



THE ROAD TO ACTION

Financial regulation addressing climate change

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EXECUTIVE SUMMARY

The December 2015 Paris Climate Change Agreement came into effect on November 4th 2016, following the decision by 55 countries and the European Union to act long before its originally expected ratification in 2020. It set in motion a global action plan designed to avoid the worst impacts of climate change by targeting net carbon neutrality by the second half of the century. It allows nations to implement their own plans, to co-operate in cutting greenhouse-gas emissions, and to review efforts periodically in order to “ratchet up ambition”.

Recent research has indicated that there is only a 50% probability of staying below the Paris temperature target¹—demonstrating the “tragedy of the horizon” described by Mark Carney, the governor of the Bank of England (BoE) and chair of the Financial Stability Board (FSB), in which the need for action becomes apparent too late to prevent disaster. “The catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors, imposing a cost on future generations that the current generation has no direct incentive to fix,” he said ahead of the Paris Climate Conference (officially known as the 21st Conference of the Parties, or COP21). “Once climate change becomes a defining issue for financial stability, it may already be too late.”

Recognising that climate change is a systemic risk to financial stability—and in order to stand a chance of sticking to the Paris target despite the US administration’s decision to withdraw its support—there must be more than just disclosure of emissions. The June 2017² recommendations by the FSB’s Task Force on Climate-related Financial Disclosures (TCFD) provide a framework for businesses to make consistent climate-related financial risk disclosures that can be aligned with investors’ expectations and needs. With consistent disclosure, both the business and the investor community should be able to make more informed decisions to take steps to reduce their emissions and create greater business resilience. However, the recommendations are voluntary—they are reliant on market demand to drive adoption. Historically, the response to voluntary recommendations has been mixed. International, regional and national supervisors, regulators and standard-setters should therefore make climate-change risk disclosure and reporting mandatory, otherwise the process risks being extended, reducing the likelihood of meeting the Paris target. Although not currently explicit in these institutions’ respective mandates, there is definite scope for expansion of these mandates because climate-change risk is considered by many, including the FSB, to be a financial stability risk. As the BoE, a national regulatory body, has stated: “Forming a strategic response to the financial risks from climate change helps ensure the Bank can fulfil its mission to maintain monetary and financial stability, both now and for the long term.”³

¹ Pfeiffer, A, Miller, R, Hepburn, C and Beinhocker, E, “The ‘2°C capital stock’ for electricity generation: cumulative committed carbon emissions and climate change”, INET Oxford Working Paper no. 2015-09, January 2016.

² <http://www.fsb.org/2017/06/task-force-publishes-recommendations-on-climate-related-financial-disclosures/>

³ Scott, M, van Huizen, J and Jung, C, “The Bank of England’s response to climate change”, *Bank of England Quarterly Bulletin*, 2017 Q2, p. 98.

The cost of inaction: Recognising the value at risk from climate change, a July 2015 report written by The Economist Intelligence Unit (The EIU) and sponsored by Aviva, identified

the need for a framework to govern the disclosure of climate-related financial risk. In this follow-up report we review the issues relating to climate-related financial disclosure and investigate the mandates of ten different international, EU and UK financial institutions, all with very different focuses and mandates, to consider what role they play, or could play, in supporting climate-related financial risk reporting. We also review the recommendations put forward by the TCFD and consider how climate-related financial disclosure can be set into the UN's broader Sustainable Development Goals (SDGs), rather than being siloed into green finance-related policies and regulations.

Key findings:

The Task Force on Climate-related Financial Disclosure (TCFD) of the Financial Stability Board (FSB) is widely regarded by our interviewees as having the clearest mandate to provide possible solutions. However, although none of the supervisory, regulatory and standard-setting institutions reviewed by The EIU has an explicit mandate covering climate-related financial risk, we consider that, based on their collective and individual commitments to ensuring financial stability, they can all play a role in ensuring that the Paris target is met. There is an obvious opportunity for the European Supervisory Authorities (ESAs) to have their mandates expanded, following the current review by the European Commission of the work of these ESAs in securing the stability of the financial sector.

Six institutions— (the IMF, the World Bank, the Financial Stability Board, the European Insurance and Occupational Pensions Authority, the Bank of England and the UK Prudential Regulatory Authority)—do have mandates that cover risk and stability. As the European Systemic Risk Board has interpreted physical manifestations of climate change as representing a systemic risk, we therefore consider these six institutions' mandates, which all cover risk and stability, to implicitly include climate change as well.

According to our interviewees, three international institutions—the International Organisation of Securities Commissions (IOSCO), the International Association of Insurance Supervisors (IAIS) and the Bank for International Settlements (BIS)—seem to be failing to act fully on their existing mandates in terms of setting climate-related risk standards and ensuring stability.

Key stakeholders interviewed from non-governmental organisations, the business sector, academia and multilateral agencies believe that the international forum of the G20 is best placed to initiate a process that would assign an institution to develop regulatory standards, with the BIS having a role through its Basel Process to ensure that the banking system addresses systemic risks posed by climate change. The IOSCO could act as an agent of harmonisation of enhanced disclosure for publicly quoted companies.

Multilateral institutional standard-setters such as the World Bank and the IMF can, through their lending and grant-making activities, establish a best-in-class practice for

climate-related financial risk reporting. This will help to ensure that the countries in which they operate are more likely to adhere to Paris targets.

The BoE has already taken the lead in conducting research on the channels through which climate change and the policies to mitigate it could affect monetary and financial stability objectives. It is an example of how national prudential and investment regulators—such as the BoE's Prudential Regulation Committee and the Financial Conduct Authority—could gradually adopt a template which ensures that the impact of climate change is included in the approach to banking and financial stability supervision.

Of the more than 400 disclosure standards currently in operation, almost all are voluntary and non-financial in nature. Existing climate disclosure standards are fragmented, and none requires disclosure of the financial impacts of climate change. This may change, depending on the adoption of the TCFD's recommendations by businesses and by supervisory and standard-setting institutions.

There remains a lack of international consensus on what constitutes a material climate risk, particularly at the sector, subsector and asset-class level. Reporting on materiality is therefore ambiguous and unregulated. Without agreed international standards on materiality, there are opportunities for arbitrage.

Internationally accepted, integrated accounting standards which incorporate climate-change-related risks would reduce investor and financial stability risks.

Standardised and regulated scenario analysis is needed to allow asset owners and asset managers to understand how climate change would affect investment return. It would enlighten their strategic and financial planning processes.

These findings indicate that persuading businesses, asset owners and asset managers to consider the long-term viability of their portfolios in terms of both climate impact and vulnerability to radical regulatory change is vital to meeting the broader targets of the SDGs. If they do not, or will not, consider their impact, they risk being left with assets that have lost all value, with resources that cannot be exploited because emissions regulations may prevent them from being used, and with models that are not viable in a business environment where the emphasis is shifting from purely profit to profit and planet. While this "stranded assets" narrative is not new, it has yet to feature significantly in the planning processes and strategies of publicly quoted companies.

