks. Supervisors should therefore be aware of key public policy commitments and initiatives in their country, such as net zero commitments or transition/adaptation plans. They may be asked to deliver their supervisory mandates in a way that is consistent with these broader public policy goals.

CHANGES TO THE PHYSICAL ENVIRONMENT

Climate change and biodiversity loss change the physical environment.

Climate change has already resulted in higher temperatures, more extreme regional and local weather conditions, rising sea levels, and more frequent weather-related disasters (including droughts, flooding, hurricanes and cyclones, and extreme heat, cold and precipitation events).

Biodiversity loss can undermine the ecosystems on which human society, economies and other species rely. These ecosystems include those providing food, raw materials, fresh water, air quality, pollination, and pest and disease control.

The physical changes caused by climate change and biodiversity loss can have a direct impact on physical assets (residential, commercial and public sector properties); utilities (electricity, gas, water, sanitation, communications, and transport infrastructure); food systems, including agricultural production (crops and livestock), fishing and food supply chains; manufacturing capacity; and tourism.

These impacts may, in turn, have an adverse impact on the economy across the household, corporate and public sectors. There may also be pronounced regional and sectoral impacts.

Vulnerability to physical risks may be greater where there are less developed mechanisms through which to share risk or to respond to risks when they crystallize. This may coincide with broader macroeconomic vulnerabilities. For example, the ability to recover from weather-related natural disasters may be limited by fiscal constraints and under-developed insurance markets.

TRANSITION TO A LOW-CARBON AND MORE BIODIVERSE ECONOMY

A transition to a low-carbon and more biodiverse economy may create sharp and substantial shifts in the value of some assets.

Government actions and policies to reduce greenhouse gas emissions or to protect biodiversity, technological developments, and shifts in consumer and investor preferences, can all lead to shifts in asset values and in patterns of the supply and demand for goods and services, nationally and internationally. Examples of government actions and policies include carbon taxes; subsidies for renewable energy and adaptation; land, forest and other natural resource protection; bans on coal and other fossil fuel production; bans on importing unsustainable natural resources; and building and transport regulations.

Countries that are more dependent on fossil fuel production and refining, timber, and the production of fertilisers and pesticides, may be more vulnerable to transition risks, with an impact not only on the value of companies involved in these sectors, but also more widely on economic growth, employment and government revenues.

Shifting investor and donor country behaviour may result in a challenging environment for governments and utilities to finance new public infrastructure such as power plants reliant on fossil fuels or large-scale hydro-electric plants relying on dams that flood ecosystems. The availability and reliability of public infrastructure can in turn be a critical determinant of private sector investment.

There may be trade-offs between physical and transition risks. For example, a rapid adjustment to a "net-zero" and more biodiverse economy could be associated with higher transition risks, even if it reduces the physical impact of climate change. Alternatively, a failure to adjust will lead to more pronounced physical risks and probably much larger transition risks when climate change and biodiversity actions are finally taken.

OTHER IMPACTS OF CLIMATE CHANGE AND BIODIVERSITY LOSS

Other impacts of climate change and biodiversity loss include their potential impact (directly and indirectly) on:

- economic growth and development;
- financial inclusion and gender equality (climate change may have a disproportionate impact on the poor and the uninsured);
- migration (of people and capital); and
- mortality rates (for example, higher rates of death from heat waves, epidemics or other climate and biodiversity loss-related factors).

KEY RESOURCES

How climate change and biodiversity loss could affect countries

1. Intergovernmental Panel on Climate Change (2021 and 2022) detail the nature and extent of climate change and biodiversity loss.
2. Network for Greening the Financial System (2022a) and INSPIRE (2022) describe biodiversity risks and their potential impact on countries and their financial sectors.
3. Most countries have submitted their nationally determined contributions to the Paris Agreement to the United Nations (2023a), including national climate risk assessments, national plans and targets. Some countries have submitted their long-term strategies (2023b).
4. Individual country data are also available from sources such as the Notre Dame Global Adaptation Initiative Vulnerability Index (2023) and the IMF Climate Change Indicators Dashboard (2023).
5. The Network for Greening the Financial System Scenarios Portal (2023) provides country-specific materials on the potential impact of different climate scenarios on the economy and on specific sectors within the economy.
6. Financial Stability Board (2020) discusses ways in which emerging markets and developing economies may be particularly vulnerable to physical and transition risks from climate change.
7. Supervisory authorities may also benefit from collaboration with other national authorities (including other supervisory authorities) that may already have made progress in considering the impacts of climate change and biodiversity loss.

THE IMPACT OF CLIMATE CHANGE AND BIODIVERSITY LOSS ON THE FINANCIAL SECTOR

Supervisors need to determine the potential impacts of climate change and biodiversity loss on the financial sector, and hence on their objectives for the safety and soundness of the financial institutions they supervise, financial stability, consumer and investor protection, and financial inclusion.

The main impacts of climate and biodiversity-related risks on the financial sector are likely to be on:

- the financial position of supervised firms (across all sectors);
- financial stability;
- consumers, investors and pension plan members; and
- financial inclusion.

The relevance of each of these impacts to a supervisory authority will depend in part on the mandate and objectives of each supervisory authority, and in part on the prospective nature and magnitude of each of these impacts.

Many supervisory authorities have found it useful to discuss these possible impacts with supervised firms and other stakeholders, individually and/or collectively, and to use this to build a picture of how climate and biodiversity-related risks might affect financial institutions, financial stability and users of financial products and services.

FINANCIAL POSITION OF SUPERVISED FIRMS

Financial institutions – individually or collectively – could make large losses, or even fail, because of the impact of climate and biodiversity-related risks, including the various physical and transition risks set out above. This could also threaten financial stability where individual institutions are systemically significant, or where failures are widespread.

Financial institutions may also face reputational and litigation risks. For example, banks' lending activities, and the assets held by banks, insurers, investment funds and pension funds, may be incompatible with the preferences of their owners and customers; or they may be incompatible with meeting national climate change and biodiversity targets.

Supervisory authorities - and supervised firms – therefore need to consider and assess the linkages

between the physical, transitional and reputational/litigation risks and their impact on individual financial institutions and on the financial sector more generally.

One approach to this is to consider how these risks feed through to more granular risk types, including credit, liquidity, insurance, market, operational resilience, and legal/reputational risks; and then to assess the potential impact of each of these granular risks on the financial positions of supervised firms. For a financial supervisor this would also be a good way to incorporate climate and biodiversity-related risks into a risk-based approach to prudential supervision.

For example, physical, transitional and reputational/litigation climate and biodiversity-related risks could:

- reduce the creditworthiness of some borrowers;
- reduce the value of the collateral and security available to lenders;
- increase insurance claims;
- increase the actuarial liabilities of insurers and pension plans;
- create losses or illiquidity from sharp falls in the value of specific assets;
- create long term instability in the prices of commodities and financial assets;
- create operational disruptions for supervised firms (and for supervisory authorities), through disruption to buildings, IT systems and other infrastructure; and
- lead to legal actions or protests, including withdrawals of deposits, investments and insurance policies from supervised firms.

Climate and biodiversity-related risk drivers will have different impacts across countries, across regions, across financial sectors, and across individual supervised firms. For example, physical risks may be the most important drivers of the credit and insurance risks inherent in lending to and in insuring small farmers; while transition risks may be the most important drivers of the market risk inherent in holding securities issued by fossil fuel producers and by companies in high hydrocarbon use sectors such as mining and cement.

Time horizons may also be important here – immediate government actions or technological advances to limit physical risks could generate short and medium-term transition risks; but inadequate government actions might minimise near term transition risks while increasing physical risks over the

medium and long term.

Scenario analysis and stress testing are useful tools here for both supervisory authorities and supervised firms. Alternative scenarios for climate change and biodiversity loss will be associated with different levels and types of physical and transition risks, which in turn will feed through in different ways to sectors within the economy, to the macroeconomy, and (directly and indirectly) to financial institutions.

Climate and biodiversity-related scenario analysis and stress testing is not straightforward. Specifying high-level climate pathways is reasonably simple, for example the use of climate change pathways based on (i) meeting national and international targets for climate change on schedule or ahead of schedule, and (ii) a continuation of recent climate change without any actions to limit or reduce these changes.

