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Testing strategy through climate scenario analysis

SUSTAINABILITY AS A BUSINESS ISSUE

As stakeholder pressure mounts, insurers must revisit their strategy in the context of sustainability, looking beyond the typical business-planning horizon. Potential long-term impacts of climate change are wide-ranging and uncertain, and although the element of the unknown presents a significant challenge, we should find new ways to investigate the issues at hand. How will changes in the physical environment and shifts in demand driven by the transition to a low-carbon economy impact insurers? The industry is in a unique position to react – not only does it have the power to affect markets, helping to close the low carbon investment gap through asset allocation strategy, it can also reduce the climate protection gap through its product offerings.

Climate feedbacks, such as the release of carbon from the soil as a result of surface warming, are accelerating the pace of change. As extreme weather events increase in frequency, it may no longer be sufficient to rely on annual repricing of insurance premiums in response to incremental movements in risks. Stakeholders expect insurers to uphold their role in the market and continue to provide risk protection into the future. Unaffordability in the context of flood insurance in northern Australia is already an issue, and home insurance premiums in California are rising to untenable levels to cover the cost of the increasing number of wildfire events. Models that rely on historical data are poorly placed to project long-term results, and may result in underestimation of costs. If insurers want to plan for the coming decades to ensure that they remain profitable, alternative tools should be considered.

GETTING STARTED WITH SCENARIO ANALYSIS

EIOPA recently announced[1] its intention to require insurers to incorporate climate-related risk scenarios into their ORSA. The DNB[2] and PRA[3] have specified similar expectations, and in its final recommendations, the Taskforce for Climate-related Financial Disclosures (TCFD) presents scenario analysis as a key component of climate risk analysis. As regulators look for evidence of how insurers consider climate-related risks in setting medium- to long-term strategy, insurers have a clear motivation to incorporate climate scenario analysis into risk management frameworks.

Climate-related scenarios focus on a time horizon of anywhere between 10 and 100 years, and are defined by the extent of the warming of the earth. They are accompanied by scenario narratives – higher levels of emissions will lead to more warming, and therefore more physical risk. A tougher policy response will lead to lower levels of emissions, less physical risk and more transition risk (the asset risk related to transitioning to a low-carbon economy).

In a recent update provided by United Nations Environment Program Financial Initiative's pilot program for the TCFD[4], a generalized scenario analysis framework was laid out, centering on publicly available data. The results were generated using the simplified output of General Circulation Models (GCMs). GCMs simulate the future climate across different time horizons and warming scenarios, and output includes a wide range of climate and weather related variables. While running these models is inherently complex and requires expert knowledge, any quantitative analyst can use the output. Actuaries are well-placed to implement such analysis.

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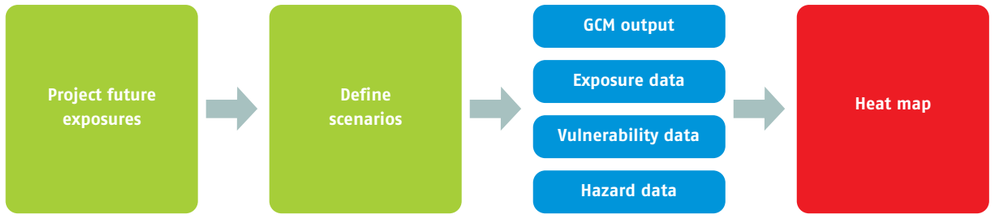

Figure: Process for climate scenario analysis heatmap

In order to tailor scenario analysis to their business, insurers should project their exposures into the coming decades, and define scenarios relevant to their unique risk exposures. Combining GCM output with insurer's projected exposures, hazard information and vulnerability data (measuring a location's ability to adapt), insurers can create a heat map which measures risk relativity across perils and countries. The output offers high-level insight into how the risk of different exposures is projected to change according to the latest climate models. This overview can highlight which lines of business and geographies may be more materially impacted under different warming scenarios and which may offer opportunities, providing input for strategy setting.

DIVING DEEPER INTO PHYSICAL RISK EXPOSURES

Following the preliminary assessment, targeted analysis should focus on identified areas of material physical risk. Natural catastrophe models can be adjusted for different warming scenarios using the latest scientific research. Underlying assumptions relating to the frequency and severity of major weather events can be calibrated to reflect expected impacts on climate. One example is increasing the inundation extent and depth of storm surge to reflect the greater hazard as a result of higher sea levels. Exposure modules can also be adjusted to take into account demographic trends such as rapid urbanization. Secondary perils such as drought are less commonly modelled but may also be material in the future – water shortages can lead to credit events across multiple industries, as a large percentage of water is used for industry and energy production.

THIS IN TURN MAY RAISE QUESTIONS REGARDING THE AFFORDABILITY OF RISK PREMIUMS

On a broader level, catastrophe model vendors calculate industry or country factors that represent percentage loss changes by peril based on their own in-house analysis. We know that the cost of severe weather events will continue to rise, and such analysis tailored to an insurer's portfolio provides an idea of the magnitude. This in turn may raise questions regarding the affordability of risk premiums and future availability of risk transfer through reinsurance. There are also accompanying implications for an insurer's business model, competitiveness, business mix and reputation. Given consumers' appetite for sustainable products, insurers should be asking how long-term opportunities can be created through product innovation, or public-private partnerships. EIOPA is encouraging insurers to consider products involving risk based pricing combined with risk mitigation initiatives leading to a reduction in annual premium and funded using long term loans.

FURTHER ASSESSING TRANSITION RISK

When considering the accompanying transition risk of each scenario, analysis is performed from the top down, using sector and geographical insights, or bottom up, with counterparty level assessments. Macroeconomic financial variables are attached to different sectors and translated to impacts on risk parameters to reflect changes in credit quality under different scenarios. Categorizing assets in this way feeds into a longer term modelling approach. Understanding portfolio structure is key to anticipating transition risks, which have implications beyond energy portfolios – insurers must consider, for example, the potential changes to the global motor book over the next ten years. Physical risk and transition risk represent the two sides of an insurer's balance sheet. But they cannot be considered in silos – if a physical risk is considered to be material in relation to underwriting, insurers must also consider how this is reflected in their investments. In both areas, actuarial methods serve to inform forward-looking management decision-making, highlighting areas of risk to be monitored, diversified or divested, and offering insight into where business should be increased.

NOW IS THE TIME TO DO THE NUMBERS

KEY TAKEAWAYS FOR INSURERS

Climate change presents long-term financial and reputational risks as well as commercial opportunities for insurers. Supervisors expect the results of climate scenario analysis to inform climate-related risk appetite statements, and help create an organization-wide framework for decision makers to steer exposure. Now is the time to do the numbers, contribute to the debate and assure regulators and the market that your business model is viable into the coming decades. ■

1 – European Insurance and Occupational Pensions Authority (2020), *Consultation on the draft Opinion on the supervision of the use of climate change risk scenarios in ORSA*

2 – De Nederlandsche Bank (2019), *QeA Climate-related risks and insurers*

3 – Prudential Regulatory Authority (2019), *The 2021 biennial exploratory scenario on the financial risks from climate change*

4 – UNEP FI Principles for Sustainable Insurance (2020), *Using hindsight and foresight: Enhancing the insurance industry's assessment of climate change futures*