What investors, asset managers and banks urgently need is a way to identify and measure how companies are responding to the risks of climate change. They need to demand information on how climate-friendly their investments are, what volume of greenhouse-gas emissions their supply chain contributes, what measures are used to reduce it, and whether they have a plan to switch to zero-carbon energy.

Despite much fanfare over the Paris agreement there is still no global mandate on financial regulation for governments, industry or financial institutions. As we consider the 2030 agenda, the question of how a disclosure framework that is accountable and integrated with achieving the broader aims of the SDGs can be put into place becomes even more important. The TCFD's recent recommendations are welcome. But banks, asset managers, industry and governments—and, in the US, individual states—will continue to need to work with regulators to determine what information is required to ensure that investors have sufficient knowledge of the risks affecting their portfolios, and which regulatory authority will be held accountable to implement such rules.

ABOUT THIS RESEARCH

The Road to Action is a report by The Economist Intelligence Unit, sponsored by Aviva, which explores the issues relating to climate-related financial disclosure and investigates the mandates of ten different international, EU and UK financial regulatory and standard-setting institutions in terms of climate-related financial risk reporting. The findings are based on desk research and in-depth interviews conducted by The Economist Intelligence Unit with recognised, independent experts from around the world, all of whom are highly familiar with the topics covered and the institutions reviewed. We would like to thank the following interviewees (listed alphabetically) for their time and insights:

- Wim Bartels, global head of sustainability reporting and assurance, KPMG
- Ryan Brightwell, researcher and analyst, BankTrack
- Mark Campanale, founder and executive director, Carbon Tracker Initiative
- Andrew Collins, technical director, ESG Standards Setting, Sustainability Accounting Standards Board
- Roberto Dumas Damas, head of environmental and social credit risk, Banco Itaú BBA
- Marcos Eguiguren, executive director, Global Alliance for Banking on Values
- Nathan Fabian, director of policy and research, Principles for Responsible Investment
- Lois Guthrie, executive director, Climate Disclosure Standards Board
- Tom Kerr, principal climate policy officer, International Finance Corporation
- Mark Lewis, managing director, European utilities research, Barclays
- David Loweth, senior technical adviser, International Accounting Standards Board
- David Lunsford, head of development, Carbon Delta
- Emilie Mazzacurati, founder and chief executive officer, Four Twenty Seven - Climate Solutions
- Tim Mohin, chief executive, Global Reporting Initiative
- Himani Phadke, sustainable finance research director, Sustainability Accounting Standards Board
- Paolo Revellino, head of sustainable finance, World Wide Fund for Nature (WWF)
- Robert Schuwerk, senior counsel, Carbon Tracker Initiative
- Hugh Shields, former executive technical director, International Accounting Standards Board, and member of the International Integrated Reporting Council
- Paul Simpson, chief executive officer, CDP (formerly Carbon Disclosure Project)

THE ROAD TO ACTION

FINANCIAL REGULATION ADDRESSING CLIMATE CHANGE

- Gavin Templeton, head of sustainable finance, Green Investment Bank
- Jason Thistlethwaite, assistant professor, University of Waterloo, Canada, and fellow at the Centre for International Governance Innovation
- Michael Wilkins, managing director, environment and climate change, S&P Global Ratings

The Economist Intelligence Unit bears sole responsibility for the content of this report. The findings and views expressed in the report do not necessarily reflect the views of the sponsor. Renée Friedman was the editor of this report.

I. THE INSTITUTIONAL RESPONSE TO THE INCREASING PACE OF CLIMATE CHANGE

If nothing is done, the world may have, according to some estimates, as little as 3 years,⁴ and certainly less than 20 years until its carbon budget is spent or, in other words, global warming goes beyond the 2°C level agreed in Paris in December 2015. However, management of the climate is not only an environmental but also a financial matter, because finance fuels climate impact. Despite this relationship, there are still no binding international agreements or standardised directives for financial regulators, stock exchanges and institutional investors to incorporate climate-change risk into their financial risk models. There are no international agreements on what constitutes a material climate-related financial risk, no formal accounting standards that integrate environmental and social risk with financial risks either quantitatively or qualitatively, no harmonised climate disclosure standards, and no established reference scenario analyses that allow for comparable stress testing and reporting. Given the entry into force of the Paris Agreement on Climate Change on November 4th 2016, following its ratification by 55 countries that signed it far earlier than the originally envisioned 2020 deadline, there is even greater pressure for countries and regulatory bodies to develop climate action plans and disclosure standards that are comparable across geographies, asset classes and industry sectors.

The need for the disclosure of potential climate-related financial risks was first reported in *The cost of inaction: Recognising the value at risk from climate change*, a study published by The Economist Intelligence Unit (The EIU) in July 2015. It calculated the potential impact on the value of assets from unchecked climate change and benefited from the October 2006 Stern Review, *The Economics of Climate Change*, which stressed that a delay in acting on climate change would lead to considerably greater expense in response to the actual manifestations of climate change. The Stern Review also formed the basis of our calculations, when we estimated that “warming of 5°C could result in US\$7trn in losses, more than the total market capitalisation of the London Stock Exchange, while 6°C of warming could lead to a present value loss of US\$43.2trn of manageable financial assets, roughly 10% of the global total”.

Our 2015 report also stated that financial regulators, stock exchanges and institutional investors needed to provide better information and establish strict disclosure rules for all market participants and investors on the financial risks emanating from climate change. The report identified a price on carbon emissions, disclosure of carbon footprints, and accurate assessment and quantification of future climate risk to portfolios as vital components of the debt, equity and capital markets’ response to the climate-change challenge.

⁴ Figueres, C, Schellnhuber, H, Whiteman, G, Rockström, J, Hobley, A, and Rahm, S, *Nature: international weekly journal of science*, vol 546, issue 7760 pp 593–595, 29 June 2017

These looming financial and physical risks from global temperature increases were implicitly acknowledged by the international finance community in November 2015, when the Financial Stability Board (FSB) established its Task Force on Climate-related Financial Disclosure (TCFD) with a mandate to “develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders”. The TCFD put forward its initial recommendations in December 2016. The final recommendations were published on June 29th 2017, in time for the G20 summit on July 7th-8th 2017 in Hamburg, Germany.

The Paris Agreement, the TCFD recommendations and other calls for more action to be taken on climate change raise the question of which organisation or organisations at national, regional and/or supranational level should be held responsible for the development of reporting requirements so that they are standardised and suitable for adoption by regulators. In this paper we not only consider which organisation should be held responsible for standardisation, but given their very different remits, we also consider the role that regulators themselves can play in incorporating climate-change risk into their own work. Questions about the real effectiveness of voluntary standards, best practice and actual regulatory requirements led The EIU to examine the mandates of globally important regulatory and standard-setting institutions to see whether they cover—explicitly or implicitly—rules related to financial disclosure of climate-related risk.

