

Emerging risks in insurance: Climate change

Kyle Audley, FIA
Dana-Marie Dick
Natasha Singhal

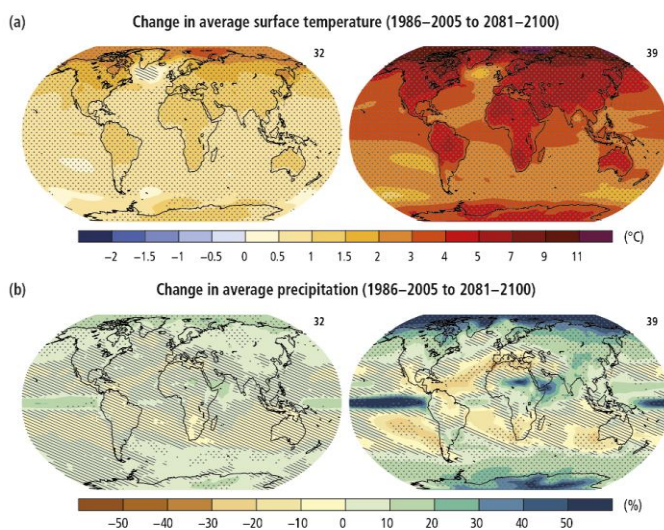


Introduction

Climate change is an important driver in the development of the physical, societal and economic environment. Though an established area of scientific research and a topic of political debate, the impacts and importance of climate change are becoming widely recognised in an economic context. As a result, an increasing number of regulatory, advisory and governmental bodies are engaging with and exploring the topic. This involvement is catalysing the reaction of the insurance industry towards the financial risks of climate change. Furthermore, investors, policyholders and wider stakeholders are increasingly interested in environmental, social and governance (ESG) policies and practices, increasing focus on the immediate and ongoing responses to these issues.

The fundamental effects of climate change describe the changing attributes of the global environment, including mean temperatures and annual rainfall. The Intergovernmental Panel on Climate Change (IPCC) report¹ explores the potential for environmental changes in the period 2081-2100 and compares it to the climate during the years 1986-2005. The model presents an altered world with increased mean global temperatures concentrated over landmasses, and a non-uniform change in global rainfall, showing increased concentration in polar and equatorial regions and a reduction in some densely populated, and densely cultivated, regions.

FIGURE 1: IPCC PROJECTED CHANGE IN GLOBAL TEMPERATURE AND AVERAGE RAINFALL



The risks of climate change can be viewed through two key risk channels, “physical” risk and “transition” risk.

The “physical” risk channel describes the risks that emerge as the global environment changes and as demographic experience develops in response to these changing conditions. This may present itself through changes in longevity and morbidity trends, but the physical impacts of geography have the potential to affect the strategy of insurers across target markets and the location of internal operations. A second risk channel emerges in response to the physical risks of climate change. The “transition” risk channel describes the risks emerging as society and world governments move towards a lower carbon economy. These risks can manifest more quickly than physical risks, and include the effects of emerging regulation, asset re-pricing and changing laws and policies driven by the response to climate change. The transition risk channel includes changing consumer demands and preferences in response to the effects of climate change, presenting significant reputational considerations when formulating a strategy in a market increasingly sensitive to environmental and social issues-- for example, exhibiting increased interest in green investment funds and engaging in greater levels of recycling in offices and at home.

Though climate change may still be catalogued as an emerging risk, it may be more representative to describe it as a risk driver with broad and diverse effects. A more robust approach may be to identify and catalogue the specific risks emerging through climate change, and consider the degree of progression and the potential responses to each risk individually. Breaking down the climate change risk driver within the highly complex system that is the global environment may present insurers with the opportunity to apply more conventional risk management techniques to what can initially appear to be an insurmountable issue.

This paper considers the current and developing regulation, in the UK and Europe, surrounding climate change-related risks, the risk identification and risk management practices available to insurers and examples of the key challenges faced by insurers in response to climate change.