However, it is more difficult to specify biodiversity pathways, in part because there is no single metric (such as temperature changes or greenhouse gas emissions) to describe each pathway. Instead, hypothetical biodiversity loss narratives can be created, with an emphasis on the loss of specific habitats or species relevant to an individual country or region. These narratives could then be combined with climate pathways, which might also enable consideration of the interactions between climate change and biodiversity loss.

These climate and biodiversity pathways then need to be translated into their likely impact on countries, sectors and financial institutions. This is difficult, not least because of:

- the lack of data to use in modelling;
- non-linearities and cliff effects (the limited historic data that exist may not be much use in predicting the impact of further increases in global temperatures or biodiversity loss);
- long-term horizons;
- extreme uncertainty about the impact of climate change and biodiversity loss on physical risks;
- uncertainty about the impact of government actions and technological change on transition risks; and
- the multiple transmission mechanisms through which physical and transition risks can have an impact (directly and indirectly) on financial institutions.

One response to these difficulties has been to focus – at least initially – on the likely impacts under each climate pathway or biodiversity narrative at the industry, sector or regional level, identifying which industries, sectors or regions in a country might be most affected by different types of physical and transition risks, and the possible magnitude of these impacts. These impacts can then be mapped against the credit, insurance and market exposures of financial institutions. This does not avoid the difficulties and limitations listed above, but it can provide a useful starting point.

KEY RESOURCES

Financial position of supervised firms

1. Toronto Centre (2017, 2019b and 2021c) discuss the implications of climate change for financial supervisors across banking, insurance and securities.
2. In Canada, as in many other countries, the supervisor of banks and insurance companies, the Office of the Superintendent of Financial Institutions (2021), launched a consultation process with the financial sector on climate-related risks.
3. Toronto Centre (2022b) discusses how climate-related risks can be integrated into risk-based supervision, while the Basel Committee's (2020, 2021a and 2021b) approach to climate-related risks shows how physical and transition risks can be incorporated within credit, market, operational and reputational risks. A similar approach can be applied in other sectors.
4. Toronto Centre (2020b) discusses how financial institutions and supervisors can use climate-related scenarios and stress testing.
5. Network for Greening the Financial System (2019) sets out the transmission mechanisms from physical and transition risks to the financial positions of financial institutions, while Network for Greening the Financial System (2021 and 2023) set out a series of alternative scenarios and shows how these feed through to physical and transition risks. The NGFS climate impact assessor has detailed country and sub region projections of losses from physical climate risks on various aspects of the economy (for example crop yields) and projections of the frequency of major climate events over various time horizons.
6. Network for Greening the Financial System (2022a) includes some country examples of how biodiversity loss could feed through to financial institutions.

FINANCIAL STABILITY

Supervisors (and other authorities with responsibilities for financial stability) need to assess the potential impact that climate and biodiversity-related risks could have on financial stability. Scenario analysis and stress testing will again be useful tools here.

Climate and biodiversity-related risks to financial stability risks include:

- The failure (including operational disruption) of systemically important financial institutions, including financial market infrastructure.
- The failure of a collection of smaller financial institutions that face common climate and biodiversity-related risks.
- Interconnections in climate risk exposures across financial institutions and sectors leading to contagion risks. For example, a withdrawal of insurance coverage because of increasing physical risk could result in the transfer of risk exposures to the banking sector.
- Sharp falls in asset prices and illiquidity in asset markets – possibly more widespread and more correlated across assets than investors had previously expected – that are amplified by sales of affected assets by investors.
- Increases in volatility and risk premia.
- Shocks to the wider economy transmitted to (and possibly amplified by) the financial sector.
- Shocks to the wider economy caused by problems in the financial sector, for example where losses suffered by the financial system cause a reduction in the financing of the wider economy, or where the intensification of climate and biodiversity-related risks triggers a widespread reappraisal of the creditworthiness and insurability of large parts of the wider economy.
- A deterioration in sovereign creditworthiness as physical and transition risks result in economic disruption at a national level, reducing tax revenues and increasing fiscal expenditures.
- The increasing amount of “brown” financing being undertaken by unregulated financial institutions, resulting from the increasing focus within the regulated financial sector on climate and biodiversity-friendly “green” financing (loans, investments and other forms of financing). This could become systemically important and increase the risk that a correction in the pricing of “brown” assets would have systemic consequences.

The financial system is the main channel for the allocation of financial resources in the economy. The channels include lending by banks, and the asset allocations of pension, insurance and asset management companies. Climate and biodiversity targets are unlikely to be achieved unless they are supported by the allocation of resources through the financial system.

Current asset pricing does not reflect the social costs of harmful emissions in contributing to climate change, either because carbon pricing is incomplete or other policies are not fully effective in reflecting these social costs. Financial systems are, therefore, likely to be inefficient in allocating financial resources consistent with climate and biodiversity targets. This inefficient allocation of financial resources will favour "brown" over "green" financing and increase the risk of climate change or biodiversity loss exceeding the levels targeted.

There are feedback loops through which the financial system accentuates climate and biodiversity-related risks, which in turn increases the risks of financial instability. The financing of harmful emissions by financial institutions (across all sectors) is currently inconsistent with meeting national and global climate change and biodiversity targets. This is not only harmful for climate change and biodiversity loss, but it also threatens financial stability because eventually the increasing physical and transition risks will crystallise and will have a damaging impact on the financial sector. By increasing the risk that climate and biodiversity targets will not be met, the misallocation of financial resources increases the risks to financial stability.

KEY RESOURCES

Financial stability

1. Financial Stability Board (2020) and Toronto Centre (2022a) discuss the channels through which climate change could affect financial stability.
2. The IMF (2022b) has begun to include climate-related risks in its Financial Sector Assessment Programmes and in other country assessments. For specific country examples, see IMF (2022a) for the Philippines and Annex 3 of IMF (2022c) for Costa Rica.

CONSUMER AND INVESTOR PROTECTION

Climate change, biodiversity loss, transition and adaptation will affect customer needs and preferences in relation to financial services, and change the scale and nature of the risks that many customers face. For example, customers may need insurance against new risks.

In some countries, many customers are already having to deal with frequent natural disasters and the difficulties these may cause in relation to obtaining and repaying credit; obtaining appropriate insurance coverage; and making provision for saving or investment. In future, these difficulties may become more widespread and supervisory authorities will need to consider how such changes affect their consumer protection mandates. There are risks that financial institutions respond to the challenges they face from climate issues in ways that reduce the financial risk to themselves, but result in unfairness to customers, for example by seeking to avoid paying legitimate insurance claims.

Where consumers have invested funds directly or through managed funds or pensions, a further risk is that the value of any "brown" assets on which they depend for a return is impaired as a result of physical or transition risk, and so does not meet the investment objective. If consumers are not even aware this is a possibility, it will be hard for them to respond to the risk.

These issues need to be borne in mind when assessing whether financial institutions are designing, marketing and delivering products and services fairly for customers; and in determining whether financial institutions have properly considered how to ensure the fair treatment of customers when identifying and mitigating risk.

In addition, some consumers and investors are choosing to invest in assets that are consistent with climate, biodiversity or other sustainability goals, or at least exclude some more harmful activities. For some this is a purely financially-driven strategy, while for others it has an ethical dimension - their choices are guided by the sustainability impact of the investment as well as the likely financial return.

Such consumers and investors are becoming more environmentally conscious and activist in their outlook. They want to know if a company's assets are vulnerable to physical risks, the volume of greenhouse gases the company emits, and the company's plans for lowering emissions and reducing biodiversity loss. They therefore want to be properly informed about the climate and biodiversity-related impacts and opportunities of companies, managed funds, pension plans, and even the own-account portfolios of assets held by financial institutions.

Misleading or fraudulent claims or disclosures (for example, about the climate or biodiversity credentials of an investment, or ESG labelling) could therefore lead to the mis-selling of financial products.

High standards of disclosure and transparency about the climate and biodiversity impact of companies

that issue securities, and the portfolios of asset management companies, are therefore an important tool to help both professional and retail investors to make well-informed decisions.

KEY RESOURCES

Consumer and investor protection

1. Consumer and investor protection issues are explored further in Toronto Centre (2021c), which discusses the implications of climate change for securities supervisors.
2. IOSCO (2020 and 2021) discuss the importance of climate and sustainability-related disclosures.