The groups of institutions included are:

- International Monetary Fund (IMF)
- World Bank (WB)
- Financial Stability Board (FSB)
- International Organisation of Securities Commissions (IOSCO)
- Bank for International Settlements (BIS)
- International Association of Insurance Supervisors (IAIS)
- European Insurance and Occupational Pensions Authority (EIOPA)
- Bank of England (BoE)
- Prudential Regulatory Committee (PRC)
- European Markets and Securities Authority (ESMA)

We used a number of indicators to determine whether the mandates of the institutions could be considered to have explicit or even implicit requirements with regard to climate-related financial risks. We developed the indicators listed below to act as a benchmark by which actions and commitments taken by these institutions in relation to climate-change financial risk could be measured. The indicators include:

- Lending: We examine whether the primary mandates of institutions providing or facilitating loans to governments or private entities to undertake sustainable development include climate-related considerations in their lending requirements and project-evaluation criteria.
- Financing: Institutional strategies and efforts to raise finance for climate-risk mitigation and adaptation investments.
- Standard-setting: We investigate where the institution is mandated to play a role in developing and/or maintaining industry standards and whether these have been extended to include climate risks.
- Policy development: Activities assisting the processes of climate-risk-related policymaking and adaptation at the sovereign level.
- Inter-agency partnerships: Initiatives where the institution is engaged with peer organisations, international, regional or supranational bodies in fostering discussion on climate-related risk disclosures.
- Knowledge and analytical assistance: Development of research and analytical resources in the areas of sustainability, stability and risk analysis for the financial sector.
- Industry outreach/consultations: Outreach and consultative processes that advance discourse in the area of financial risk (climate risk by extension).

Figure 1. Organisations and their mandates

Organisation	Mandate
IMF	Promotes international monetary co-operation and provides policy advice and technical assistance. It also makes loans and helps countries design policy programmes to solve balance-of-payments problems when sufficient financing on affordable terms cannot be obtained to meet net international payments. IMF loans are short-and medium-term and are funded mainly by the pool of quota contributions that its members provide. As part of its global and country-level surveillance, the IMF highlights possible risks to stability and advises policy adjustments.
World Bank	Promotes long-term economic development and poverty-reduction by providing technical and financial support to help countries reform particular sectors or implement specific projects. The Bank provides low-interest loans, credits and grants to developing countries. World Bank assistance is generally long-term and is funded both by member country contributions and through bond issuance.
Financial Stability Board (FSB)	Monitors and assesses vulnerabilities affecting the global financial system and proposes actions needed to address them. It co-ordinates information exchange among authorities responsible for financial stability. It advises on market developments and their implications for regulatory policy as well as best practices in regulatory standards.
International Organisation of Securities Commissions (IOSCO)	Develops, implements and promotes adherence to internationally recognised standards for securities regulation; enhances investor protection and reduces systemic risk. While the mandate does not explicitly include sustainability, it may be implicit in its mandate to address systemic risk.
International Association of Insurance Supervisors (IAIS)	Promotes effective and globally consistent supervision of insurance industry; develops and maintains fair, safe and stable insurance markets; and contributes to global financial stability.
Bank for International Settlements (BIS)	Serves central banks in their pursuit of monetary and financial stability and promotes co-operation between central banks and facilitates international financial operations.
European Insurance and Occupational Pensions Authority (EIOPA)	Supports the stability of the financial system and the transparency of markets and financial products as well as ensures a high level of regulation and supervision.
Bank of England (BoE)	Maintains monetary and financial stability in the UK, acts as lender and market-maker of last resort and promotes the safety and soundness of individual financial institutions. Responsible for the removal of risks to financial system and supervision of financial market infrastructure.
Prudential Regulatory Committee (PRC)	On March 1st 2017 the PRC replaced the Board of the Prudential Regulation Authority and was brought within the BoE as required by the Bank of England and Financial Services Act 2016. It keeps the same general objectives: promoting the safety and soundness of the firms it regulates, protecting policyholders in insurance firms and facilitating effective competition. The Financial Services and Markets Act 2000 gives the PRC the "power to provide for additional objectives".
European Securities and Markets Authority (ESMA)	ESMA's mandate allows it to assess risks to investors, markets and financial stability. It is required to develop a complete single rulebook for EU financial markets, promote supervisory convergence and directly supervise specific financial entities.

Research by The Economist Intelligence Unit found that none of the institutions is explicitly required to address climate change as part of its mandate (See figure 1). However, all the mandates cover aspects of risk related to financial stability and/or systemic risk and should therefore, in theory, be reflected in their activities. Consequently, the absence of explicit requirements within their mandates to address climate change does not preclude them from acting on climate change. International institutions can and do respond to new developments which are not explicitly mentioned in their remit but which are relevant to the extent that they affect the achievement of their institutional objectives. We consider that any institution with a remit to promote financial stability or

financial reporting standards or to address systemic financial risk has the responsibility—automatically and by definition—to address climate-related financial risk within its remit.

Of the multilateral standard-setting institutions reviewed, the World Bank has made the most progress to adopt climate-related risk into its mandate. It has implemented an institutional commitment in relation to its financing activities through the issuance of green bonds and with its industry outreach and consultations through its Environmental and Social Safeguards Framework, which addresses impacts on climate change at the project level. The Bank has also set an institutional target on its lending activities (e.g., increasing the climate-related share of its portfolio from 21% to 28% by 2020) in its policy development, inter-agency partnerships and in the knowledge-sharing and analytical assistance it provides.

The IMF, as the global lender of last resort and with a mandate to ensure the stability of the international monetary system, has not taken as broad a view in its activities. It has started to implement an institutional commitment towards inter-agency partnerships, eg, it collaborates with the World Bank, the OECD and the UN Environment Programme (UNEP) to promote policy dialogue among finance ministries, emphasising the benefits of carbon pricing and fiscal reforms to promote greener growth more broadly. However, it has not fully implemented its policy development with member countries to help design disclosure rules for climate-risk exposure, support countries in developing best practices for stress-testing climate risks, build buffers and risk transfer through financial-market instruments, and help countries to incorporate adaptation strategies in their medium-term budget frameworks or in addressing climate challenges through fiscal instruments such as taxes.

The other standard-setters and financial stability supervisors reviewed (IOSCO, IAIS and BIS) have a generally much weaker institutional response to climate-related risks within their explicit and implicit mandates. The exception is the FSB, which, in keeping with its mandate to “monitor and advise on market developments and their implications for regulatory policy”, is taking the lead in developing industry standards for climate-related financial disclosures, including in the financial industry. It recognises climate risk as a systemic risk, participates in inter-agency partnerships through its membership spanning private providers of capital, major issuers, accounting firms and rating agencies, and contributes to industry outreach activities such as stakeholder forums.

The IOSCO has implemented limited climate-related changes in terms of its inter-agency partnerships through its involvement in the Sustainable Stock Exchanges (SSE) initiative. There was a conspicuous gap in action on the relevant mandate at the IOSCO and the IAIS in terms of standard-setting and policy development. The IAIS has not included climate-change-related risk in its supervisory regime, and nor has it mentioned climate risk when developing globally consistent prudential requirements for the insurance sector. It has also failed to include climate risk when participating in an inter-agency (FSB and G20) global initiative to identify global, systemically important financial institutions (G-SIFIs).

