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GOVERNING INSURANCE FOR FINANCIAL STABILITY AND ENVIRONMENTAL SUSTAINABILITY

Jérôme Crugnola-Humbert

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AUTHOR

Jérôme CRUGNOLA-HUMBERT is an actuary and expert in sustainability for the insurance sector. He is a former sustainable finance policy officer with the European Insurance and Occupational Pensions Authority (EIOPA) and was previously a director for sustainability services with Deloitte, a global audit and consulting firm. He currently works as an independent advisor and chairs the sustainability and climate-related risk committee at the Actuarial Association of Europe.

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INTRODUCTION

We are in the middle of a global crisis of climate change and nature loss. The rapid warming of the planet due to man-made greenhouse gas emissions since the beginning of the Industrial Revolution has created major physical and transition risks. Sea-level elevation, heat waves, and the intensification of windstorms, floods and wildfires are threatening people, economies, as well as global trade and supply chains. The social, technological, political and regulatory uncertainties associated with the transition to a low-carbon economy are also adding to the risks for individuals, corporations and the financial system. This climate crisis is part of a broader trend of nature destruction and biodiversity loss, linked to increased resource extraction, deforestation and land conversion, as well as the pollution and depletion of soils, freshwater and oceans. Critical ecosystem services upon which our economy and survival ultimately rest are being endangered like never before in modern history.

Climate, nature and the financial sector are linked through indirect transmission channels which are critical for policy and regulation. The direct climate and nature footprint of banks, insurers, pension funds, asset managers and other financial actors through their own operations is modest compared to industrial corporations. However, their real impact is indirect and through their financial activities. The financial system constitutes the lifeblood of the real economy: without financing, lending and insurance, economic activities would face higher costs and, in many cases, grind to a halt. Conversely, climate- and nature-related physical and transition risks can quickly translate into losses for the financial sector as insurance claims increase, investments become stranded assets, and loans cannot be repaid.

This policy brief focuses on the role of the insurance sector. Despite its links to climate and nature risks (for instance, through insurance against natural catastrophes), the insurance sector has so far received insufficient attention from most policymakers, regulators and supervisors. Against this background, we will examine the dual systemic roles of insurers:

- First, as risk underwriters and claims managers who help individuals, corporations and the economy absorb fluctuations and diversify risks that could not be borne in full by individual economic actors.
- Second, as major long-term institutional investors.

The analysis highlights the climate- and nature-related risk transmission channels between these two aspects of insurers' activities and between insurers and the rest of the financial system to identify key challenges and formulate concrete policy proposals.

The report examines how insurers and their regulators should address risks linked to climate and nature. While climate is a subset of broader nature-related issues and one of the planetary boundaries, it has acquired, in recent decades, a specific focus. Methodologies and data are more widely available for climate than for biodiversity loss, for example. Therefore, climate-related examples feature prominently, but not exclusively, in the analysis. We also distinguish between climate mitigation, i.e., the reduction of greenhouse gas emissions to prevent further climate change, and climate adaptation, i.e., society's physical, economic and financial resilience to climate warming. While insurers have a role to play in climate mitigation (for instance through insuring and financing renewable energy), they also

have a key part to play in climate adaptation[1]. Of course, insurance also has an important social component (such as complementing social security systems), but the report only addresses social topics in the specific context of their relation to climate and nature issues.

The policymakers, regulators and supervisors who oversee the insurance sector must set requirements and incentives for insurers to mitigate and mutualize climate and nature risks better across economic actors and the financial system. Policymakers, regulators and supervisors should give due consideration to the potential negative impacts on climate, nature and financial stability from insurers' underwriting and investment activities. To that end, traditional supervisory objectives, such as protecting insurance policyholders and ensuring that insurance markets function correctly, require a more holistic, long-term and forward-looking view of climate- and nature-related risks. With this in mind, our key policy recommendations focus on enhancing financial stability and environmental sustainability by increasing macroprudential oversight for insurance, integrating transition plans into prudential supervision, adapting insurers' capital requirements to evolving climate and nature risks, supporting society's resilience against natural disasters, reducing the climate insurance protection gap, and ensuring the availability of insurance for transition technologies.