FINANCIAL INCLUSION

Climate and biodiversity-related risks may have an adverse impact on financial inclusion, both directly and through their negative impact on economic growth, development, and poverty.

Poorer and more marginalized segments of the population may lack the tools to help them cope with the challenges to their health and livelihoods that accompany climate change and biodiversity loss. Poorer people (and the more financially excluded) may also face greater physical climate and biodiversity-related risks because they live on land and in buildings that are more likely to be flooded or damaged by adverse weather events, or because their livelihoods or household food and water sources depend on sectors of the economy (for example agriculture or tourism) that are more likely to be disrupted by climate change and biodiversity loss.

Climate change and biodiversity loss may also heighten gender inequality because it tends to have a different impact on women. Women and girls in developing countries are often the primary collectors, users, and managers of water and producers of food for family use, so reductions or other changes in water and food availability will jeopardize their families' livelihoods as well as increase their workloads. There is less opportunity for women to engage in income-generating activities if they spend greater portions of their day managing water and food resources. In many countries large numbers of women are employed in sectors that may be negatively affected by climate change and biodiversity loss.

Actions taken by financial institutions to reduce their exposure to climate and biodiversity-related risks could also have negative consequences for financial inclusion. For example, an increase in the frequency and severity of natural disasters or of biodiversity loss may lead to an increase in insurance premiums, reduce the availability of insurance, or make some risks uninsurable against. If insurers

significantly increase premiums or withdraw their coverage of certain climate and biodiversity-related risks (such as insurance cover for crop failures or insurance for buildings located in areas or regions that may be subject to flooding or rising sea levels), this might leave households and firms without access to, or unable to afford, insurance coverage. Banks may also become less willing to lend to borrowers in sectors or locations subject to climate and biodiversity-related risks.

KEY RESOURCES

Financial inclusion

1. Innovations for Poverty Action (2017) and CGAP (2022) discuss the linkages between financial inclusion and climate change.
2. The impact of climate change on gender equality is discussed in Oxfam (2010).

TAKING SUPERVISORY ACTIONS IN RESPONSE TO CLIMATE AND BIODIVERSITY-RELATED RISKS TO SUPERVISORY OBJECTIVES

Supervisors need to respond to the climate and biodiversity-related risks discussed above because these risks may threaten their supervisory objectives.

Supervisors need to consider how well climate and biodiversity-related risks are being identified and managed by financial institutions; how these risks relate to consumer and investor protection and to the disclosures that financial and non-financial companies should make; the potential impact of these risks on financial stability and financial inclusion; and what supervisory interventions might be required in response.

This is likely to require some combination of assigning and prioritizing resources, hiring of expertise, and collaboration with other stakeholders with an interest in climate and biodiversity-related risks and in the development of climate and biodiversity scenarios.

For financial institutions (and indeed for supervisory authorities), biodiversity risks can be considered (and governed and risk managed) in very much the same way as climate-related risks. The Network for Greening the Financial System uses the same physical and transition risks framework for both types of risk. Consider, for example, a bank or insurer lending to or insuring an enterprise in the

agricultural sector that faces the risk that a crop or a variety of livestock is under threat. This could be because of climate change (for example higher temperatures, severe drought or flooding), or because of the impact of harmful pesticides or other pollutants. Both types of risk should certainly be assessed, but this can be done within a common framework.

THE FINANCIAL POSITION AND RISK MANAGEMENT OF SUPERVISED FIRMS

Supervisors need to focus on four main areas here:

(i) How well are financial institutions identifying the climate and biodiversity-related risks that they face?

(ii) How well are financial institutions managing these risks?

(iii) Do financial institutions have sufficient resources (capital, solvency, liquidity, expertise, etc.) to cope with the crystallization of these risks?

(iv) Do supervisors need to intervene to require financial institutions to improve their ability to identify, manage and control these risks, and to hold additional capital?

Supervisory focus on the management of climate and biodiversity-related risks by financial institutions

This supervisory review should include:

- Discussions with financial institutions, individually or collectively, to establish how they identify, measure and manage climate and biodiversity-related financial risks.
- Issuing regulations and supervisory guidance on how financial institutions should be identifying and managing climate and biodiversity-related financial risks.
- Undertaking risk assessments of individual financial institutions, or thematic assessments of a sample of financial institutions, focusing on their identification and management of climate and biodiversity-related risks, including assessments of whether financial institutions are meeting the rules, guidance or other standards issued by the supervisory authority.
- Reviewing individual capital adequacy assessments (ICAAPs), own risk and solvency assessments (ORSAs) and similar documents prepared by supervised firms to assess how they are taking account of climate and biodiversity-related financial risks in determining the adequacy of their risk management, controls, and capital or solvency.

(i) Supervisors should expect financial institutions to be identifying their climate and biodiversity-related financial risks. This should include a financial institution being expected to:

- Identify and define the types of climate and biodiversity-related financial risks that may be relevant for the financial institution, taking account of the impacts on its customers and investors, across a range of time horizons (financial institutions should not ignore longer-term risks that have not yet materialised).
- Identify the ways in which these risks may feed through to the financial position of the financial institution, through credit, liquidity, insurance, market, operational, reputational or other types of risk.
- Assess the magnitude and materiality of these risks, including the use of available metrics.
- Undertake scenario analysis and stress testing to assess the impact of alternative climate change and biodiversity loss scenarios on the financial institution (see Box 1).

(ii) Supervisors should expect financial institutions to include climate and biodiversity-related risks within their governance and risk management frameworks.

This should be on a proportional basis, depending on the magnitude of the risks.

To a large extent, financial institutions and supervisors should be in reasonably familiar territory here, since basic good governance and risk management (and its assessment by supervisors) should include the standard areas of how well a financial institution:

- Identifies and understands its risks.
- Assesses how these risks might affect the financial institution.
- Measures, controls and reports upwards its risks.
- Sets limits and reduces the risks as necessary to be in line with the financial institution's risk appetite.
- Delivers the responsibilities of all three lines of defence (front line, risk management and internal audit).
- Oversees all this through the Board and senior management.

More specifically, supervisors should expect the governance and risk management of climate and biodiversity-related risks to include:

Governance

- Board and senior management understanding of these risks and their potential impact on the financial institution.
- Incorporating climate and biodiversity-related considerations in the financial institution's risk appetite, strategy and business plans.
- Setting clear roles and responsibilities of the Board and senior management, including specific personnel who are responsible for the oversight of the financial institution's climate and biodiversity-related risks.
- Maintaining effective Board and senior management oversight of the financial institution's risk management, including the policies and processes to assess, monitor and report such risks, and to ensure that appropriate internal controls are in place.
- Taking account of the potential climate and biodiversity-related reputational and litigation risks to the financial institution.

Risk Management

- Developing a risk management framework to manage climate and biodiversity-related risks in a systematic and consistent manner and to incorporate these risks into existing risk management practices.
- Identifying and managing not just financial risks, but also the impacts of climate and biodiversity issues on their customers and on investors. This includes thinking about risks and challenges for customers, and changes in customer needs and preferences. A financial institution that has considered these aspects will be better placed not only to accurately gauge the risks it faces but also to respond in a manner that delivers both effective risk management and fair and inclusive treatment of customers.
- Considering what data may be required to monitor and measure climate and biodiversity-related risks.
- Risk management function monitoring of the financial institution's climate and biodiversity risk management policies and challenging practices and decisions where appropriate.
- Internal audit function review of the robustness and effectiveness of the financial institution's risk management framework in managing climate and biodiversity-related risks.
- Assessing climate and biodiversity-related risks before accepting new businesses and in managing business relationships, particularly for sectors with higher climate and biodiversity-related risks.
- Including climate and biodiversity-related financial risks in the financial institution's ICAAP (for a bank) or ORSA (for an insurer) if these risks are material.
- Using scenario analysis and stress testing to inform strategy setting and risk assessment and identification (see Box 1).

BOX 1

Scenario analysis and stress testing by financial institutions

Supervisors should be expecting financial institutions (in particular larger and more systemically important financial institutions) to undertake scenario analysis and stress testing to:

- assess the impact of alternative climate change and biodiversity loss scenarios;
- inform strategy setting; and
- assess the adequacy of the financial institution's capital and other resources.

As with risk management more generally, this is essentially an extension of the scenario analysis and stress testing that financial institutions should already be undertaking to assess other types of risk.