However, of the financial stability supervisors, the BIS has the worst record, given its conspicuous gap in climate-change-related actions, ie, the institution is lacking action where there is a case for intervention. In terms of policy development, the BIS has not included climate change as posing a direct threat to the stability of the financial system, even though its mission is to serve central banks in their pursuit of monetary and financial stability. The BIS has also failed to develop inter-agency relations with other authorities that are responsible for promoting financial stability, which includes climate-change-related risk, nor has it really developed knowledge/analytical assistance in this area. It has also failed to engage in industry outreach/consultation, even on its website, which houses speeches made by all central bankers.

The remits of national regulators are entirely different from those of the international and European standard-setters and regulatory bodies. Prudential regulators such as the PRC are focused on promoting the safety and soundness of the firms they regulate, and specifically for insurers to contribute to the securing of an appropriate degree of protection for policyholders. However, climate-change risk may impact the safety and soundness of firms. It can also create liability risk for insurers.⁵ The BoE and the PRC under the governor, Mark Carney, have taken significant steps towards the inclusion of climate-related financial risks in their everyday work, particularly in terms of inter-agency partnerships, knowledge/analytical work, and, for the PRC, in industry outreach/consultation activities. The BoE has acknowledged that climate change does not necessarily create new categories of financial risk but touches existing categories, such as credit and market risk for banks and investors, or risks to underwriting and reserving for insurance firms.⁶

The European supervisory, standard-setting and regulatory institutions are all, to varying degrees, failing to fulfil their mandates in relation to climate change. It is hoped that the EU's review of these European Supervisory Authorities (ESAs) will address the shortcomings in sustainability—including climate change—as part of their objectives. It should also provide for new areas of supervision relating to this as they emerge in EU law. Of these agencies, EIOPA has taken limited policy development action, eg, a position paper adopted by EIOPA's working group on occupational pensions on March 29th 2016, which recommended climate-related updates to EIOPA's terms of reference, but it has not fulfilled its mandate to provide knowledge or analytical advisory to the European Parliament, the European Council and the Commission in the area of climate-risk regulation. ESMA has not engaged in standard-setting in relation to climate-change risk or in its inter-agency partnerships (particularly with regard to its observer role on the board of IOSCO). It has also not included climate-change-related risk in its knowledge sharing/analytical work on micro- and macroprudential policy instruments in the non-banking sector.

⁵ Prudential Regulation Authority, *The impact of climate change on the UK insurance sector. A Climate Change Adaptation Report*. September 2015.

⁶ Scott, M, van Huizen, J and Jung, C, "The Bank of England's response to climate change", *Bank of England Quarterly Bulletin*, 2017 Q2, p. 100.

As is evident from our mandate review, the challenge that multilateral standard-setters, regional supervisory, regulatory and standard-setting institutions and national regulatory and standard-setting institutions now face is to bring this climate-change

imperative to bear on their day-to-day activities. Despite not having climate-change-related risks explicitly within their mandates, their regular activities do lend themselves to a mandate revision that would incorporate such a requirement into their lending, financing, supervisory and standard-setting activities and encourage it in their inter-agency partnerships, in the knowledge and analytical assistance they provide, and in their industry outreach/consultation activities.

The FSB's mandate to address systemic risks to the financial structure arguably already includes the responsibility to address climate change in so far as it presents risks or the threat of contagion to the financial system. Given its remit to ensure financial stability and the established link between financial stability and climate-related risk, the IMF should make climate-change-related risk analysis a precondition of its lending and other financing activities and part of its industry consultations. It could include it in the standards it sets for governments in their medium-term expenditure frameworks and in any debt forgiveness or restructuring requirement. Given that the World Bank's 2016 Climate Change Action Plan already includes developing a synergy between all World Bank projects and activities and climate-change mitigation, it should include it in the standards it sets for all its projects.

For IOSCO, given its existing mandate to develop, implement and promote adherence to internationally recognised standards for securities regulation, the incorporation of climate-change risk analysis to enhance investor protection and reduce systemic risk is an obvious next step. The IAIS could make climate risk more explicit within its standard-setting and policy-developing mandates towards ensuring a stable insurance sector. The financial stability mandate of the BIS, in terms of it serving central banks in their pursuit of monetary and financial stability, makes the inclusion of climate risk as systemic risk a logical extension of its policy development and standard-setting solution. In its inter-agency role and as a provider of knowledge, including climate-change risk knowledge and analytical assistance, it would be appropriate to require the inclusion of climate-change risk as a financial stability risk to be taken into account by these central banks in their own policymaking.

For the regional supervisory and standard-setting institutions, the situation is not much different. Mandates should be changed to explicitly include climate-change risk. They should also require that climate-change risk is always considered within their activities. They should use this in their relations with other institutions and in their industry outreach/consultation activities. For example, EIOPA's core responsibilities are to support the stability of the financial system and the transparency of markets and financial products, as well as ensure a high level of regulation and supervision. ESMA's mandate allows it to assess risks to investors, markets and financial stability, including developing a single rulebook for EU financial markets, promoting supervisory convergence and setting unified standards for EU financial markets. ESMA could include climate-change-related risks in its single rulebook development and in its standards for financial markets, particularly in terms of how these markets evaluate and account for risk in their products.

For national standard-setters such as the BoE in its core roles of maintaining monetary and financial stability in the UK and acting as lender and market-maker of last resort, climate risk can be seen to be implicit in that mandate. While climate risk is not reflected in the lending work of the bank, it should be included without an official mandate change. Under the Financial Services and Markets Act 2000 the PRC, in its role as prudential regulator of financial firms, already has the power to provide for additional objectives. And the BoE has already taken a global lead in climate-change-related initiatives in inter-agency partnerships, industry outreach and knowledge assistance, so should be able to incorporate climate-change risk into its policy development.

These organisations should accept, as part of their responsibility to their governors—the taxpayers whose interests they are duty-bound to represent—the implicit inclusion of climate-change-related risk in their policy, lending, financing and standard-setting activities. An acceptance by these organisations would be similar to how commercial banks and asset managers need to maintain their fiduciary responsibilities to their investors. And investors need to ensure that their capital is being directed into assets that will avoid the long-term impacts of climate change or that they will not be adversely impacted by policies aimed at mitigating global warming.

For many asset owners, asset managers and businesses it is becoming increasingly clear that huge weather-related physical risks pose a significant challenge to socioeconomic development and create liability risks as well as systemic macroeconomic risks. This financial threat is not adequately reported or accounted for in such a way that progress towards a low-carbon economy can be reliably assessed and risks managed. Financial market participants need to know more precisely where climate risk lies and how it affects the value of assets. A range of requirements (both voluntary and mandatory) and practices are in place to facilitate this. However, for these practices to become standardised, they need to be supported by international institutions if individuals and groups are to understand fully the broader implications of these risks.

II. GETTING TO DISCLOSURE

Growing creditor and investor interest in climate-related financial risks is highly likely to lead to ever more questions about what type of global data are available about these risks. Investors and creditors are increasingly interested in the disclosure of data, how they should be applied, and who is responsible for collecting these data, as they will want to use them to make realistic decisions around risk.

