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Climate change and P&C insurance: The threat and opportunity

Many in the property and casualty insurance industry have underestimated the immediacy of physical—and systemic—effects from climate change. Business models must adapt.

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The effects of climate change are here. Stronger and more frequent natural disasters, for example, are destroying homes and businesses at record-breaking rates and putting entire food systems at risk. Hurricane Harvey caused $125 billion in economic damage in 2017. The 2019–20 Australian bushfires killed more than a billion animals and caused more than $4.4 billion in damage. Climate-linked issues, such as extreme heat, natural disasters, and biodiversity loss—and the failure to respond to these challenges in time—dominate reports issued by organizations such as the World Economic Forum.[1] Further changes in the global climate are locked in for at least the next ten years,[2] and insurers' concerns are no longer individual catastrophic events but the interactions between the global climate and human systems.

At first glance, the effects of climate change may not seem detrimental to property and casualty (P&C) insurers. They can use the annual policy cycle and their sophisticated understanding of evolving risks to reprice and rearrange portfolios to avoid long-term exposure to climate events. And the growth in the value at risk—and possibly volatility—should increase the demand for new and different insurance solutions and services, which, in turn, could expand the industry's opportunities.

Insurers, however, must be careful not to underestimate the true threat of climate change. Because its effects are systemic, climate risk is likely to stress local economies and—more grimly—cause market failures that affect both consumers and insurers. More frequent catastrophic events, in combination with the need to meet evolving regulatory requirements, can threaten company business models—and make insuring some risk unaffordable for customers or unfeasible for insurers. Stakeholders—such as customers, shareholders, and regulators—are therefore likely to demand that insurance solutions go beyond traditional risk transfer to explicitly address risk mitigation.[3] These risks can be either physical, directly affecting the insurance business, or transitional, affecting insurers' portfolios as assets are repriced. Insurers should seize this moment to stress-test their exposure to climate risk and rebalance their portfolios. Perhaps more importantly, insurers should use their understanding of risk to help organizations mitigate and adapt—and thus protect a greater share of the global economy. In particular, the industry should develop products that cover climate-related risk specifically and should revisit its (potentially carbon-intensive) investment strategies. The effects of climate change are already here, and efforts to respond at scale will take time. With the long-term viability of the industry at stake, insurers should act now.

Pervasive risk requires new responses

Evidence is mounting that the P&C insurance industry will soon need to reshape its business models, but only a few stakeholders have taken meaningful action: several insurers are incorporating climate-risk considerations in their new-product launches and underwriting processes. Some others have publicly committed to reducing their exposure to carbon-intensive industries by 2030 or 2040. In recent interactions with industry executives, more than half have said that the industry's response so far has been underwhelming and inadequate—even though the vast majority said that responding to climate risk is either "very important" or "a top priority." The industry has an opportunity to develop a response that reacts to the shifts driven by climate change while broadening

[1] *The Global Risks Report 2020, World Economic Forum*, January 15, 2020, weforum.org.
[2] For more, see "Climate risk and response: Physical hazards and socioeconomic impacts," McKinsey Global Institute, January 16, 2020, on McKinsey.com.
[3] For a more on stakeholder capitalism in insurance, see Stephan Binder, Brad Mendelson, and Kurt Strovink, "Reimagine insurance: Five keys to innovation," September 10, 2020, McKinsey.com.

the relevance of the industry from risk mitigation via risk transfer.

McKinsey research shows that the value at stake from climate-induced hazards could, conservatively, increase from about 2 percent of global GDP to more than 4 percent of global GDP in 2050. And the risks associated with climate change are multiplying. They vary by locale, evolve, and have nonlinear systemic effects that tend to be regressive. In short, a small physical shift can change entire systems irreversibly—and, vulnerable populations could be affected disproportionately (for more on physical climate risk, see sidebar "Seven crucial traits of physical climate risk").[4]

The projected escalation of climate risk, such as the occurrence of more floods and wildfires, may lead

[4] For a more detailed view of the physical hazards and socioeconomic effects of climate change, see "Climate risk and response: Physical hazards and socioeconomic impacts," McKinsey Global Institute, January 16, 2020, on McKinsey.com.