Supervisory authorities should be expecting the financial institutions they supervise (on a proportionate basis) to:

1. Undertake sufficiently severe but plausible stress tests, over a long-term horizon, based on a range of climate pathways and biodiversity narratives. For climate, these pathways might include (a) a relatively early and orderly transition consistent with a temperature increase of no more than 2°C, in line with the Paris Agreement; (b) a late and disruptive transition, consistent with the same temperature increase but with a much greater (albeit later) transition risk; (c) a limited transition, so temperatures increase by 3 or 4°C by 2100, maximising physical risks; and (d) a "too little, too late" scenario that exhibits both transition and physical risks. For biodiversity, the narratives might include a range of habitat and species loss.
2. Reflect within these broad pathways the specific climate and biodiversity risks faced by the specific country (or region) and by the specific financial institution. A financial institution should consider the impact of each pathway on (i) broad economic variables such as GDP, employment and inflation; (ii) regions and sectors of the economy; and (iii) the specific physical and transition risks that will depend on the location and the types of business undertaken by the financial institution.
3. Be imaginative and prudent in addressing the challenges posed by the absence of data to use in modelling; the uncertainty about the impact of climate change and biodiversity loss on physical risks, and of government actions on transition risks; possible non-linearities and cliff effects; and the multiple transmission mechanisms through which physical and transition risks can have an impact on a financial institution.

BOX 1

4. Use the results of these scenarios and stress tests to inform the board and senior management about the climate and biodiversity-related risks being taken by their financial institution; and to input into the financial institution's capital adequacy planning, recovery planning, and, where applicable, disclosures to the market.

Supervisors should then review the scenario analysis and stress tests undertaken by a financial institution to:

a) Assess whether the scenarios and stress tests are sensible (in the sense of relating to the key risks being run by the specific financial institution); sufficiently plausible and severe; and cover a sufficient range of outcomes reflecting model uncertainty and the key tail risks.

b) Consider what this scenario analysis and stress testing indicates about the risks faced by the financial institution; the quality of its stress testing and of its risk management more generally; and the adequacy of its financial resources.

c) Intervene as necessary, for example by requiring a financial institution to run additional scenario analysis and stress tests, to improve its risk management, or to hold additional capital (Pillar 2).

As in other technical areas, supervisory authorities should be able to make use of specialist resources with expertise in scenario analysis and stress testing (although such specialists may not be available in all supervisory authorities). However, supervisors can also make good progress even with very little specialist expertise – for example by discussing the scenarios used and the results of stress tests with the financial institutions that have run them; by considering how well a financial institution has met the supervisory expectations set out above; and by taking a thematic perspective to compare good and less good practices across financial institutions and to share the results among all financial institutions.

In addition, supervisory authorities can reinforce and enhance the scenario analysis and stress tests undertaken by financial institutions by:

i) Including rules and guidance on scenario analysis and stress testing within any rules and guidance issued to financial institutions on the management of climate and biodiversity-related risks.

ii) Setting "top-down" requirements on financial institutions to run standard stress tests as specified by the supervisory authority.

iii) Undertaking their own scenario analysis and stress testing as part of the assessment of both the micro and macro-level impacts of climate and biodiversity-related risks.

(iii) Supervisors should expect banks and insurers to include climate and biodiversity-related risks in their ICAAPs and ORSAs, and to use this analysis to assess the adequacy of their risk management and of their capital and other resources. Pension plan trustees should include climate and biodiversity-related considerations in their statement of investment policies and procedures (SIPPs).

The content and substance of ICAAPs, ORSAs, SIPPs and other similar assessments by financial institutions provide supervisors with an indication of how a financial institution is assessing its climate and biodiversity-related risks, and - where these risks are material - whether and how the financial institution is including these risks in its own assessment of the adequacy of its capital and other resources.

Financial institutions may need to hold additional capital resources to enable them to absorb losses that might arise from the crystallization of climate and biodiversity-related risks, including losses from the reduced creditworthiness of borrowers, higher insurance claims, and sharp reductions in asset values.

There should also be a clear link to good governance here. ICAAPs and ORSAs should be reviewed and approved by the Board and senior management before they are finalized.

(iv) Using a risk-based supervisory approach, supervisors should focus their prudential supervision in particular on any higher-impact financial institutions that face significant climate and biodiversity-related prudential risks, and should intervene where necessary.

Supervisors should take a risk-based approach to assess how well financial institutions are identifying, managing and controlling climate and biodiversity-related financial risks. Resources for prudential supervision should be devoted primarily to higher impact financial institutions (including any systemically important financial institutions).

Consistent with the principles and practices of consolidated supervision, supervisors should also consider climate and biodiversity-related financial risks not just within an individual financial institution but also, where applicable, across the group of which that institution is a part, including both financial and non-financial entities.

Supervisors should intervene where necessary to require financial institutions to strengthen their governance and risk management policies and practices, including in relation to climate and biodiversity-related risks.

Supervisors should, where they have the powers to do so, also consider imposing Pillar 2 capital add-ons where financial institutions do not meet supervisory expectations on governance and risk management, or are judged by supervisors to need more capital to meet possible losses from large or concentrated exposures to climate and biodiversity-related risks.

KEY RESOURCES

Risk management

1. The basics of good governance are set out in Toronto Centre (2016).
2. Many international standard setters and national supervisory authorities have issued guidance on how financial institutions should identify and manage environmental and climate-related risks. These include the International Association of Insurance Supervisors (2021), the Basel Committee (2022a), the Australian Prudential Regulation Authority (2021), the Bank of England (2019), the Central Bank of Kenya (2021), the European Central Bank (2020), the Monetary Authority of Singapore (2020, separately for banks, insurers and asset managers), and the Office of the Superintendent of Financial Institutions in Canada (2022).
3. Following the publication of their respective guidance notes, the European Central Bank (2022) has published a thematic review of the progress made by major EU banks in meeting the ECB's guidance, while the Australian Prudential Regulation Authority (2022) has published the results of a self-assessment survey completed by banks, insurers and superannuation funds. In both cases the results show that many financial institutions still have a long way to go to meet the supervisory guidance.
4. Toronto Centre (2020b) discusses how financial institutions and supervisors can use climate-related scenarios and stress testing.
5. Alternative climate scenarios and how they may feed through to physical and transition risks have been published by the Network for Greening the Financial System (2021 and 2023), the Financial Stability Board (2022d), and the International Actuarial Association (2021).
6. Network for Greening the Financial System (2022a) discusses the use of biodiversity narratives as a basis for stress testing.
7. Financial Stability Institute (2021) surveys how some supervisory authorities are using climate-related stress tests.
8. Toronto Centre (2018 and 2020a) discuss impact assessments within risk-based supervision and the setting of Pillar 2 capital add-ons.

FINANCIAL STABILITY

Macroprudential frameworks are concerned with two issues: systemic risk identification and systemic risk mitigation (preventing financial crises). Climate change and biodiversity loss pose new macroprudential challenges. As discussed above, the unique aspects of climate and biodiversity-related risks – in particular that financial risks will materialise over long time horizons and involve considerable uncertainty – make the identification of systemic risks very difficult. Nevertheless, there is a high degree of certainty that if climate and biodiversity targets are not met this will increase the risk to financial stability.

In addition to the Financial Stability Board, many national macroprudential authorities are beginning to recognise climate change and biodiversity loss as threats to financial stability and to cover them in their financial stability reports.

For systemic risk mitigation, the challenge is how to formulate a macroprudential framework and macroprudential policy to address climate and biodiversity-related risks. Currently, macroprudential authorities are relying primarily on information enhancement, vulnerability analysis, scenario analysis and stress testing, increased attention by financial institutions to climate and biodiversity-related risks, supported by regulatory and supervisory actions, and international and national efforts to tackle climate change and biodiversity loss.

In view of the feedback loops from financial flows to climate change, one of the roles that macroprudential policy can play in mitigating the systemic risks from climate change and biodiversity loss is to assess whether financial flows are consistent with meeting climate and biodiversity goals, and to promote policies that would bring these flows into consistency with the targets. As part of this process, macroprudential authorities should assess the carbon footprint of financial institutions. This information would also be critical to quantifying the transition risks that would be involved in meeting the climate targets and thus to inform both the assessment of the financial stability risks and the microprudential supervision of financial institution-specific risks.