¹ IPCC Fifth Assessment report.

Regulatory developments

The level of explicit regulation in place for climate change-related disclosure and conduct has been quite limited historically. However, this is quickly changing. There are many regulatory and advisory bodies exploring the risks associated with climate change, and regulation and best practice around many aspects of climate change continues to develop. Formal requirements are emerging in the UK. For example, as of October 2019 the PRA will require firms to nominate a Senior Manager Function (SMF) to act as risk owner for climate change, and this has encouraged engagement at a board level for many firms. The emerging practice appears to be for the chief risk officer to fulfil this role, though other suitable candidates include the CFO or the CEO with a degree of delegated responsibility to the wider board.

In the UK, both the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA) have published papers and statements to engage the industry on various topics within climate change. The European Insurance and Occupational Pensions Authority (EIOPA) and the Task Force on Climate-related Financial Disclosures (TCFD) are also exploring the topic in detail, and engaging with the wider industry through consultation and guidance papers.

PRUDENTIAL REGULATORY AUTHORITY

In April 2019 the PRA issued a Supervisory Statement (SS) on “Enhancing banks’ and insurers’ approaches to managing the financial risks from climate change”. The SS identifies four key areas in developing an approach to climate change as a source of emerging risk. The four areas are:

1. **Governance.** The PRA requires firms to understand the distinctive elements of financial risk to them due to climate change which are relevant and to provide evidence of this as well as evidence of how they monitor and manage the identified financial risks.
2. **Risk management.** The inclusion of climate change risks in existing risk management frameworks. Firms must identify climate change risks that are relevant to them, and also understand how such risks would affect their business model in order to measure the financial impact.
3. **Scenario analysis.** A range of scenarios to inform risk identification and management, looking both at the short and long term. Short-term scenario recommendations are quantitative, considering a firm’s exposure to financial risks from climate change within the current business projection period. Long-term scenarios are expected to assess a range of scenarios, such as transitioning to a low-carbon economy, spanning a period of years. These form a qualitative exercise to inform strategic planning.

4. **Disclosure.** Material risks must be disclosed in line with Solvency II requirements, with firms considering additional disclosures to enhance the transparency of a firm’s approach to measuring and managing the financial risks due to climate change.

The components of risk management presented in the SS are sufficiently broad as to apply to any risk, suggesting that approaching climate change in a manner consistent with other, existing emerging risk drivers is a suitable approach to incorporating this risk into ongoing risk management.

Subsequently, the PRA released the Life Insurance Stress Test 2019, which includes a section focused on climate change scenarios, undertaken on a “best endeavours” basis and recognising the uncertainty in such scenario analysis. This requires firms to consider the impact of three scenarios:

- **Scenario A:** The “disorderly transition” to a low carbon economy over a medium-term business planning timescale, involving significant transition risks and asset re-pricing
- **Scenario B:** The “orderly transition” to a low carbon economy over a longer timescale with reduced transition risks relative to scenario A
- **Scenario C:** The “hot-house” scenario with no transition risk but physical risk is maximised.

Life insurance companies are not required to explore the physical risks of scenarios in this exercise, but may choose to consider this aspect in the qualitative information submitted to the PRA as well as any transition risks that are not included in the provided scenario effects.

FINANCIAL CONDUCT AUTHORITY

The FCA has published a discussion paper looking at climate change and green finance². The FCA acknowledges the impact of climate change on financial markets is uncertain, but there are legal frameworks in place to support a low carbon economy, which in themselves could have major effects on financial markets and products. As consumer demand for “green” products, including insurance products and services, increases, there is greater focus in areas such as “green taxonomy”³, green disclosure and green performance measures.

The FCA’s aims are similar to that of a recent government paper, Green Finance Strategy⁴. The paper outlines a number of measures to illustrate how the financial sector can drive progress on climate change and push towards net-zero emissions. These measures include better climate disclosure from corporate companies, such as inclusion of mandatory regulations for companies to explain how climate change would affect them.