In November 2015 the G20 mandated the FSB to conduct an investigation into existing climate disclosure requirements and practices and recommend voluntary measures to enhance disclosure. Under the leadership of Michael Bloomberg, the former New York City mayor and founder, CEO and owner of Bloomberg L.P., the global financial data and media company, the FSB's Task Force on Climate-related Financial Disclosure has a remit to deliver "specific recommendations and guidelines for voluntary disclosure by identifying leading practices to improve consistency, accessibility, clarity and usefulness of climate-related financial reporting".

The TCFD's Phase 1 report, released in March 2016, found that existing voluntary disclosure standards suffer from "inconsistency and fragmentation", which, it suggested, may reflect "differences in financial-system structures, regulatory and legal environments, and even culture". According to unpublished research by the Climate Standards Disclosure Board, more than 400 voluntary standards, most of which are non-financial in nature, currently exist. They do not all focus specifically on climate-change-related reporting. However, they all influence—directly or indirectly—companies' behaviour or reporting practice on sustainability (of which climate reporting is a subset).

The quality and depth of information submitted is a function of how many data each subscribing company is willing to divulge. The TCFD Phase I report found that very few reporting standards specify disclosure of climate-related financial risk as opposed to physical, social or environmental risk. The December 2016 TCFD report on disclosure of climate-related financial risks developed four main recommendations based on an organisation's governance, strategy, risk management, and the metrics and targets that it believes to be widely adoptable for organisations across sectors and jurisdictions.

The TCFD December 2016 report showed that the benchmark for climate-related risk disclosure has moved on. Although the reporting of greenhouse-gas emissions remains an integral part of reporting, this should now include both transparent governance and management plans for dealing with impacts of climate change in the short- and longer-term business strategy and on competitiveness, as well as the risks represented by increased regulation of emissions. According to David Lunsford, head of development at Carbon Delta, a research firm which specialises in identifying and analysing the climate-change resilience of publicly traded companies, "non-financial reporting, which is mostly qualitative, is the minimum of what companies should do ... It merges lots of qualitative details with the true financial statement ... and analysts want numbers and risk levels."

Globally, there is no consensus on what constitutes a material climate risk, particularly at the sector, subsector and asset-class level. The TCFD's work is in part a response to the multiplicity of standards, requirements and practices that currently influence disclosure on climate-related financial risk. The TCFD's December 2016 report put forward recommendations which defined climate-related risks (technology risk, market risk, reputation risk, acute risk, chronic risk) and outlined how climate-related risks can affect organisations' revenue and expenditure as well as future cash flows.

The final TCFD report, released on June 29th 2017, developed the recommendations set forth in the December 2016 report based on the consultation responses. Even though these recommendations are voluntary, to some, such as Michael Wilkins, managing director for environment and climate change at S&P Global Ratings, this does not matter. "Because recommendations are industry-led and come via the Financial Stability Board, the expectation is the adoption rate of these recommendations will be high," he says. "The FSB's Enhanced Disclosure Task Force recommendations, which came out in 2015, have an over 80% adoption rate, even though the recommendations were voluntary." However, others remain concerned that these recommendations will not be thoroughly and consistently adopted.

III. WHO SHOULD BE HELD RESPONSIBLE?

If international, regional and national supervisory, standard-setting and regulatory institutions regard climate change as posing financial stability risk, it should automatically be considered as part of their mandate. It could also be considered part of their fiduciary duty to those whose interests they represent to include climate-change-related risk in their range of activities.

According to the experts interviewed for this report, all of the institutions reviewed have an implicit mandate to act on climate-change-related financial risks. The question then is: "Who has the strongest mandate to lead on incorporating climate-change-related financial risk into their rules?" To Gavin Templeton, head of sustainable finance at the Green Investment Bank, "the obvious place for a mandate is with the regulators", but according to Tom Kerr, principal climate policy officer at the IFC, "the long-term goal is to get financial regulators or central banks to have this become part of their bread and butter, their DNA, so this is not just a 'green' or 'climate' issue."

Multilateral standard-setters such as the World Bank and the IMF can, through their investments and practices, encourage and "normalise" greater disclosure of financial risk. By subjecting their own portfolios to the same degree of transparency and forward-looking analysis, they can lead by example. Using these institutions' actions as a form of "best practice" is considered necessary by several interviewees, but it is not considered sufficient for international bodies to lead by example. According to Wim Bartels, global head of sustainability reporting and assurance at consultancy KPMG, "best practice would help companies start to implement [reporting] in their own organisation ... Companies will ignore it if there is nowhere to start or they will do the minimum because they do not have the capacity to do anything beyond that. Best practice can inspire those companies."

The lack of consolidated international standards or even a recognised best practice may reflect perceived difficulties with proving the immediacy of climate risk, the lack of a framework for quantifying and reporting it, and competitive concerns. But it is the FSB's Task Force that is widely regarded as having been given the clearest mandate to provide possible solutions. According to Tim Mohin, chief executive of the Global Reporting Initiative (GRI), an independent international standards organisation, "the Task Force on Climate-related Disclosures embodies this collaborative approach, and we recommend that the TCFD continue to draw from existing and well-established climate disclosures, such as those from the GRI and the CDP, to avoid duplication, confusion and additional reporting burden for companies." However, for solution implementation, Mr Wilkins says, "the UN is the best". Mark Lewis, managing director of European utilities research at Barclays, echoes this sentiment, stating that regulation should be via the UN, as "UN agencies are the natural body for these things, but we need political unity from

member states, and under President Trump life might be more difficult for the UN." By using the UN as a standard-setter, climate-related financial disclosure can be set into the UN's broader Sustainable Development Goals (SDGs), rather than being siloed into green finance-related policies and regulations.

"In terms of international regulatory bodies, we should think beyond the BIS, the commission in charge of the Basel Accords and IOSCO. We should expand the target group to include the G20 and the FSB as well as the EU. Both the G20 and the EU are moving pretty quickly in the alignment of the global financial system to sustainable development. There are also a number of national regulatory bodies that are now integrating—or starting to integrate—sustainability in financial regulation in many countries globally," notes Paolo Revellino, head of sustainable finance at the WWF.

"Even when you see regulations like the EU Directive, France's Article 173 and the guidance of the SEC [the US Securities and Exchange Commission], they're all slightly different, whether they're principles-based or criteria-based, and asking for slightly different information," according to Andrew Collins, technical director at the US Sustainability Accounting Standards Board. "The issue and challenge of effective climate disclosure does lend itself to international harmonisation." This is supported by Jason Thistlethwaite, assistant professor at the University of Waterloo, Canada, and fellow at the Centre for International Governance Innovation (CIGI), who notes that "the globalisation of financial accounting standards, for example, has largely occurred as a consequence of the European Union adopting the IASB's [International Accounting Standards Board] International Financial Reporting Standards."

A similar scenario could play out in terms of financial risk disclosure. If businesses, asset managers and banks wish to access the largest capital markets, they would then need to implement the same guidelines or rules governing disclosure, thereby in effect creating global or at least regional standards.

IV. CONSIDERATIONS BEYOND THE FINANCIAL IMPACT

Businesses, financial institutions and investors may become more willing to change their behaviour if there are incentives as well as fiduciary requirements to do so. In its report *The cost of inaction*, The EIU found that “if investment managers are aware of the extent of climate risk to the long-term value of the portfolios they manage, then it could be argued that to ignore it is a breach of their fiduciary duty”. This longer-term element of fiduciary duty, however, may often be perceived to conflict with shorter-term commercial interests and is not required by national or international regulation.