Macroprudential authorities can promote policies to help to bring financial flows into consistency with climate and biodiversity targets by incentivizing flows into “green” finance, including better accounting for the shadow price of carbon in investment decisions, and various types of blended finance.

Consideration can also be given to macroprudential policies and tools that could complement microprudential measures. For example, the European Central Bank and the European Systemic Risk Board are examining the use of systemic risk buffers in response to unaddressed systemic climate risk, while the Bank of England is undertaking further analysis to explore possible adjustments to capital adequacy requirements. This would build up additional capital buffers in anticipation of losses caused by physical and transition risks.

A form of the counter-cyclical capital buffer (CCyB) for climate and biodiversity-related risks has also been proposed. The concept here is that the financial system is currently in the middle of a very long upward cycle in providing lending and investment for activities that are harmful to the environment, increasing physical risks. Meanwhile, if government actions are taken to meet the Paris Agreement and other national targets the cycle will eventually come to an end, albeit with inevitable transition risks. An additional capital buffer based on the level of harmful emissions and measures of biodiversity loss would build up additional capital buffers in anticipation of both physical and transition risks.

Meanwhile, the climate and biodiversity-related risks to individual financial institutions and to financial stability reinforce the need for supervisory authorities – and other authorities – to enhance their crisis preparedness and their crisis management capabilities.

KEY RESOURCES

Financial stability

1. Toronto Centre (2022a) discusses how macroprudential frameworks can be adapted to take account of climate-related risks.
2. The Financial Stability Board progress report (2022a) presents some of the early thinking and work of international standard-setting bodies and national authorities on macroprudential policies in response to climate-related risks to financial stability.
3. The Partnership for Carbon Accounting Financials (2020) outlines a framework for calculating the carbon footprint of financial institutions.

CONSUMER AND INVESTOR PROTECTION

Accurate, clear and relevant disclosures – by corporate issuers, fund managers, and other financial institutions - could enable retail and institutional investors to make better-informed decisions based on their own preferences regarding climate and biodiversity-related risks.

Disclosure standards are important for three types of firms – issuers of listed securities, financial institutions generally, and fund managers. In each case, climate and biodiversity-related disclosures should enable investors, consumers, and other stakeholders to make better-informed decisions. Such disclosures could therefore form an increasingly important component of investor protection as well as market discipline.

There is a strong connection between firms' risk management, and disclosure. The work firms do to identify, govern and manage risk will form the basis for their disclosures. Investors and other stakeholders can use disclosures to assess the quality of these firms' risk management and to form a view on whether an investment is consistent with their sustainability preferences as well as other investment objectives.

Securities supervisors have a key role to play in encouraging or mandating companies to publish clear and accurate disclosures about the impact of climate and biodiversity-related risks on the company; on the impact of the company's activities on the climate and on biodiversity; and on how the company is managing these risks. Similarly, supervisors should encourage or mandate managed funds to publish clear and accurate disclosures about the climate and biodiversity credentials of the investments held within the fund.

Securities, insurance and pension fund supervisors should consider whether asset portfolios remain consistent with investment objectives and obligations to investors once climate and biodiversity-related risks are factored in, and ensure that valuations of assets highly exposed to climate or biodiversity risks are robust.

For banking and payments, ensuring continued access to services and the accurate recording and execution of payments is key for customers in situations where financial institutions may experience heightened threats to operational resilience as a result of physical risks. Supervisors should require financial institutions with operations exposed to physical risks to pay particular attention to business continuity arrangements and ways to minimise the extent and impact of business disruption.

All supervisors also have a role in ensuring that appropriate innovation can take place that enables the changing needs of customers to be met without undue constraint from the regulatory framework or supervisory practices. For example, in some countries insurers have experimented with index (parametric) insurance as a way of providing protection from weather-related risk without the need for claims validation which would make cover uneconomic to provide. Some authorities have used regulatory 'sandboxes' to enable firms to pilot such products. In Mexico, experiments have taken place to develop insurance products for threatened reef environments, with those whose livelihood depends on the reef among those deemed to have an insurable interest.

(i) FSB Task Force on Climate-Related Financial Disclosures

The most important international disclosure initiative has been the work of the FSB Task Force on Climate-Related Financial Disclosures (TCFD). The TCFD made several recommendations for climate-related disclosures by listed firms, with additional recommendations for banks, insurers, and asset managers. Many of the TCFD recommendations are also broadly applicable to pension plans.

The TCFD recommendations are intended to provide a common basis for ensuring that disclosures reflect the impact of climate change on an issuer's strategy, governance, operations, and metrics (see Box 2).

BOX 2

TCFD Recommendations

The TCFD recommendations are that listed companies (not just financial institutions) should disclose information about their:

- Governance – the firm's governance around climate-related risks and opportunities.
- Strategy – the actual and potential impacts of climate-related risks and opportunities on the firm's businesses, strategy and financial planning.
- Risk Management – the processes used by the firm to identify, assess and manage climate-related risks.
- Metrics and Targets – the metrics and targets used by the firm to assess and manage relevant climate-related risks and opportunities.

In addition, the TCFD made specific recommendations on disclosures by banks, insurers and asset managers.

Banks should:

- disclose their climate change-related risks (physical and transition) in their lending and other business activities;
- characterize their climate change-related risks in the context of traditional banking industry risk categories such as credit risk, market risk, liquidity risk, and operational risk;
- describe any risk classification frameworks used;
- provide the metrics used to assess the impact of climate change-related risks (physical and transition risks) on their lending and other business activities in the short, medium and long term;
- describe significant concentrations of credit exposure to carbon-related assets; and
- disclose the amount and percentage of carbon-related assets relative to total assets as well as the amount of lending and other financing connected with climate-related opportunities.

Insurers should:

- provide supporting quantitative information, where available, on their core businesses,

BOX 2

products, and services, including information at the business division, sector, or geography levels;

- explain how potential climate impacts influence client, cedent, or broker selection, and whether specific climate-related products or competencies are being developed;
- perform climate-related scenario analysis on their investment and underwriting activities (both investment and liability exposures) and describe the climate-related scenarios used, including the critical input parameters, assumptions and considerations, analytical choices, and time frames. In addition to a 2°C scenario, insurance companies with substantial exposure to weather-related perils should consider using a greater than 2°C scenario to account for physical effects of climate change;
- describe the processes for identifying and assessing climate-related risks on insurance portfolios by geography, business division, or product segments, including physical risks, transition risks and litigation risk;
- describe key tools or instruments, such as risk models, used to manage climate-related risks in relation to product development and pricing;
- describe the range of climate-related events considered and how the risks generated by the rising propensity and severity of such events are managed; and
- provide aggregated risk exposure to weather-related catastrophes of their property business (annual aggregated expected losses from weather-related catastrophes) by the relevant jurisdiction.

Asset Managers should:

- describe how climate-related risks and opportunities are factored into relevant products or investment strategies and how each product or investment strategy might be affected by the transition to a lower-carbon economy;
- describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset managers' ability to assess climate-related risks;
- describe how they identify, assess and manage material climate-related risks for each product or investment strategy;
- describe metrics used to assess climate-related risks and opportunities in each product or investment strategy and how these metrics have changed over time;

BOX 2

- provide the weighted average carbon intensity, where data are available or can be reasonably estimated, for each product or investment strategy; and
- provide other metrics they believe are useful for decision-making along with a description of the methodology used.

The TCFD has published annual reports on the progress made in implementing these recommendations and has highlighted examples of good practice.

Supervisory authorities should consider whether to encourage (or even require) issuers of securities and some financial institutions to follow the TCFD recommendations. Some authorities have already made the TCFD recommendations a mandatory requirement for issuers of listed securities, or have introduced a "comply or explain" regime. Some have also started supervising the adequacy of disclosures made by institutions that state they are making TCFD-compliant disclosures.

The G7 Finance Ministers (2021) announced in June 2021 that they "support moving towards mandatory climate-related financial disclosures that provide consistent and decision-useful information for market participants and that are based on the TCFD framework, in line with domestic regulatory frameworks."

(ii) Accounting standards

Other key inputs to the accuracy and usefulness of financial statements are the accounting standards according to which they are prepared and how they are audited. These should complement the TCFD recommendations by ensuring that the information and risks disclosed are appropriately reflected in the valuations underpinning financial statements.