The scope of the policy brief is global, and examples from various parts of the world are analyzed. Several jurisdictions feature recurringly, either because they have a more advanced regulatory approach (such as the European Union) or because they are at the forefront of climate-related insurance market disruptions (such as the US states of California and Florida). Beyond insurers and their direct regulators and supervisors, we also explain how other stakeholders (from policymakers to tax authorities, insurance associations or non-governmental organizations) have an important role to play in addressing climate- and nature-related risks.

The report is structured as follows:

- In the first section, we provide a general **overview of the insurance sector**, its role within the financial system, and its relation to the broader economy.
- In the second section, we highlight the **links between insurance, climate and nature** and the corresponding risk transmission channels.
- In the third section, we analyze the **challenges for policymakers, regulators and supervisors** to ensure that the insurance sector adequately addresses climate- and nature-related risks for itself, for the financial system and for the economy as whole.
- In the fourth section, we formulate the **main policy recommendations** derived from this analysis, and we mention the key stakeholders for their implementation.

[1] See The climate insurance protection gap (European Central Bank, 2024)

OVERVIEW OF THE INSURANCE SECTOR

Business activities and systemic roles of insurance companies

Insurance companies have two main business activities and a double systemic role: as insurers and as investors. Some insurers may also provide ancillary services such as asset management for third parties (i.e. non-insurance clients), banking services, risk advisory and prevention services, and dedicated technological, legal or financial planning support. Of course, an insurance company is also a corporation with its own operations, notably encompassing the buildings, vehicles and equipment it uses, the people it employs, and the energy, resources and products it purchases. However, these direct operations only account for a small fraction of their risks and their role in the economy and in the financial system. Like other financial institutions, their largest material impacts, risks and opportunities originate from their financial activities.

Insurers fulfill their primary economic function as risk underwriters and claim managers. *Ex ante*, insurers underwrite, mutualize and diversify risks for their clients prior to the potential occurrence of an insured event. *Ex-post*, they manage and settle insurance claims after the occurrence of such an event. Through these risk underwriting and claims management activities, they pool together, diversify and assume the risks that economic actors could not or would not carry by themselves. By doing so, they provide a key financial instrument for individuals and corporations to smooth and manage their risks. In many instances, insurance is either an explicit legal requirement or a *de facto* precondition for businesses to operate and for individuals to participate in economic activities (e.g. property insurance for home ownership, credit insurance, health insurance, freight shipping insurance, or third-party liability, depending on the jurisdiction considered). Because they have a vested financial interest in risks not materializing, insurers are also often involved in prevention, whereby risk advisory services can be added to the financial aspects of the insurance contract. The German insurance group Allianz estimated that the annual gross written premiums for the global insurance industry amounted to USD 6.7 trillion in 2023[2].

Insurers are also major institutional investors. They manage assets for their own account (as asset owners) and, in some cases, for their clients (as asset managers). These assets originate primarily from the premiums paid by insurance clients, which are invested to pay for future claims. This close relationship between the premiums invested (assets) and the insurance payouts (liabilities) underscores the centrality of Asset-Liability Management (ALM) for insurers. Insurers are generally long-term investors, in particular through their life insurance activities (such as whole-life insurance, annuities, and pensions-like insurance products that can take the form of insurance contracts in many countries). Insurers typically hold large amounts of government bonds, corporate bonds, equities, real estate, infrastructure, as well as strategic equity participations and other illiquid assets due to a mix of ALM, capital, and political considerations. The International Association of Insurance Supervisors (IAIS) estimated in its data collection (which covers more than 90% of the global insurance market) that the sector collectively held more than USD 40 trillion of assets at the end of 2022[3].

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[2] Allianz Global Insurance Report (Allianz, 2024)
[3] Global Insurance Market Report (GIMAR) (IAIS, 2023)

Main types of insurance products

Insurance is traditionally divided between Life & Health (L&H) insurance and Property & Casualty (P&C) insurance. The latter is sometimes also referred to as non-life[4]. A given insurance company may be active in all or only some of these segments, and some insurers may be 'monoline' life, health or property insurers.