The UNEP Finance Initiative, a global partnership between the UN Environment Programme and the financial sector, noted in June 2016 that many countries are hesitant to develop rules on transparency because they are concerned that in doing so, national policy would “diverge significantly from international practice. The lack of regulatory action has been interpreted by many investors as a signal that Environmental, Social and Governance (ESG) issues are not important to short- and long-term investment performance and as a signal that investors have limited responsibility for the wider social, environmental or economic consequences of their activities.”

“Investors need to look at the [ESG] information, think about their portfolio and diversify away [from emissions-intensive activities],” says Mr Thistlethwaite of the CIGI. Mr Kerr of the IFC notes that “investors will help send the signal that climate risk is important by asking companies to disclose the risks that may affect their bottom line, and how they plan to manage these risks.” And Mr Templeton of the Green Investment Bank adds: “The market will ultimately decide, but it can only be made more efficient by better disclosure.” These comments are aligned with the TCFD report, where it says: “Disclosures by the financial sector could foster an early assessment of climate-related risks and opportunities, improve pricing of climate-related risks, and lead to more informed capital allocation decisions.” Corporates need to know that investors will act on the information provided, and if material information is omitted, there is a clear risk of divestment.

However, in an increasingly interconnected world, where capital moves seamlessly across borders, if there are no required standardised reporting regulations, corporations can easily be tempted to take advantage of less stringent regulations by shifting their businesses. Similarly, investors can migrate to less restrictive jurisdictions. The existing patchwork of national regulations risks allowing financial operators to exploit regulatory arbitrage.

Mr Wilkins of S&P Global Ratings sees the risk of such arbitrage as being reduced if international accounting standards boards are involved at an early stage. “These are bodies which ensure consistency across different countries and companies, so that prudential arbitrage will hopefully be prevented to some degree by having the recommendations adopted by the international bodies for reporting.”

Defining the reporting framework

One of the key concerns around disclosure relates to how it informs investing, lending and even insurance underwriting decisions. The mandate review and the TCFD's Phase 1 report confirm that there are currently no explicit global regulatory reporting standards and requirements for climate-related financial disclosure. Those frameworks that do exist are generally voluntary and inconsistent across country and regional lines. Unless the G20 agree to act on the final TCFD recommendations and develop global standards and regulations, they will remain so.

"If you have to disclose a risk, in my view it will could get managed more as closely as an impairment on the balance sheet", according to David Loweth, director for Trustee activities and senior technical advisor at the International Accounting Standards Board (IASB). Mr Wilkins adds: "Disclosure is not just about reporting emissions scope, it is also doing scenario analysis and disclosing how risks are managed, how the company strategy and decision-making is incorporated into its governance structure... So it's quite broad in what disclosure is going to be required." If this is true, then disclosure is therefore tied into strategy as well as materiality.

"Financial institutions ... have an obligation to manage their tail risks, and institutional investors specifically must manage their funds with the long-term benefit of their beneficiaries in mind," we wrote in our 2015 report, *The cost of inaction*. "For this to be possible, regulators should issue guidance explicitly recognising climate risks as material."

The way in which the transition to a low-carbon economy proceeds—in particular whether it is smooth and measured or abrupt—is itself a systemic risk to the financial system, according to a February 2016 report from the European Systemic Risk Board. "In an adverse scenario, the transition to a low-carbon economy occurs late and abruptly," it states. "Belated awareness about the importance of controlling emissions could result in an abrupt implementation of quantity constraints on the use of carbon-intensive energy sources. The costs of the transition will be correspondingly higher."

Standardisation of the reporting framework

In terms of standard-setting, the reaction of our interviewees is mixed. Mr Wilkins of S&P says: "The TCFD is an industry-led initiative whose voluntary recommendations will need to be adopted by the business community, no matter who sets the standards." But according to Mr Lunsford of Carbon Delta, "climate-risk reporting should become mandatory, anything less than this is insufficient. With voluntary reporting there is every interest for a company to make themselves look more sustainable."

For others, the level of standardisation depends on the data being reported. As Mr Templeton of the Green Investment Bank points out, "We can't introduce standards until there is agreement in the methodology being the correct one."

What will climate-related financial disclosure mean?

The lack of internationally agreed guidelines has resulted in climate-change-related financial risk disclosure being addressed through carbon footprint calculations or management commentary and not being fully integrated into account reporting. It is clear that most environmental information is published as part of corporations' social responsibility reports and not in their accounting reports.

According to Mr Mohin at GRI, "the key for climate disclosure is that this information is utilised to take action. To ensure this, the information must be concise, current, consistent and comparable. It also must be disclosed in a manner that management, directors, shareholders and other stakeholders can access and process." Nathan Fabian, director of policy at Principles for Responsible Investment (PRI), a UN-supported network of international investors, suggests: "There's recognition there needs to be convergence of the 400 [voluntary standards], because comparability is a problem, and there are some quality issues. It doesn't work if everyone's using a different framework to report." Even though the framework suggested in the TCFD December 2016 report does make an attempt to deal with that comparability problem, there is still the issue of the short-term nature of the financial accounting and planning process.

The TCFD has responded to the question of what disclosure should mean with its recommendation that preparers of climate-related financial disclosures provide such disclosures in their public financial filing. The Task Force stressed that the publication of climate-related financial information in mainstream financial filings would help to ensure that appropriate controls govern the production and disclosure of required information with the governance processes similar to those used for existing public financial disclosures, and that they would likely involve review by the chief financial officer and audit committee.

Accounting

The accounting treatment of financial risk from climate-change-related causes is likely to be one of the more challenging aspects of increasing disclosure. It may be addressed through integrated reporting, which takes a more holistic view and includes physical assets as well as less tangible elements, such as intellectual property and energy security. However, Hugh Shields, former executive technical director at the IASB and a member of the Framework Working Group of the International Integrated Reporting Council (IIRC), agrees that the integrated report could be an excellent vehicle for such reporting but also notes that integrated reporting is, in general, non-mandatory.

"A challenge with integrated reporting is that there are only a few jurisdictions in the world that require it. If the FSB wants to mandate immediate action in the short term in relation to these broader issues, it will be necessary to find an alternative reporting mechanism."

Mr Bartels of KPMG says: "If we are thinking of effective integrated reporting, with all the inputs it requires, it would be best to start with the largest companies in the world. Multinational companies have a bigger impact on an individual basis. They are much more visible in the media and have a much larger profile."

So even though climate change is acknowledged by the institutions in our review and increasingly also by banks, asset managers and asset owners as a real financial risk, in terms of accounting it remains an intangible one.

PRI's Mr Fabian agrees that accounting rules may take longer to incorporate climate-risk disclosure. "Whether or not we end up with immediate response from accounting standards bodies remains to be seen," he says. "They tend to move a bit more slowly than what is required here, and they're the last port of call. The dialogue that has to take place on standardisation to accounting standards is a very protracted one."