For example, climate change and biodiversity loss may result in fundamental changes to the value of an issuer's physical and other assets. They may be worth significantly less than previously thought or become stranded assets that cease to have value before the end of their expected economic life. A coal mine or a petroleum production facility could cease to be viable through a combination of taxes on emissions and legislative restrictions on the production and use of coal and petroleum products.

It is therefore important to ensure that accounting standards and sustainability disclosures are properly aligned. Work is under way to enhance this alignment internationally (see Box 3) and some supervisory authorities are starting to work together on ensuring that sustainability disclosures and financial statements are accurate and consistent.

BOX 3

Reflecting sustainability in financial statements

The International Financial Reporting Standards (IFRS) Foundation has established the International Sustainability Standards Board (ISSB) to create a global baseline for sustainability disclosure standards. The ISSB is an independent, private-sector body that develops and approves IFRS Sustainability Disclosure Standards under the oversight of the IFRS Foundation. The ISSB published two Exposure Draft standards, on general sustainability-related disclosures and on climate-related disclosures, in March 2022 for public consultation, with the aim to issue the final standards in 2023. The draft standards:

- set out the overall requirements for disclosing sustainability-related financial information about a company's significant sustainability-related risks and opportunities, to provide the market with a complete set of sustainability-related financial disclosures;
- provide guidance on how to identify and develop appropriate disclosures about sustainability-related risks and opportunities, using the earlier Climate Disclosure Standards Board (CDSB – now incorporated within the IFRS Foundation) guidance for water- and biodiversity-related disclosures;
- set out the specific requirements for the identification, measurement and disclosure of climate-related financial information, incorporating the recommendations of the TCFD and including metrics tailored to industry classifications derived from the industry-based SASB Standards; and
- propose to require a company to disclose information that would enable an investor to assess the effect of climate-related risks and opportunities on the company, and to disclose information about climate-related physical and transition risks.

The ISSB standards are intended to create more comparable and consistent disclosures across jurisdictions, to limit harmful fragmentation and unnecessary costs for issuers, and to help investors and other users to compare and aggregate climate risk exposures across jurisdictions.

Alongside the development of a global baseline reporting standards on climate, the International Auditing and Assurance Standards Board (IAASB) is developing a new sustainability-related assurance framework and the International Ethics Standards Board for Accountants (IESBA) is developing sustainability-related ethics and independence standards.

The ISSB standards are being supported by IOSCO, the Basel Committee and the IAIS. IOSCO will encourage its 130 members to consider adopting the ISSB standards when setting sustainability-related disclosure requirements, while the Basel Committee will consider how Pillar 3 can provide a common disclosure baseline for climate-related financial risks.

(iii) Taskforce on Nature-related Financial Disclosures

The Taskforce on Nature-related Financial Disclosures (TNFD) is developing a reporting and risk management framework for nature-related risks and opportunities, mirroring the work of the TCFD, to advance the development of a common set of accounting metrics and indicators to support comparable and consistent biodiversity-related financial disclosures. This is intended to bring biodiversity-related financial disclosures more closely into line with climate-related financial disclosures.

Meanwhile, some countries have already moved towards the introduction of mandatory biodiversity-related disclosures, usually alongside climate-related disclosures.

(iv) Retail investor protection

Supervisors need to consider how to protect retail investors with a preference for "green" funds and other financial investments, or where claims are made about the sustainability characteristics of the investments. This should include consideration of:

- whether investors have access to information about the impact on the climate and biodiversity of a fund or other financial investment, and know how to interpret this information;
- how investors can assess, verify and compare any claims made about the compatibility of the fund or other investment with a particular climate or biodiversity target (such as consistency with "net-zero" emissions, or with a specific rise in temperature by 2050);
- whether a fund or other entity setting a climate or biodiversity-related objective or making climate or biodiversity-related claims can actually deliver on the commitment; and
- the potential for fraud or mis-selling ("greenwashing"), through false claims (spurious attempts by financial or non-financial companies to enhance their environmental credentials) or by using misleading marketing to attract investments that do not have the claimed climate-related or other environmental benefits.

This is a complex area because it is hard to accurately assess and compare the climate and biodiversity impact of different activities. It is challenging to deliver consistent and effective climate and biodiversity-related reporting and for supervisors to assess and, where necessary, enforce the

adequacy of this reporting.

However, several supervisory authorities have been able to take action to address misleading claims by applying general principles and rules (not specific to climate or biodiversity) where firms have made claims about sustainability practices or impact that have not been borne out in practice. Some jurisdictions are also requiring specific disclosures for funds about their sustainability characteristics, with additional disclosures for those claiming to be targeting sustainable investments.

Two other related initiatives have been used to help investors here.

First, various international and national authorities have developed taxonomies of economic activities to support the assessment and disclosure of climate and biodiversity-related risks. The aim of such taxonomies is to provide a common classification of the climate and biodiversity impacts of different activities to provide a consistent basis for the assessment of risks and for disclosures.

However, while this is a useful attempt to simplify the measurement of impacts by using industry level averages, this may not identify significant differences between companies in an industry or sector, and national taxonomies are not always consistent in their classifications. Efforts are therefore under way internationally to find ways to enable convergence and interoperability between the various taxonomies.

Second, individual companies and collective investment funds can be "ESG" (Environmental, Social, and Governance) rated. Funds may also use benchmarks which screen or select potential assets according to ESG criteria.

However, there is a marked lack of transparency and comparability of the measures, criteria and methodologies used by different rating providers; the "E" score may not align with an orderly transition to a low-carbon and biodiverse world because it places too much weight on disclosed corporate policies and targets rather than on actual environmental impacts; and in many cases there is a potential conflict of interest because the ratings provider is paid by the issuer or fund.

Supervisory authorities can intervene to prescribe taxonomies and to constrain how ESG ratings are constructed, but these will have a limited impact without supervisory oversight of how ESG data, benchmarks and ratings are used by financial institutions in practice.

KEY RESOURCES

Disclosure

1. Toronto Centre (2021c) discusses the implications of climate-related risks for securities supervisors, and covers a range of consumer and investor protection issues.
2. Toronto Centre (2021b) explains key concepts and practical steps for supervisors in relation to operational resilience.
3. A2ii (2019) gives examples of innovation in climate and biodiversity-related insurance and how supervisors can enable the development of appropriate innovation.
4. TCFD (2017) has made a number of recommendations for climate-related disclosures by listed firms, with additional recommendations (2021a) for banks, insurers and asset managers.
5. The International Sustainability Standards Board has proposed accounting standards for general sustainability-related (2022a) and climate-related (2022b) disclosures.
6. TNFD (2022) provides a framework for nature-related financial disclosures.
7. IOSCO (2021) has been active in trying to ensure that various disclosure initiatives are consistent with each other.
8. Financial Stability Board (2022c) provides a useful progress report on climate-related disclosures.
9. IOSCO (2021a and 2021b) and OECD (2021) outline a range of problems with ESG and other sustainability reporting approaches, including multiple examples of greenwashing and mis-selling.
10. France (2021) was the first country to introduce mandatory reporting for biodiversity, under Article 29 of its 2019 Energy Climate Law. The European Union (2022) is proposing a mandatory approach to biodiversity reporting, under the Corporate Sustainability Reporting Directive.

DATA

One common theme running through the roles of supervisory authorities in responding to climate and biodiversity-related risks is the lack of sufficiently consistent, comparable, granular and reliable climate and biodiversity data. This is a challenge for:

(a) financial institutions trying to assess the climate and biodiversity-related risks in their assets and insurance liabilities, including through scenario analysis and stress testing;

(b) investors trying to assess whether issuers of securities and collective investment funds meet investors' climate and biodiversity preferences. Financial market participants face a lack of high-quality, reliable, and comparable data needed to efficiently price climate and biodiversity-related risks and to prevent greenwashing; and

(c) supervisory authorities trying to assess the climate and biodiversity-related risks faced by financial institutions as a result of their lending, investment and insurance activities, and the risks to financial stability.

Various international organisations have therefore begun work – or made recommendations to national authorities – to fill this "data deficit". This has included the creation of a climate data directory and a climate change indicators dashboard; recommendations on the reporting of climate and biodiversity data and other information by financial institutions to supervisory authorities; the developments of principles for taxonomies and other sustainable-finance alignment approaches; and the various disclosure and accounting standard initiatives described above.