Seven crucial traits of physical climate risk

Of the growing physical risks from climate change, for insurers, seven stand out:

- Because physical climate risk is increasing, so is the scope of risk aggregation and the prospective economic impact. Some risk may become difficult to insure at reasonable rates.
- Climate events happen locally, and therefore need to be understood spatially, or within the context of a geographic area. Insurers will need tools and processes that can assess spatial insights. Using parametric insurance may become important.
- Risk is nonstationary and evolves, especially since further warming is "locked in" for the next decade because of inertia in the geophysical system. Actuarial assessments should therefore include climate science and the projection of hazards in addition to the historical experiences that currently inform pricing.
- Socioeconomic effects will be nonlinear, meaning that breaching thresholds in natural and human systems could release a cascade of effects. Insurers will need to consider qualitative factors to identify patterns and dependencies in underwriting risk.
- Effects will be systemic, because the initial impact of a discrete event will set off a chain of knock-on effects. A natural catastrophe, for instance, may destroy property, cause business interruption, damage ecosystems, and create a humanitarian crisis. Because of the interconnected nature of systems, there will be greater volatility.
- Effects will be regressive: the poorest communities are typically the most vulnerable. Emerging economies face the largest increase in potential impact on workability and livability. Less-developed economies also rely more on outdoor work and natural capital, and they have fewer financial means to adapt quickly. The protection gap in developing economies will probably increase without collaborative intervention from insurers and governments.
- Human systems are underprepared to manage the rising level of physical climate risk and its effects. The pace and scale of adaptation will need to increase significantly. Insurers could, for example, offer risk-engineering and risk-mitigation services.

to underinsurance—or to no insurance at all. The result, substantial market dislocation will include premium loss, higher rates of self-insurance, and an increased demand for disaster relief from the public sector (for more on market dislocation, see sidebar "Florida flooding and insurance market failures").

Some insurers may feel protected from the escalating effects so far. However, this is a false sense of safety: while climate risk can change quickly, revisions to policies that are based only on historical data may not reflect the full cost of climate risk. Indeed, common catastrophe models, which are mostly based on historical data, are unlikely to accurately project risk because the climate now behaves differently. These models may end up hiding the true extent of the risk for both the insurers and the insured. As a result, the two parties' interests are consistently misaligned. And for insurers, changes in the climate—and therefore the market—will only increase their exposure. Consider the following:

— As the frequency and severity of tail events—formerly thought to be low probability—increase, so do changes to the balance sheet, including higher capital requirements for reinsurance consumption.

— Financial markets can rapidly reprice assets that are exposed to climate risk, affecting insurers' investment portfolios and their own market valuations negatively.

— Investors, regulators, and society will increase pressure on the industry to respond to climate risk as large portions of the economy and society continue to be affected.

— Some historically stable premium and profit pools will shrink, and possibly disappear, in places and industries that are exposed to climate risk while assets will become harder to insure.

— A lack of responsiveness can damage the industry's reputation and its credibility as a global economic citizen.

Ignoring these considerations will be untenable in the long term.

Florida flooding and insurance market failures

As sea levels rise from the warming effects of climate change, the 10 percent of Florida residents who live fewer than five feet above sea level today are at increased risk of damage from storm surges. The value of the 2.9 million homes at risk in 2020 is estimated at $581 billion.[1] In addition, by 2050, sea levels in parts of the state are expected to rise 2.5 feet from 2000.[2] This change in physical systems may cause tidal flooding in the state to increase from a few days in 2019 to more than 200 by 2050.[3]

Such changes could increase annual flood losses in Florida from $1.98 billion in 2019 to $2.94 billion in 2050. The corresponding premium increase, from $800 to $1,200 (in 2019 dollars), may render flood insurance unaffordable to many residents. For insurers, such a development would mean that large portions of their books of business could become unviable. And more frequent flooding could cause economic disruption that fans out into the web of systemic relationships beyond the area immediately affected by the flood. By acting as stewards of risk, customer advisers, and partners to the public and social sectors, insurers could help to mitigate such effects.