² Green finance refers to any financial instrument or investment issued under a contract in exchange for the delivery of positive environmental externalities that are additional to business as usual.

³ The classification of green produces and markets

⁴ [Green Finance Strategy: Transforming Finance for a Greener Future. \(July 2019\)](#)

WIDER GUIDANCE AND REGULATION

More widely, the European Insurance and Occupational Pensions Authority (EIOPA) has released a consultation paper on the broader topic of sustainability within Solvency II, within which climate change featured prominently among ESG factors.

EIOPA has found insurers may interpret climate-change risk narrowly as a natural catastrophe risk. However, in reality it also encompasses more general climate trends such as temperature rises, sea level rise or climate-related forced migration, all of which could affect insurance through demographic trends, operational challenges and asset impacts.

Discussing climate change in the context of Solvency II, EIOPA considers the practical challenges of climate change risk inclusion in the Pillar I capital requirements, which have a one-year outlook. Due to the longer time horizon of climate change risk, it may not be fully captured by a one year Value at Risk measure such as the Solvency Capital Requirement. Though EIOPA does not recommend changes in the timeframe of regulatory capital requirements, it encourages the use of complementary tools such as scenario analysis and stress tests to include climate change as a risk.

Finally, the TCFD, a voluntary body involving several senior figures across multiple industries, has developed a framework in which companies can meaningfully disclose their approach and exposure to climate change risks. Its objective was to develop recommendations for more effective climate-related disclosures and it aimed to promote more informed investment, credit and insurance decisions, as well as improve stakeholders' understanding of concentrations of carbon-related assets in the financial sector.

The four main pillars of its disclosure recommendations, which are designed to apply to all industries, are included in Figure 2.

FIGURE 2: TCFD RECOMMENDED DISCLOSURES

1	<p>Governance</p> <p>The rules, guidelines and policies within a firm around climate-related risks and opportunities</p>
2	<p>Strategy</p> <p>Actual and potential impacts of climate-related risks and opportunities for the firm's businesses, strategy and planning</p>
3	<p>Risk management</p> <p>How the firm identifies, assesses and manages climate-related risks</p>
4	<p>Metrics and Targets</p> <p>The metrics and targets used to assess and manage relevant climate-related risks and opportunities</p>

Risk management

RISK IDENTIFICATION

Though climate change is a multi-faceted issue, it possesses key features that are definitive as a risk driver. Isolating these key attributes and exploring how these can lead to emerging risks and impacts for insurers may help to reduce the complexity of the physical process of climate change. Ultimately, the effects of climate change drive uncertainty in future economic conditions and demographic trends, and such effects are expected to manifest over an uncertain time period. These effects may be highly interconnected and there is a strong dependence on the actions of governments and policymakers.

Firm-specific risks can be identified by considering how the transition and physical risk channels may interact with more traditional risk groupings.

1. **Physical risk.** Encompassing the risks associated with changes in the environment over a prolonged period. This includes event-based and trend changes such as severe single weather events, deaths at extreme temperatures and the operational risks of supply chain interruption.
2. **Transition risk.** Risks associated with a changing economic environment and moving to a low carbon economy. Drivers include changing regulations, advancements in technology, incentives around various asset classes, changing consumer demands and reputational risks.

For example, considering the effect of transition risk on market risks, the treatment of carbon-intensive assets is an area of potential significant regulatory changes, and asset holdings with direct exposure to natural resources face the risk of becoming stranded assets⁵, with asset repricing leading to material balance sheet volatility. Physical risks of the changing environment may introduce important new drivers in demographic trends, as changes in temperature and air quality influence longevity, mortality and morbidity trends.