- Life & Health (L&H) insurance includes protection contracts (i.e., without an investment component) based on biometric risks (mortality, morbidity, disability and longevity). It can also include savings contracts, whereby the insurance contract is primarily an investment vehicle onto which secondary life protection insurance guarantees are attached. In some markets, life insurance is primarily geared towards such savings contracts (for instance, due to tax advantages granted by governments to encourage people to use a long-term insurance investment vehicle for financial planning purposes). The sub-category of savings contracts where the client retains the direct choice and ownership of the underlying investments is called unit-linked insurance.
- Property & Casualty (P&C) insurance notably includes motor, home, commercial, travel, marine, aviation, cybersecurity and crop insurance, as well as third-party liability. Insurance against natural catastrophes is a subset of P&C insurance. Most P&C insurance contracts are short-term (one year) and can be renewed, repriced or terminated annually. This is an important risk management instrument for the insurance company, and it is theoretically balanced by consumer protection considerations as the insurance client is also free to cancel its contract each year.

The role of the reinsurance system

Insurance is founded on mutualization, i.e., the pooling and diversification of independent but similar risks. Conceptually, it rests upon the application of mathematical probabilistic instruments such as the Law of Large Numbers. The fact that the individual risks insured are (mostly) independent is a key assumption. For instance, the insurer expects that a limited and predictable number of insured properties will be damaged during the same year. Therefore, direct insurance companies may be financially unable to face extreme events where damages across insured assets become heavily correlated.

Insurers reinsure their portfolio with specialized reinsurance companies. Reinsurers are able to assume extreme risks because they can diversify them globally. It is unlikely, for instance, that major earthquakes strike Japan and California in the same year. Large direct insurers (and some industrial corporations) may also use internal reinsurance to manage risks within their group, but the reinsurance system retains a key role in providing reinsurance to direct insurers across the world, with risks usually split across several reinsurers. Without reinsurance, many large-scale adverse events would be uninsurable since direct insurers cannot hold enough reserves and capital for such unlikely and expensive catastrophes. This is notably the case for natural and weather catastrophes, such as floods, hurricanes and windstorms.

[4] Please note that some alternative classifications separate health insurance from life insurance and consider it either as part of P&C insurance, or as a stand-alone third category

The reinsurance system is mostly private and decentralized. Although some parallels can be drawn between reinsurance and central banking (whereby banks refinance themselves with central banks, and insurers reinsure themselves with reinsurers), the analogy has limits due to the mostly private nature of the reinsurance system[5]. The reinsurance market is loosely structured in several tiers, with the first tier comprising, in recent years, three large reinsurers (Munich Re, Swiss Re and Hannover Re). It is also organized around key regional hubs such as Bermuda, Switzerland and the London market (Lloyd's). Despite the specific systemic role of the reinsurance market and the *de facto* importance of several host jurisdictions (such as the EU, Switzerland, Bermuda or the UK), reinsurers are mostly regulated and supervised in the same way as direct insurers. In practice, their credit rating plays a pivotal role in signaling their financial strength to their insurance clients (the *cedants*) and to the brokers who intermediate between insurers and reinsurers.

Reinsurers only have an indirect link to the risks they ultimately insure. They are at least twice removed from these risks (and potentially more times if brokers are involved in the transactions), since direct insurers stand between them and the insured lives and assets. It is also important to note that for the main form of reinsurance, known as *treaty* reinsurance, reinsurers generally agree to reinsure a whole insurance portfolio and have only limited knowledge and aggregated data about the individual risks within this portfolio. This is less true for *facultative* reinsurance, where reinsurers examine specific risks before accepting them. This has important implications not only in terms of financial risk management but also in terms of corporate responsibility since it raises the question as to whether reinsurers' value chain stops with the ceding insurance company or if it extends to the ultimate assets and lives insured.

A fragmented regulatory and supervisory landscape

The regulatory and supervisory landscape for insurance is fragmented. While some countries have a single supervisor for all insurers, other jurisdictions may involve a constellation of governmental agencies to regulate or supervise different types of insurance. In Switzerland for instance, the Financial Market Supervisory Authority (FINMA) supervises banks, insurance companies, stock exchanges, securities dealers, and other financial intermediaries. However, mandatory health insurance is supervised by the Federal Office of Public Health. Swiss pension funds may take the legal form of autonomous pension funds (in which case they are supervised by regional authorities, themselves overseen by a national commission) or of life insurance contracts (in which case they are supervised by FINMA).

The mandate of insurance supervisors is generally focused on customer protection and financial stability. At the global level, local insurance supervisors come together within the International Association of Insurance Supervisors (IAIS). Like their sister institution, the Basel Committee on Banking Supervision (BCBS), the IAIS is hosted by the Bank for International Settlements. The IAIS formulates supervisory standards, guidelines and best practices with the expectation that national authorities will implement them through their own systems. According to the IAIS mission statement, insurance supervision's core objectives are to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to the stability of the financial system.