Notwithstanding the challenges, it is important that supervisors underline the importance of financial institutions using the data that are already available; being explicit about gaps, limitations and areas where confidence is greater or lower; and seeking ways to make the data more complete and robust.

KEY RESOURCES

Data

1. International Monetary Fund (2021b) discusses the importance of high-quality, reliable, and comparable climate data; a globally harmonized and consistent set of climate disclosure standards; and globally agreed principles for climate finance taxonomies.
2. The Network for Greening the Financial System (2022b) makes a series of recommendations on bridging data gaps, including convergence toward common and consistent global disclosure standards, increased efforts toward shared principles for taxonomies, developing well-defined metrics and methodological standards, and leveraging available data sources, approaches, and tools more effectively. The NGFS has also developed a climate data directory.
3. The International Monetary Fund (2023) has developed a Climate Change Indicators Dashboard.
4. The Financial Stability Board (2022b) has made a series of recommendations on how supervisory authorities can improve the regulatory reporting of climate-related information by financial institutions.

FINANCIAL INCLUSION

Climate and biodiversity-related risks, and financial institutions' response to them, have the potential both to increase the number of consumers excluded from accessing and using financial services they need or want, and to increase the harm consumers face from such exclusion.

There is an argument for supervisory authorities and other authorities to enhance financial inclusion in advance to increase resilience ahead of climate change and biodiversity loss shocks.

Providing access to formal financial services, such as insurance, savings, or loans, can help the poor smooth consumption when they face unexpected setbacks. Financial services may also enable poor women and men to make affordable investments in environmentally friendly practices, lessening environmental damage. Achieving greater financial inclusion ahead of the impacts of climate change and biodiversity loss could help to protect vulnerable people from some of the impacts, for example through insurance against weather-related events and crop failures, and through borrowing to invest in solar power and in climate adaptation measures.

Once climate and biodiversity-related changes begin to appear, supervisory authorities should consider whether they can counteract their potentially negative impact on financial inclusion, consistent with their mandates.

Supervisory authorities can make an important contribution by ensuring that climate and biodiversity-related risks and impacts are factored into their own financial inclusion activities and any national plans for financial inclusion. Explicit consideration of gender and the needs of women will increase the effectiveness of such strategies and plans.

Supervision of whether financial institutions are treating customers fairly, for example through customer-centric product design, claims-handling practices and complaints resolution, could also play a part in reducing the extent to which financial institutions' responses to risk exacerbate financial exclusion.

There may also be scope here for government interventions to support financial inclusion, for example, through the government taking on some insurance risks to mitigate the impact of climate and biodiversity-related changes.

KEY RESOURCES

Financial inclusion

1. The importance of financial inclusion as a protection against climate change is discussed in Innovations for Poverty Action (2017) and Nikkei Asia (2020).
2. Alliance for Financial Inclusion (2022) discusses how supervisory authorities have built climate change and biodiversity loss into their financial inclusion strategies and plans.

CAN SUPERVISORS DO ANYTHING TO INFLUENCE CLIMATE CHANGE AND BIODIVERSITY LOSS?

Most supervisory authorities do not have a specific mandate or objective to reduce climate change or biodiversity loss. Nevertheless, the supervisory interventions discussed above may themselves have some impact on climate change. Better risk management by financial

institutions may lead to some climate and biodiversity-related risks being reduced; and enhanced disclosures should facilitate investor preferences for climate and biodiversity-friendly investments.

Furthermore, financial stability and financial inclusion are threatened by climate change and biodiversity loss. There is a strong case for intervention by supervisory authorities with a mandate to maintain financial stability, where the lending and investments of financial institutions are financing continuing climate change and biodiversity loss; and for intervention by authorities with a mandate for financial inclusion.

GOVERNMENT ACTIONS

The main driver for achieving climate and biodiversity targets should be government actions. These could include introducing a sufficiently high carbon tax; subsidizing investment in renewable energy and adaptation technology; and introducing legislation to mandate climate-friendly transport (for example, electric vehicles), energy-efficient buildings and other infrastructure, and to prohibit deforestation and other harmful changes in land use.

The most fundamental issue here – which only government action can tackle effectively - is that markets do not incorporate a price for the social costs of climate change and biodiversity loss. Climate change and biodiversity loss are a negative externality. Without government intervention, the private cost, for example of burning fossil fuels, does not reflect the cost to society from the release of harmful emissions and their contribution to climate change. Products that cause climate change and biodiversity are under-priced in private markets compared to their social costs.

Governments can address this market failure through, for example, imposing taxes on products that reflect the social costs, including through carbon taxes. However, while such taxes are recognized to be the first best solution to address climate change, for various reasons many countries have found them difficult to implement in practice. As a result, the private sector, including financial institutions, make decisions based on prices that do not fully reflect the social costs.

It should also be recognized that some emerging economies and developing countries are essentially "climate takers" in the sense that they generate low levels of harmful emissions but are significantly affected by the climate change generated by the actions of other countries. These climate takers may have very limited scope for actions to reduce climate change.

PRESSURE FOR CHANGE

Supervisory authorities may decide – or be encouraged by national governments – to take additional actions in support of national climate targets.

There is, or is likely to be, increasing public and political pressure in some countries on financial institutions - and their supervisory authorities – to "play their part" in national efforts to meet climate targets. Indeed, this may be particularly acute where a country has ambitious targets but lacks government actions/policies to deliver them – there may then be more pressure on financial institutions and financial supervisors to intervene in ways that go well beyond risk management and disclosure.

This pressure also reflects in part the evidence that the supervisory emphasis on risk management and disclosures is not yet having a significant impact on the lending and investment decisions of many financial institutions. Bank lending to and investments in fossil fuel extraction and production continue to grow, even in countries where supervisors are focusing on the impact of climate and biodiversity-related risks on financial institutions and on the TCFD recommendations. And such lending and investment is being undertaken in part by financial institutions that have been cited as examples of good disclosure in TCFD status reports.

So, what more can supervisory authorities do? They might consider ways to incentivize financial flows towards greener and more sustainable projects and to improve the extent to which financial institutions disclose the climate and biodiversity impact of their lending and investments.

These early-stage initiatives take various forms, but they may become more widespread, and possibly more consistent, across countries as moves towards meeting international and national climate and biodiversity targets become more demanding and more detailed.

Supervisory authorities could also advise governments to take a more proactive stance on taxes, subsidies and other government interventions to limit climate change and biodiversity loss, not least because of the consequences that might otherwise arise for financial stability and financial inclusion.

RISK WEIGHTS

One means of incentivising the direction of financial flows would be for a supervisory authority to set higher risk weights on banks' and insurers' exposures to "brown" exposures, or on concentrations of such exposures, and similarly to set lower risk weights on "green" exposures.

A similar result could be achieved by a supervisor setting Pillar 2 capital requirements that took account of the climate and biodiversity impacts of an individual bank's or insurer's exposures. This would be in addition to any Pillar 2 capital requirements imposed on an individual financial institution to reflect weaknesses in its governance and risk management.

Many supervisory authorities have been resistant to changing risk weights in this way because it appears to conflict with the objective to impose risk-sensitive risk weightings. For example, lending to and investment in renewable energy may be risky because some new technologies are unproven

while others may be difficult to implement cost-effectively.

Moreover, although "brown" exposures may be subject to higher transition risks they may not represent higher physical risks to financial institutions – a financial institution's lending and investments subject to higher physical risks may not be the same exposures that cause climate change and biodiversity loss. For example, an agricultural enterprise growing crops may be subject to significant physical risks from both climate change and biodiversity loss, but may not itself cause any harm to the environment.

Some supervisory authorities also argue that existing "Pillar 1" capital requirements can capture environmental risks, albeit imperfectly, for example by incorporating these risks into estimates of expected loss; internal models and ratings based on probabilities of default, exposure at default, loss given default and market risks; external credit ratings; and the valuations of collateral and financial instruments. However, the historical information on which these metrics are based are unlikely to be good predictors of future climate risk.