It is important to recognise that these channels do not form the ends of a climate-change risk spectrum, with physical at one end and transition at the other. They are coexisting risk channels. Identification of one risk may lead to the potential for or manifestation of other risks, e.g., identifying a physical risk could lead to transition risks based on the reactions of society, government and regulators. Furthermore, the complexity and co-evolution of transition risk drivers can lead to step changes in the nature and emergence of risks. Such "tipping points" are an important concept in the evolution of the risks of climate change and present material challenges to risk monitoring and risk identification processes.

⁵ An asset that has become obsolete or nonperforming prematurely. It will have encountered unanticipated write-downs, devaluations or conversion to liability ahead of its useful lifetime.

SCENARIO ANALYSIS

To quantify the financial risks from climate change, guidelines recommend considering the resilience of a company's strategy through scenario analysis, including climate change-related assumptions.

The TCFD has recommended that companies use a two degrees Celsius or higher increase in average global temperature scenario, alongside other scenarios that are most relevant to an individual company's circumstances. Additional scenarios, such as those presented in PRA Life Insurance Stress Test 2019, may explore any combination of the physical or transition risks discussed above, and variations in assumptions may arise from consideration of different factors such as regions, lines of business or asset classes or sector.

The key challenges found in the TCFD's 2019 feedback are:

- The lack of relevant data to supplement the scenario analysis
- Difficulty to determine business-related scenarios and connecting climate-related scenarios to business requirements
- Difficulty quantifying climate-related risks

There are also concerns that current scenario planning may not consider a long enough time horizon to truly capture the impact of certain climate-change risks. In its supervisory statement released in April 2019, the PRA requires longer term scenarios to be in the order of decades – which it recognises is beyond the typical timescales of business planning.

At this stage, scenario testing will likely focus on the narrative around these risks, aiming to describe the impacts most relevant to a firm and identify what actions or further work may be necessary to formulate a more robust response.

RISK MANAGEMENT

Developing the risk management of climate change beyond scenario analysis, firms may look to include the risks of climate change in their wider risk management framework. The PRA supervisory statement requires an SMF to own the risks of climate change within their firm, with the formal inclusion of these responsibilities in the SMF's statement of responsibilities. This should encourage a greater degree of board engagement with the topic, and promoting the findings of scenario analysis to board level discussions should support the inclusion of climate change risks in strategic planning. Equally, promoting a wider consideration of climate change risks in the business, and ensuring each business function has properly considered climate change in their work may encourage greater firmwide recognition of the importance of the topic.

For a risk such as climate change, there are numerous potential scenarios and risks to a company. Firms must consider which risks to model within their scenarios and where to set their risk tolerance levels to identify the significance of these risks to a firm. This may facilitate firms including the risks of climate change in elements of their enterprise risk

management (ERM) framework, beginning to express risk preferences in respect of climate change.

Opportunities and challenges

Fundamentally, the physical and transition risks that may manifest as a result of climate change present a number of ways in which the global physical, economic and social environment may alter in future. Shifts in global mean temperature, regulation and social attitudes generate opportunities and challenges for insurance companies and financial services providers. In the short term, many of the challenges presented are in developing an approach and understanding what this emerging risk driver means for companies' risk functions, investment functions and strategic decisionmaking processes. In developing an approach, firms may identify opportunities in response to the financial risks of climate change and develop a framework through which they are better situated to explore and capitalise upon them. In the longer term, the need for new insurance products and changing demands for existing products present strategic opportunities across investment and risk transfer. This section considers topics within risk and investment which have emerged as important themes, but which also present a significant challenge or opportunity.