[5] There are also some state reinsurers, such as China Re or CCR in France

Prudential regulation requires insurers to keep additional capital to ensure their solvency. This solvency capital comes on top of the adequate reserves they should maintain to cover expected future claims and liabilities. At the moment, there is no insurance equivalent to the Basel III international capital framework for banking[6]. Instead, various local standards for solvency requirements impose capital charges for underwriting risk (for insurance liabilities), market risk and credit risk (for investments and other assets such as reinsurance arrangements), and operational risk. They are calibrated to ensure that insurers can withstand severe adverse scenarios with a high degree of confidence, typically a 99.5% probability (1-in-200-year event), over a one-year period. Capital requirements constitute the first pillar of solvency capital frameworks and are supplemented by adequate risk management systems (second pillar) and public disclosures (third pillar)[7].

Insurance supervisors conduct stress-testing exercises to identify potential systemic risks, but there are no globally standardized macroprudential capital buffers. However, some jurisdictions have introduced elements in their local solvency frameworks that implicitly serve similar purposes (such as the Volatility Adjustment in the European Union's Solvency II framework). There is also no insurance equivalent to the list of globally systemically important banks (G-SIBs[8]). A similar list of systemically important insurers (G-SIIs[9]) had been identified following the 2007-2008 financial crisis, but the process was primarily focused on the role of insurers as investors. G-SIIs identification was suspended in 2020 and officially abandoned in 2022[10].

The United States is the world's largest insurance market (due both to the size of its economy and to a large private health insurance market) and is characterized by a complex system of state-based regulation. In practice, the primary responsibility for insurance regulation in the U.S. lies with individual states, where each state has its own regulatory body as well as its own insurance laws and regulations, which can lead to significant inconsistencies across state lines. At the national level, the National Association of Insurance Commissioners (NAIC) promotes some uniformity as a standard-setting organization for state insurance regulators. The Federal Insurance Office (FIO) also monitors the US insurance industry, but it plays only a minor role in state insurance regulation.

In contrast, the European Union has adopted some common standards for insurance regulation and supervision across its member countries. This notably includes the Solvency II Directive, which provides a European framework for insurance capital requirements. The European Insurance and Occupational Pensions Authority (EIOPA) is based in Germany together with the European Central Bank (ECB), but unlike the ECB for banks, it has no direct supervisory powers over individual insurance companies. EIOPA's role is limited to developing technical standards and guidelines for insurance regulation. Some significant European insurance markets also remain outside the EU framework (such as Switzerland) or have left it (such as the United Kingdom following Brexit).

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[6] At the time of writing, the IAIS is working on the development of International Capital Standards (ICS) for internationally active insurers to enhance global convergence among local capital standards

[7] More generally, prudential regulations for insurers also include rules for setting premiums and for admissible investments, which vary by jurisdiction

[8] List of Global Systemically Important Banks (G-SIBs) (FSB, 2023)

[9] Global Systemically Important Insurers (Guiné C., 2014)

[10] Global Systemically Important Insurers (G-SII) (IAIS)

Concerns over affordability and insurability rather than liquidity

Insurance companies are relatively less exposed to liquidity risk than banks. Banks are exposed to short-term liquidity risk linked to potential deposit outflows or funding market disruptions. In comparison, insurance companies have more predictable and more illiquid liabilities. However, while there is no direct equivalent of a bank run for insurers, liquidity risk still exists in insurance and may take specific forms, such as:

- P&C insurers might experience a liquidity shortage due to catastrophic events requiring significant immediate payouts. This may lead to the fire sale of illiquid assets and can be compounded by operational issues linked to difficulties in processing a high number of simultaneous insurance claims[11]. Such liquidity risk can be mitigated using reinsurance though, and in practice it is also slowed down by case-by-case examination of insurance claims before payouts are made.
- L&H insurers may be exposed to liquidity risk through their portfolio of life insurance savings products, as happened in the 1990s in Japan. Due to the bursting of the asset bubble and falling interest rates, Japanese life insurers with inadequate asset-liability management could not cover any more the high guaranteed returns promised during the previous period of economic boom. This led to a gradual loss of confidence in insurers' solvency and an increase in policy surrenders (mass lapse). As a result, seven Japanese life insurance companies went bankrupt between 1997 and 2001[12].