[1] "Fact file: Florida hurricane insurance," Insurance Information Institute, June 2020, iii.org.
[2] *Recommended projections of sea level rise in the Tampa Bay region*, Tampa Bay Climate Science Advisory Panel, updated April 2019, tbrpc.org.
[3] For more, see "Will mortgages and markets stay afloat in Florida?," April 27, 2020, McKinsey Global Institute, on McKinsey.com.

Revised business models help support customers

The insurance industry can create economic security by offering reliable protection. Insurers must therefore make climate risk a part of their management decisions. In particular, they should use their understanding of risk and climate science to mitigate the systemic effects of physical climate risk for themselves and their customers. Accomplishing these tasks involves five simultaneous actions.

Stress-test total exposure against projected climate hazards

Interconnected global systems mean that the concentration of risk will likely increase as climate-related losses spread across different types of coverage—flood, property damage, and business interruption. Aggregation risk—the risk of multiple claims filed in connection to a single event—will also extend beyond geographic bounds as climate change elevates the risk of systemic disruption. For instance, an increase in average global temperatures increases the probability of floods and wildfires—regardless of location.

Moreover, insurers' current models may not account for the growing number, types, and interconnectivity of risk—particularly in locations that have low penetration of property insurance, such as countries with developing economies. Preliminary findings from the Bank of England suggest that the industry is failing to capture the full spectrum of potential losses, such as a flood after a hurricane, and that it uses low-quality data.[5]

To understand their risk exposure to climate change, insurers may consider adopting climate-specific stress-testing, beyond traditional catastrophe models, to understand the impact of climate-related risk on their portfolios. Insurers can accomplish this task by using advanced-analytics techniques to project how various acute and chronic hazards are likely to affect them over time. Insurers should combine detailed climate data, down to the risk of a flood or fire for a single address, with an analysis of the macroeconomic implications of climate change to inform pricing and portfolio adjustments.

Build resilience and rebalance portfolios

With such a detailed analysis, insurers can build greater resilience by considering low-probability catastrophic events, diversifying their portfolio, and planning to evolve exposure over time. Risk models that assume nonstationary risk and de-emphasize historical data will be especially valuable.

As "traders of climate risk," insurance companies fare better in understanding and measuring the impact of climate risk on their financial resilience when compared with other sectors. However, the industry's current loss estimates are incomplete because of insufficient consideration of secondary perils.[6] In the broader financial services industry, many institutions, from banks to asset managers, that have historically been less exposed—and therefore less-sophisticated assessors of climate risk—have begun to incorporate climate risk into their considerations of investment allocations, credit risk, and financial resilience.

Help organizations mitigate climate risk

Insurers have long helped customers mitigate risk. They should now also focus on mitigating and even preventing physical climate risk. This commitment requires shifting business models away from transactional risk transfers and indemnity payments and toward scaling existing incentives—such as rebates for using resilient construction materials—toward direct partnerships with end customers. These relationships should focus on risk engineering (managing and avoiding risk) and risk mitigation. A major part of this shift will be focused on preventing customers from incurring damage

[5] *Discussion paper: The 2021 biennial exploratory scenario on the financial risks from climate change*, Financial Policy Committee and Prudential Regulation Committee, Bank of England, December 2019, bankofengland.co.uk.

[6] Charlotte Gerken and Anna Sweeney, "Letter sent to participating firms: Insurance stress test 2019 and COVID-19 stress testing: Feedback for general and life insurers," Prudential Regulation Authority, Bank of England, June 17, 2020, bankofengland.co.uk.

and having to make claims. For example, one North American insurer gives its homeowners insurance customers access to wildfire-defense services to help them with prevention and mitigation measures. Services include relocating valuables and deploying certified fire professionals to homes if a wildfire is approaching. Adjusting premiums to individual behaviors may also become more common.

Similarly, insurers could work with the public sector to improve building standards and policies; an analysis of risk models may suggest limits to building in flood-prone areas, for example. Insurers will need to collaborate with governments to provide affordable coverage and adapt to evolving risks—as some insurers, particularly in the United Kingdom, have begun to do (for more on the social role insurance could play, see sidebar "Contributing to the public conversation on climate risk").