METRICS

In order to monitor risks, define risk appetites, explore scenarios and ultimately form the basis for public disclosure, insurers need to produce meaningful metrics. The metrics associated with climate change (e.g., CO₂ emissions) and the metrics familiar to insurers disclosures have little in common. Developing and implementing metrics which are rooted in the effects of climate change but remain relevant to an insurer's balance sheet is challenging. These metrics could take several forms, such as:

- **Asset-based metrics:** Considering a broader range of asset sectors and value-chains, e.g., banks with significant counterparty exposure to industrialised agriculture may yield a clearer understanding of the climate sensitivity of an asset portfolio. Such analysis could also investigate the potential credit risk of sovereign debt for countries that rely heavily on natural resources, including major mining operations.
- **Geographic metrics:** These metrics will be particularly important for supply chain analysis and operational risks, particularly the risks of outsourcing. An insurer's activities by location could have a significant effect on the level of exposure to climate-related risks. For example, if the customer services function is outsourced to a country that is exposed to natural disasters, an increase in the frequency or severity of such events presents a significant risk of an interruption to normal business activities. Metrics describing the extent of the exposure to such risks would be beneficial in strategic planning.

MEANINGFUL SCENARIOS

Scenario analysis is key in developing an understanding of climate change as a source of risk. The PRA, in its call for insurers to participate in the 2019 stress programme⁶, included a climate change scenario considering the impact on asset values given varying levels of transition risk. However, the PRA stresses that the scenario is intended for illustration purposes and calls on insurers to respond with scenarios used in the industry.

Climate changes scenarios are generally presented as an average increase in global temperature of “n” degrees. This presents a challenging starting point from which to explore a scenario, as there are hundreds of potential inherent impacts. Given such a complex system, it may be difficult to isolate the key impacts and correlations within scenarios, and there is the additional challenge of translating each of these impacts to the specific impact to a particular company. Companies may consider focussing on the potential impacts of climate change risks, and probe the series of events, or key milestones, leading to such an outcome to find a more tangible path through scenario analysis. This may also encourage a stronger narrative and identify available management actions.

TIPPING POINTS

Transitional risks encompass a variety of risk drivers, many of which involve concepts or ideologies that are prone to sudden and significant development. For example, step changes in consumer attitudes or preferences can quickly influence demand for products or product providers. These “tipping points” are a form of non-linear risk behaviour that can manifest through the co-evolution of multiple risk drivers. Tipping points

⁶ Bank of England Prudential Regulation Authority. Life Insurance Stress Test. Draft. (April 2019). Retrieved 22 August 2019, from <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2019/life-insurance-stress-test-2019-scenario-specification-guidelines-and-instructions-draft>

represent important shifts in the measurable effects of risk drivers and, from such complex interactions, new risks may emerge through mechanisms that are not reliably monitored. Such changes are characterised by a low probability of occurrence and difficulty in recognising the underlying processes. Identifying and understanding this non-linear behaviour is an important process in monitoring the evolution and progression of risk drivers.

INFRASTRUCTURE

A common theme in climate change is the need to invest in global infrastructure. The more direct response to the physical risks of climate change includes building flood defenses and key transition risk may be emerging requirements around developing environmentally friendly homes. Long-term responses could include changes in transport systems and switching to greener methods of power production. This may present investment opportunities for companies as infrastructure as an asset class grows and opportunities become more diverse. However, infrastructure may be one of the asset classes most affected by the physical and transition risks of climate change.

How Milliman can help

Milliman consultants have considerable experience helping firms to develop their risk management frameworks. We are well placed to benchmark firms’ approaches against the rest of the industry, and provide insight and advice that is tailored to your individual circumstances and needs.

We have helped numerous clients to introduce robust processes for identifying and assessing emerging risks ranging from building up a narrative through to the use of new analytical techniques and artificial intelligence.

If you have any questions or comments on this paper, on the subject of climate change or on any other aspect of your risk management framework, please contact any of the consultants below or your usual Milliman consultant.



Milliman is among the world’s largest providers of actuarial and related products and services. The firm has consulting practices in life insurance and financial services, property & casualty insurance, healthcare, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

uk.milliman.com

CONTACT

Neil Cante
Neil.Cante@milliman.com

Dana-Marie Dick
Dana-Marie.Dick@milliman.com

Natasha Singhal
Natasha.Singhal@milliman.com