There are, however, growing concerns for the insurance sector around affordability and insurability. As explained earlier, insurers assume and manage risks for individuals and companies. If insurance premiums soar or if insurance becomes unavailable, this imposes additional costs on economic actors. Some activities may even stop due to a perception that the associated financial risks are not manageable. Reduced insurance coverage can lead to higher recovery costs in the aftermath of disasters, higher public spending to fill the gap, widening socio-economic inequalities, reduced credit availability, and increased systemic risk overall. Such problems are currently being observed for specific risks, like health insurance in some countries, and for climate risks in a growing number of geographies. Maintaining the availability and affordability of insurance is therefore crucial, not just for the long-term business perspectives of the insurance industry itself but also for the sake of socio-economic resilience and financial stability.

[11] L&H insurers may also be affected by large-scale events, such as the Covid-19 pandemic

[12] Fixing Japanese Life-Insurance Companies (Fukao M., 2024)

INSURANCE, CLIMATE AND NATURE

Climate and nature risks impact insurers' whole balance sheet

On the liability side of their balance sheet, insurers are experiencing increasing insurance claims linked to climate risks. Major acute perils linked to climate change include floods, storms, wildfires, droughts and heatwaves[13]. They are compounded by chronic changes in physical climate patterns (such as sea level rise, increasing temperatures and changes in precipitation) and by nature-related issues (such as environmental degradation and biodiversity loss, which reduce natural buffers against catastrophes and increase vulnerability to disasters). Swiss Re estimated that global economic losses that are insured reached USD 108 billion in 2023, above the previous 10-year average of USD 89 billion[14]. The same publication noted that the insurance loss burden from catastrophes has more than doubled relative to GDP over the last 30 years. While part of this increase is linked to an increase in exposures, in the value of assets insured, and to the inflation of claims over time, some of it is also linked to an intensification in climate physical risk itself[15]. In addition to physical risks, various transition risks can also affect insurers' liabilities. Changes in legislation can increase the amounts insurers have to indemnify, for instance, for environmental pollution liability contracts. Technological changes can potentially affect insurers' traditional business models, as with electric vehicles and motor insurance. Electric vehicles are often more expensive to repair than traditional internal combustion engine vehicles. Together with the rise of self-driving cars and ride-sharing schemes, the increase in electric vehicles is expected to create major changes for insurers' motor insurance portfolios. Reputation and litigation risk due to climate inaction can also directly impact the insurer itself[16].

On the asset side of the balance sheet, the investments of insurance companies are also exposed to the risk of depreciation. Transition risks linked to policy, legal, technological, market and social changes can potentially impact the insurer's investments and create stranded assets, whether it is for the shares of an oil and gas company, the debt of a chemical corporation, or a portfolio of energy-inefficient buildings. Such transition risks may play out over extended periods of time, but they may also happen suddenly if certain market tipping points are reached, leading to brutal asset repricing (in what can be described as a 'climate Minsky moment'[17]). In addition, physical risks can create direct losses to the insurer's physical investments, such as real estate and infrastructure. Physical risks can also affect the insurers' portfolio through indirect transmission channels such as supply chain disruptions or losses of productivity.

[13] CLIMATE RESILIENCE DIALOGUE Final report (European Commission, 2024), section 6.
[14] sigma 01/2024: Natural catastrophes in 2023 (Swiss Re Institute, 2024)
[15] The global costs of extreme weather that are attributable to climate change (Newman & Noy, 2023)
[16] See Climate Litigation and the Financial Sector (Bänziger & Crugnola-Humbert, 2024), section III.d.
[17] Climate Minsky moments and endogenous financial crises (Kaldorf & Rottner, 2024)

Insurance companies are, therefore, simultaneously exposed to risks from climate change and nature loss on both sides of their balance sheet. For climate- and nature-related risks, assets in the insurer's portfolio may depreciate (for instance, due to the transition to more sustainable business models) at the same time as liabilities increase (for instance, due to higher claims caused by climate warming). Such asymmetrical movements in assets and liabilities can create significant capital losses for insurance companies. This is different from traditional financial risk drivers, where a good matching of assets and liabilities (ALM) may protect the insurer's capital position from most market movements. For instance, if expected claims are backed by fixed-income assets, changes in interest rates will affect the discounted value of future asset and liability cash-flows in a similar manner. Such hedging strategies are much more difficult to find for systemic risks like climate change and nature loss.