Nevertheless, there may be an increasing acceptance of the argument that capital and solvency requirements should reflect at least the increased transition risks inherent in "brown" financing. Exposures to high emission companies are subject to transition risks that could reduce the value of investments in these companies and make these companies less creditworthy. But there is a risk of regulatory arbitrage here - the application of higher capital charges will result in the disintermediation of "brown" finance to unregulated financial entities. There is already evidence that this is occurring. Moreover, the issues are not limited to the banks and insurance companies that may be subject to higher regulatory capital charges. To tackle the risk of climate change, fund managers would also need to be incentivised to reduce their "brown" exposures.

SUSTAINABLE FINANCE

The UN Principles for Responsible Banking, Responsible Investment and Sustainable Insurance are intended to set the benchmark for what it means to be a responsible bank, investor or insurer. Many financial institutions have signed up to these voluntary and aspirational principles, which encourage financial institutions to set and publish targets and to report on outcomes.

The Glasgow Financial Alliance for Net-Zero (GFANZ) goes a step further by requiring member financial institutions to commit to lending and investment that is compatible with net-zero emissions by 2050 at the latest. GFANZ includes the UN-convened Net-Zero Banking Alliance, the Net-Zero Asset Owner Alliance, the Net-Zero Asset Manager Initiative and the Net-Zero Insurance Alliance.

Supervisory authorities could encourage financial institutions to sign up to the UN principles and other related initiatives and could take steps to encourage and facilitate sustainable finance and blended

finance more generally.

GREEN TARGETS

Some emerging economies with development agendas (and pressing climate issues) are taking a lead in setting "green targets." For example, the Central Bank of Bangladesh requires that at least five percent of bank loans should be directed to "green" sectors.

As with risk weights, there is a conundrum here for financial supervisors - directed lending may be riskier because credit standards may be weaker, so there is a difficult balance to be struck by supervisory authorities trying to boost "green" lending.

MACROPRUDENTIAL INSTRUMENTS

Although macroprudential authorities have not yet used macroprudential instruments in response to climate or biodiversity-related risks to financial stability, they could introduce instruments for this purpose.

For example, macroprudential authorities could impose an additional climate or biodiversity-related capital charge on banks, along the lines of the countercyclical capital buffer, calibrated to reflect climate and biodiversity-related risks to financial stability, such as:

- how likely a country is to achieve the Paris Agreement climate targets;
- financial sector exposures to fossil fuel and other high emission companies; and
- national and regional exposures to climate and biodiversity-related natural disasters.

This would be a relatively crude tool, but it could help build climate and biodiversity-related risks into the pricing of loans, provide incentives for financial institutions to transition away from high emission exposures, and provide an additional buffer against potential climate and biodiversity-related losses. It could also be extended to the insurance sector if that sector posed risks to financial stability.

There is also an argument that capital requirements ought to be generally higher to reflect the increasing climate and biodiversity-related risks faced by financial institutions across all sectors.

However, while macroprudential (and microprudential) tools that protect financial institutions from these risks (such as higher capital buffers) are valuable and necessary, they may not have much

impact on the financing itself, and therefore do not solve the underlying problem. Macroprudential (and microprudential) tools are required that would significantly reduce the extent to which the financial sector is financing climate change and biodiversity loss. The financial sector itself exerts a high impact on climate change and biodiversity loss, and therefore endogenously contributes to risks to financial stability. Given this endogeneity of risk, it is important to assess how financial institutions not only face physical or transition risks from environmental threats but also contribute to the build-up of such risks through the activities that they finance, with various complex feedback loops between them.

A further consideration here is that – as with changes to risk weights – attempts to incentivise the direction of financing by supervised financial institutions, and to increase the capital supporting the financial sector, could be offset by increased financing from unregulated financial institutions. There is already evidence that some of the least climate and biodiversity friendly companies are already financing themselves increasingly from private funds rather than publicly issued securities.

DISCLOSING THE CLIMATE AND BIODIVERSITY IMPACT OF LENDING AND INVESTMENTS

The TCFD recommendations focus primarily on how companies (including financial institutions) govern and manage their climate-related risks. However, this needs to move to the next level, with more focus on the targets being set by financial institutions and what they are doing to meet these targets.

One natural extension of the TCFD recommendations would be to develop measures of the amounts of harmful emissions being financed by the lending and investment activities of financial institutions, and require financial institutions to publish these measures. These measures would need to cover the full scope of the emissions being financed – scope 1 (emissions directly caused by a financial institution), scope 2 (indirect emissions) and, most importantly, scope 3 (the emissions that arise from the activities of the companies financed by the lending and investment activities of financial institutions).

Financial institutions could then set – and measure their performance against - voluntary targets for the consistency of their financing with a path for climate change. For example, the Global Alliance for Banking on Values is a climate change commitment from 28 banks from across the world to track, monitor and disclose the carbon impact of their portfolios of loans and investments, using a measurement methodology developed by a group of Dutch banks.

The Japanese government pension fund (the largest pension fund in the world) calculates – and publishes – the climate change path (in terms of global warming) that is consistent with its investment portfolio.

The TCFD is itself consulting on metrics that could be used to estimate the climate impact of lending and investment. The TNFD is seeking to extend this to biodiversity risks, although biodiversity loss is more difficult to measure than climate change, because there are no single summary metrics such as greenhouse gas emissions.

This is a complicated area, with many alternative proposed methods for measuring climate and biodiversity impacts. But it is important that progress is made and that some degree of standardisation of metrics is achieved, not least so that the increasing number of claims by financial institutions to be on specific financing paths (for example, for their financing to be compatible with net-zero emissions by a particular date) can be independently verified.

Supervisory authorities could encourage (or even mandate) such disclosures, as an addition to the TCFD recommendations; could focus on such measures as part of the assessment of a financial institution's risk management framework; and could conceivably set supervisory targets or limits for the extent to which a financial institution's activities finance harmful emissions.

KEY RESOURCES

Additional interventions by supervisory authorities

1. The role of governments in taking actions to achieve climate targets is discussed in International Monetary Fund (2016 and 2021a). Carbon pricing is also discussed in World Bank (2023).
2. The continuing high level of bank financing of high emission borrowers is discussed in Rainforest Action Network (2020).
3. Adjusting risk weightings to reflect climate and biodiversity-related risks is discussed in Basel Committee (2022b), European Banking Authority (2022), and Bank of England (2022).
4. The United Nations Environment Programme Finance Initiative (2012, 2019 and 2020) has published principles for sustainable insurance, responsible banking, and responsible investment.
5. Glasgow Financial Alliance for Net Zero (United Nations Climate Change 2021) goes a step further, with its members committing to align operational and attributable emissions from their portfolios with pathways to net-zero by 2050 or sooner.
6. Toronto Centre (2019a and 2021a) discuss the roles that supervisory authorities can play to facilitate and encourage sustainable finance and blended finance.
7. Metrics for assessing the climate impact of the lending and investment undertaken by financial institutions are discussed in Global Alliance for Banking on Values (2019), Partnership for Carbon Accounting Financials (2020), and TCFD (2021b).
8. Network for Greening the Financial System (2022a) discusses metrics for biodiversity.

CONCLUSIONS

This Toronto Centre Toolkit has outlined approaches that financial supervisors can follow to assess:

- the extent to which their financial sector is vulnerable to climate and biodiversity-related risks;
- the quality of financial institutions' governance and risk management in identifying and managing their climate and biodiversity-related risks;
- the financial stability implications of climate change and biodiversity loss, and possible macroprudential responses;
- the quality of climate and biodiversity-related disclosures to investors and other stakeholders;
- the ways in which supervisory authorities might intervene to improve governance, data, risk management and disclosures;
- the impacts of climate change and biodiversity loss on financial inclusion; and
- the ways in which supervisory authorities could limit the extent to which financial institutions are financing harmful climate change and biodiversity loss.

This is consistent with the recommendations of international organisations that supervisory authorities should:

- Recognise climate change and biodiversity loss as a potential source of economic and financial risk and commit to developing a response strategy.
- Build the skills and the capacity to analyse and address climate and biodiversity-related financial risks.
- Assess the degree to which financial systems are exposed to climate and biodiversity-related risks.
- Explore options for supervisory actions on managing climate and biodiversity-related risks and minimising negative impacts on the environment.
- Devote efforts to building the necessary financial architecture (classification, standards and taxonomies; disclosure standards and supervisory reporting; indicators, metrics, dashboards and tools) for mobilising investment for a low carbon and biodiverse economy.
- Promote policies that would help to bring financial flows into consistency with climate and biodiversity targets.

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