Create innovative products to address climate-related risk

Insurers have an opportunity to offer innovative solutions to cover newer and more frequent hazards, both acute (such as wildfires) and chronic (such as reduced crop yields). Solutions could be as straightforward as parametric pricing—insuring policy holders against events of a set magnitude instead of insuring the value of losses. Whatever the details of the solutions, long-standing actuarial approaches to risk modeling will need to evolve as climate risk changes.

To identify new exposures and market opportunities, insurers need to understand the consequences and knock-on effects of specific climate hazards within the context of different sectors and geographic areas. As adviser-partners, insurers might deploy new solutions to protect customers from such events. Insurers should also explore ways to better protect businesses from the effects of systemic catastrophes, such as heat waves that reduce crop yield, kill livestock, or limit outdoor working hours.

In addition, insurers could play a role in matching risk-transfer solutions to alternative capital from investors with more risk appetite. For instance, the World Bank convened multiple investors, including a hedge fund and a reinsurance company, to insure a Uruguayan electric-power company

Contributing to the public conversation on climate risk

The insurance industry can fulfill its purpose of creating stability and safety for customers in crisis by serving as climate-risk experts in the private sector and partners in the public sector.[1] A number of large insurers and reinsurance groups are already participating in the discussion of a global climate agenda. This work involves raising customers' awareness of the consequences of climate risk and working with governments and banks to mitigate risk for the most vulnerable populations.

In particular, insurers can offer insights about ways to influence behavior that can help people and systems adapt. For instance, updating building codes could help lower carbon emissions, and enacting incentives for building in low-risk areas could help lower the value at risk from catastrophes.

Within the industry, leading insurers can help set the tone by publicly responding to climate change by changing the way they work. Within the highly concentrated reinsurance industry, leadership from the largest companies can be especially effective.

[1] For more on the mission of the insurance industry during times of crisis, see Stephan Binder, Brad Mendelson, and Kurt Strovink, "Reimagine insurance: Five keys to innovation," September 10, 2020, McKinsey.com.

against drought (which would cripple hydroelectric production) and high oil prices (which would make power generation costly).[7] Similarly, some industry stakeholders have explored ways to provide catastrophe-specific coverage without geographic limitation, such as global wildfire coverage.

Revise investment strategies

Insurers should reevaluate their investment-allocation strategies as the economy transitions toward long-term decarbonization, which may cause rapid asset repricing and portfolio volatility, particularly for carbon-intensive investments. Insurers should also systematically evaluate the combined exposure of their investment and underwriting portfolios to physical climate risk, especially where both assets and liabilities could be affected. For instance, the oil and gas industry is exposed to both transitional risk and physical risk. Less-liquid asset classes that were appealing in an environment of sustained low-interest rates, such as real estate, are also exposed to climate risk. Reviewing investment- and underwriting-portfolio exposure simultaneously is currently uncommon for the industry, but it will be increasingly important as climate risk increases.

Insurers should also consider the environmental impact of their investments, just as banks and asset managers are doing, and follow a plan to shift significant portions of their portfolios toward supporting a sustainable, decarbonized economy. In addition to long-term benefits, this shift will help insurers demonstrate their proactive compliance, as regulators may enact policies and incentives that can affect the investments financial-services companies make toward their environmental, social, and governance (ESG) footprint.

The P&C insurance industry should change its business model in response to climate risk. Not only can this proactive response better protect customers in the long term, but it can also help safeguard the interests of society and serve the foundational purpose of the insurance industry. But insurers must act quickly—the window for an effective response is limited.

[7] "Uruguay buys insurance against lack of rain and high oil prices," Results Brief, World Bank, January 10, 2018, worldbank.org.

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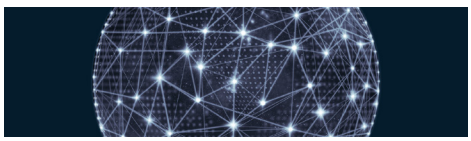

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