Feedback loops from climate and nature risk in insurance

The underwriting and investment activities of insurance companies affect climate, nature and the stability of the financial system through risk feedback loops. Like other financial institutions, the transmission of climate- and nature-related risks to insurance companies materializes through classical risk categories such as market risk, credit risk, operational risk, liquidity risk, and reputation/litigation risk[18]. Insurers are also specifically impacted by insurance underwriting risk. Assessing and managing the transmission of these risks to an insurance company's balance sheet is critical for the micro-prudential supervision of individual insurers and for understanding their financially material risk drivers. However, climate and nature are not purely exogenous risks, and risk transmission does not only flow unilaterally from climate and nature to individual insurers. For instance, if insurance companies keep financing or insuring the development of new oil and gas fields, they are contributing to the further rise of physical climate risks and thereby compounding future losses for themselves and for their peers. If they financially support the production of environmentally dangerous herbicides and pesticides, they contribute to the decline of pollinator populations, which has a negative effect on crop yields and can in turn lead to farmers defaulting on their loans and to higher payouts for agricultural insurance (not to mention the wider economic and social risks for food prices and supply). Such risk feedback loops from insurers' external impacts are illustrated in Figure 1 below:

[18] Guide for Supervisors: Integrating climate-related and environmental risks into prudential supervision (NGFS, 2020), Section 1)

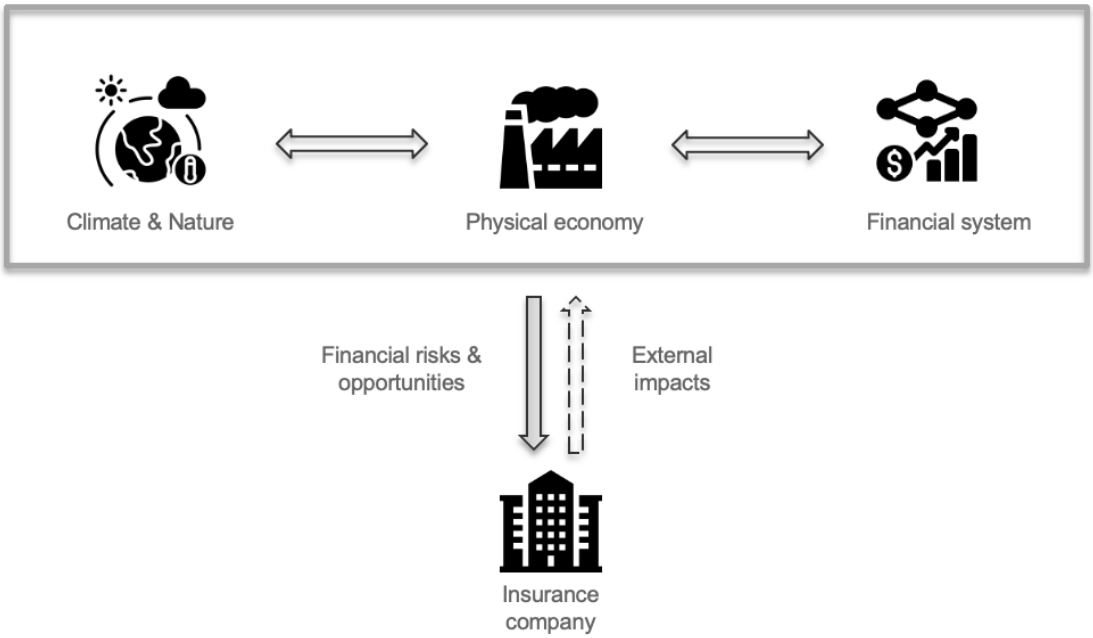

Figure 1. Source: author

Climate- and nature-related risk feedback loops for insurers occur at multiple levels:

- Within insurers' investment activities (since the negative external consequences of their asset-related choices can increase future investment risks)
- Within their insurance activities (since negative external consequences of insurance-related choices can increase future risks for the liability side of their balance sheet)
- Between their investment and insurance activities (negative external consequences of asset-related choices can increase future insurance risks, and *vice versa*)
- Between insurers and the rest of the financial system
- Between insurers and the real economy, climate and nature

P&C insurance often receives the most attention due to its direct links to climate and nature, for instance through property insurance against natural catastrophes. However, L&H insurance is not immune from climate- and nature-related risks, for instance through increased claims linked to the spread of vector-borne pathologies (such as ticks- and mosquito-borne diseases) due to climate warming and to the mass destruction of natural habitats. Life insurers also typically have a larger and more long-term investment portfolio than their P&C counterparts and, thus, a larger exposure to investment-related transition risks.