Credit

One area that may force banks and businesses to react and report on their climate-change risk is their ability to obtain credit. "The average lending duration in Brazil is not more than four or five years, so climate risk per se, that we understand as physical risks, does not affect the quality of creditworthiness of our portfolio clients," says Roberto Dumas Damas, head of environmental and social credit risk at Banco Itaú BBA in Brazil. However, "if a client doesn't take into account that government policy may change, his company's credit rating could be downgraded. This, according to Basel, means we would have to make higher provision for losses, impairing the loan."

It is not only banks that can be affected. Any corporation that is perceived to be failing in its duty to account for future regulatory changes can suffer a downgraded credit rating, which impairs its access to finance at advantageous rates. This can affect its future investment plans, cut profits and therefore dividends for investors.

In turn, investors would seek out those companies that are incorporating the fullest possible disclosure, have a clearly defined sustainability strategy and are seen as less exposed to regulatory risk and therefore perceived as having less credit risk.

Materiality

One of the main reasons why climate-change-related financial risk is not reported is that there is no international agreement on when a risk is significant enough to be reported, ie, when it is considered to be a "material" risk. A clear definition of what is material will vary from sector to sector.

"Climate-change risk needs to be material for it to be disclosed, but materiality puts the onus on the reporting organisation to determine whether that risk is material," says Mr Thistlethwaite of CIGI. "That's asking a lot of a reporting organisation. Climate change

is spatially and temporally diffuse, and is not an outflow of resources you can measure in the present term."

Furthermore, what may not appear to be a material risk to a reporting company may in fact be a critical risk to an investor, and the investor, therefore, needs to communicate this, according to Lois Guthrie, executive director of the Climate Disclosure Standards Board (CDSB).

"It's very hard for a disclosing organisation to imagine what is in the mind or the models of investors making the decisions," she says. "To date they've been asked to use concepts like materiality to decide what to put in their report, but without knowing more about the requirements of the investor, it's very difficult for them to identify that."

Because companies have not priced the impacts of climate change into their activities, climate is still not considered a material issue by most companies, according to Emilie Mazzacurati, chief executive officer of Four Twenty Seven, a California-based company offering integrated climate-risk management solutions to the private sector.

"[Regulators] need to think about making some exceptions to the concept of materiality," notes Mr Thistlethwaite. "A good example of this is the Sustainable Accounting Standards Board, which has said there should be a forward-looking component to materiality which suggests [considering] issues that don't constitute a present outflow of resources from the firm but those that could constitute an outflow in the future as countries start to enforce the 2oC limit through regulation."

This approach would mean that disclosure rules need to change. Companies would be required to outline how they will perform financially under a scenario where governments impose regulations and emissions cuts sufficient to restrict global temperature increases to 2oC. These might include more national and international carbon markets or mandatory limits on fossil-fuel use.

In such scenarios, companies would have to identify the impact on their costs and sales, and therefore the value at risk on their assets. In some jurisdictions, a degree of cost is already imposed through carbon markets; the EU, for example, publishes the amount of carbon permits each industrial installation buys every year, allowing an approximate calculation of the cost associated with compliance with climate-related rules.

Much as in banking, the investor, asset management and business community may need an agreement on its "output floor", the check used by banks on how much lower their estimates of risk can be compared with those produced by standard formulas set by regulators, if it is to be clear on the level of material risk it considers to be important within its portfolios.

Scenario analysis

Most risk disclosure experts seem to agree that corporates should be required to model future company performance under more climate-change-specific scenarios. This view is reinforced in the TCFD's December 2016 report, where it says: "The Task Force believes that all organisations exposed to climate-related risks should consider using scenario analysis to help inform their strategic and financial planning processes and disclosing the potential impacts and related organisation responses. The use of such modelling would permit investors and asset managers to understand how climate risk may likely impact returns in different scenarios and over a longer-term horizon." In its report the TCFD put forward recommendations around scenario analysis, in which companies are expected to describe how different scenarios could potentially impact their business, strategy and financial planning. Although this guidance represents significant progress in climate disclosure, the recommendations do not fully encapsulate the actual risks to businesses and will need further development.

The International Energy Agency (IEA), for example, models energy demand under a variety of scenarios relating to regulatory action on climate change. Each scenario assumes differing levels of policy commitment to reining in emissions. However, as noted by Barclays' Mr Lewis, "the IEA is the closest we've got to an objective data set, although it should be remembered that even the IEA has consistently underestimated the speed with which renewables would be rolled out over the last decade, thus underlining the importance of constantly refining one's assumptions with regard to the speed with which change can happen in the global energy system."

However, given that corporates can currently select the most advantageous scenario, it may be more appropriate, in terms of comparability, for there to be defined scenarios across different industries that are developed externally by standard-setting or regulatory bodies. An analogy can be drawn with the way in which banks were entitled to set their own risk levels prior to the 2009 financial crisis, with all the consequent impact this had on global financial stability and the greater macroprudential risk environment.

"What you must do is talk about scenarios where your core business and assets are at risk," says Mark Campanale, founder and executive director of the Carbon Tracker Initiative, an independent financial think-tank providing analysis on the impact of climate change on capital markets and investment in fossil fuels. "If you're trying to work out what the business-as-usual trajectory is, it might make sense to use a business-as-usual scenario, but if you're trying to manage risk, it doesn't make sense to essentially have a case that discounts that risk to zero."

CONCLUSION

Investors, banks and asset managers are becoming increasingly aware of the financial risk posed by climate change. The physical risks of climate change create liability risks and increase systemic macroeconomic risks. Financial market participants need to know where climate risks exist and how material they actually are. Disclosure of climate-related financial risk will have the most impact if it is introduced in the largest capital markets. Although a range of voluntary standards and practices exist around disclosure, materiality and reporting, they are inconsistent and need to be standardised. Therefore, international institutions and agencies will need to adopt and standardise the TCFD's recommendations at a global level or allow regional and national institutions to do so. Such action would remove arbitrage opportunities and create a level playing field for these market participants.

The EIU's research suggests that for the TCFD's recommendations to be successful, they will need the support of the largest economies and of companies with the largest sector exposure. However, unless there are obvious financial incentives in place for businesses, banks and asset managers, then international, regional and national supervisors, regulators and standard-setters should step in and make climate-change risk disclosure and reporting mandatory. Not doing so will greatly reduce the likelihood of meeting the Paris target. Although some may argue that such action would be an overreach by these institutions, we do not consider this to be the case. We consider that any institution with a remit to promote financial stability or financial reporting standards or to address systemic financial risk has the responsibility—automatically and by definition—to address climate-related financial risk within its remit. When we compared the mandates of each institution, it became clear that any role they may have in developing greater financial disclosure was rooted in their mandates to preserve financial stability and mitigate systemic risk. Therefore we consider it appropriate for these supervisors and standard-setting bodies to take action, and also for prudential regulators to try to incorporate climate-change risk into their policy, as it can negatively impact the safety and soundness of the firms they regulate.

Even if these institutions were to adopt all of the TCFD's general recommendations, specific standards and regulatory rules will have to be developed. Although the G20 forum is considered by this report's interviewees as overall the most appropriate organisation to start the process, other organisations, such as the BIS, IOSCO, the UN and the IASB, are also mentioned as having a potential role in standard-setting.

To ensure that rules are applied as equally as possible in all relevant jurisdictions, these bodies will need to work with national regulators, politicians and representatives of the financial sector.

Asset managers, asset owners, banks and corporations should be prepared to adopt a new and more forward-looking form of financial transparency. The governance, strategy and risk-management framework suggested by the TCFD may be a good

starting point. Standardised metrics, including the adoption of realistic scenarios to make comparability easier for investors, should be seen as a critical component to valuing sustainability. They should be ready to model their businesses against scenarios in which the global economy takes on board the scale of the Paris challenge and sets ambitious carbon-reduction goals. And they will need to disclose the risks that this pathway entails for their businesses.

The Economist Intelligence Unit's July 2015 report, *The cost of inaction: Recognising the value at risk from climate change*, highlighted the need for climate risks to be "assessed, disclosed and, where feasible, mitigated". Governments agreed to this in Paris in 2015 on behalf of their countries. The international finance community must now do the same.

APPENDIX

This appendix provides information on the organisations' mandates and any inclusion of climate change within those mandates. It includes a list of indicators that act as a benchmark by which actions and commitments taken by these institutions in relation to climate-change financial risk are to be evaluated.

Table 1. Organisational mandates and climate change recognition inclusion

ORGANISATION	MANDATE	CLIMATE CHANGE RECOGNITION
Multilateral standard-setting institutions		
International Monetary Fund (IMF)	Promotes international monetary co-operation and provides policy advice and technical assistance. It also makes loans and helps countries design policy programmes to solve balance-of-payments problems when sufficient financing on affordable terms cannot be obtained to meet net international payments. IMF loans are short- and medium-term and are funded mainly by the pool of quota contributions that its members provide. As part of its global and country-level surveillance, the IMF highlights possible risks to stability and advises policy adjustments.	No explicit mention of climate change in the Articles of Agreement of the IMF, but in 2015 the Fund highlighted its role in addressing climate change in the areas of technical and policy assistance to member countries. Accordingly, the Fund has made efforts in the areas of policy development, knowledge and inter-agency partnerships.
World Bank (WB)	Promotes long-term economic development and poverty-reduction by providing technical and financial support to help countries reform particular sectors or implement specific projects. The Bank provides loans to low-income economies and credits and grants to developing countries. World Bank assistance is generally long-term and is funded both by member state contributions and through bond issuance.	No explicit mention of sustainability in the articles of Agreement, but the 2016 Climate Action Plan lays out a climate change mitigation strategy. The strategy includes action items in the areas of lending, financing, policy development, inter-agency partnerships as well as outreach activities.
Financial stability supervisors / Standard-setters		
Financial Stability Board (FSB)	Monitors and assesses vulnerabilities affecting the global financial system and proposes actions needed to address them. It co-ordinates information exchange among authorities responsible for financial stability. It advises on market developments and their implications for regulatory policy as well as best practices in regulatory standards.	The mandate does not explicitly include climate risk, but it is responsible for addressing systemic risks to the financial structure. The work of the FSB's Task Force on Climate-related Financial Disclosure (TCFD) spans the mandate areas of standard-setting, policy development, knowledge assistance and industry outreach.
International Organisation of Securities Commissions (IOSCO)	To develop, implement and promote adherence to internationally recognised standards for securities regulation; enhance investor protection; and reduce systemic risk. While the mandate does not explicitly include sustainability, it may be implicit in its mandate to address systemic risk.	While a standard-setting and policy-development role in the area of climate-risk disclosure is envisaged, we only see some efforts in the areas of inter-agency partnerships and knowledge assistance.
International Association of Insurance Supervisors (IAIS)	To promote the effective and globally consistent supervision of the insurance industry; to develop and maintain fair, safe and stable insurance markets; and to contribute to global financial stability.	Its standard-setting and policy-developing mandate towards ensuring a stable insurance sector implicitly encompasses climate risk.
Bank for International Settlements (BIS)	To serve central banks in their pursuit of monetary and financial stability and promote co-operation between central banks and facilitate international financial operations.	The statutes of the BIS do not explicitly define a climate-risk mitigation role. However, its financial stability mandate can be read to include climate as a systemic risk.

APPENDIX

Regional/country supervisors/advisory bodies		
European Insurance and Occupational Pensions Authority (EIOPA)	EIOPA's core responsibilities are to support the stability of the financial system and the transparency of markets and financial products, and to ensure a high level of regulation and supervision.	The mandate does not specify sustainability but stability of the financial system—identifying potential risks and vulnerabilities and playing an advisory role in addressing them. Currently, we only find some progress on the issue in the area of policy development.
Bank of England (BoE)	To maintain monetary and financial stability in the UK and act as lender and market-maker of last resort; to promote the safety and soundness of individual financial institutions. The Bank is responsible for the removal of risks to the financial system and the supervision of financial market infrastructure.	The Bank of England Act 1998 mandates the court of directors of the Bank to "determine the Bank's strategy in relation to the Financial Stability Objective and review, and if necessary revise, the strategy". Climate risk can be seen to be implicit in the financial stability mandate. The Financial Policy Committee is tasked with abating systemic risks. While climate risk is not reflected in the lending of the Bank, we see some efforts in the areas of inter-agency partnerships and knowledge assistance.
Prudential Regulatory Committee (PRC)	On March 1st 2017 the PRC replaced the PRA Board and was brought within the BoE as required by the Bank of England and Financial Services Act 2016. It keeps the same general objectives: promoting the safety and soundness of the firms it regulates; providing protection for policyholders in insurance firms; and facilitating effective competition. The Financial Services and Markets Act 2000 gives the PRC the "power to provide for additional objectives".	There are some climate-related initiatives to be seen in the areas of inter-agency partnerships, industry outreach and knowledge assistance, but we see a gap in the mandate area of policy development.
European Securities and Markets Authority (ESMA)	ESMA's mandate allows it to assess risks to investors, markets and financial stability. It is required to develop a complete single rulebook for EU financial markets, promote supervisory convergence and directly supervise specific financial entities.	No explicit mention of sustainability, but climate risk is a risk to investors, markets and financial stability.

Table 2 Mandate evaluation indicators

	Indicator	Description
1	Lending	Sustainable development included in their lending requirements; project-evaluation criteria encompass climate-related considerations.
2	Financing	Institutional strategies and efforts to raise finance for climate-risk mitigation and adaptation investments.
3	Standard-setting	Where mandated to play a role in developing and/or maintaining industry standards and whether these have been extended to include climate risks.
4	Policy development	Activities assisting the processes of climate-risk-related policymaking and adaptation at the sovereign level.
5	Inter-agency partnerships	Initiatives where the institution is engaged with peer organisations, international, regional or supranational bodies in fostering discussion on climate-related risk disclosures.
6	Knowledge/analytical assistance	Development of research and analytical resources in the areas of sustainability, stability and risk analysis for the financial sector.
7	Industry outreach/consultation	Outreach and consultative processes that advance discourse in the area of financial risk (climate risk by extension).

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