Negative external impacts from insurers' business activities reinforce financial risks both for the financial system and for the insurer itself. Therefore, a comprehensive risk management approach requires insurers to consider external impacts alongside traditional financial risks[19]. This is not limited to long-term and indirect effects. Climate and nature-related risks are already materializing today. In addition, there are immediate and direct risks for individual insurers through the specific channels of reputation and litigation risks. Losses can materialize quickly if an insurer is taken to court or sees its brand publicly damaged over the breach of environmental regulation or of its own climate and nature commitments (which can also happen involuntarily due to poor risk governance and oversight). More generally, insurance companies will be faced with increasing and harder-to-predict financial risks if they do not actively manage the external impacts of their business activities on climate and nature. At the same time, their customer base will be affected as a growing number of clients can no longer afford rising insurance premiums or are excluded by insurers due to the deterioration of the risks. Such external risk feedback loops can build up and play out at a systemic level over several years. They may also turn over time into a self-sustaining risk dynamic if certain physical tipping points are reached (such as the melting of ice caps, the dieback of rainforests or the thawing of the permafrost). In this case, the insurance industry will become increasingly unable to fulfill its core economic function of structuring and diversifying risks, as well as its key role in climate adaptation.

The main levers of insurers to address climate and nature risks

Insurance companies have many levers at their disposal to manage their impacts on climate and nature, and the corresponding financial risks. Thanks to their activities as investors, risk underwriters, claims managers, and risk managers, there are many ways through which insurers can act to prevent the further build-up of climate and nature risk into the financial system. These levers can be broadly sorted into three main categories[20]:

- What economic activities do insurers choose to financially support and thus enable through the provision of investment and insurance.
- How they provide this support, and under which terms and conditions they insure specific risks and settle claims.
- Additional ways to leverage their risk expertise, the financial resources at their disposal, and their influence on the economy and policymakers.

[19] This is referred to as 'double materiality' and is enshrined in law in some jurisdictions such as the European Union and Switzerland

[20] For more details, see also Underwriting our Planet: How Insurers Can Help Address the Twin Crises in Climate and Biodiversity (WWF/Deloitte, September 2023)

What insurers choose to insure and finance has an impact on the level of climate and nature risk which builds up within the financial system. The insurance industry is a key enabler of economic activities since the provision of insurance coverage and long-term investments is essential for economic development, innovation, and planning. Therefore, it does matter whether insurers provide risk coverage and financial support to renewable energy, regenerative agriculture and the circular economy or if they finance and insure fossil fuel development, deforestation and single-use plastics. In practice, most insurers insure and finance a wide range of activities, both harmful and beneficial for climate and nature. Inconsistencies can also be observed between insurers' policies related to the two sides of their balance sheet, as insurers' investment strategies are sometimes more ambitious than their underwriting strategies when it comes to sustainability risks. For instance, a given insurer may stop investing in fossil fuels but keep insuring fossil fuel facilities if they are not at high risk of immediate damage. Such an approach makes limited sense from a long-term risk perspective, as the further build-up of systemic climate- and nature-related risk will ultimately be harmful to the insurer itself.

Insurers can tailor their terms and conditions to incentivize the sound management of climate- and nature-related risks. As risk underwriters, insurance companies can include clauses and covenants in their products which aim to minimize environmental risks. For instance, the simple withdrawal of insurance for pollution liability may ultimately undermine the 'polluter pays' principle[21]. Instead, the insurer can keep extending insurance coverage to an industrial company but make it conditional to on-site risk inspections to ensure that appropriate environmental standards are met. The insurer can also raise the insurance policy's deductible to reduce moral hazard. More generally, insurers with sufficient in-house expertise can attach risk advisory services to their traditional product offering. This emphasis on risk mitigation and prevention aligns with the insurer's own interest in avoiding damages in the first place. The other area where insurers have influence is in their role in claims settlement after an insured event, where they can favor resilient reinstatement solutions. This includes approaches such as 'build-back-better', whereby the insurer goes beyond the traditional like-for-like indemnification process and ensures that damaged assets are restored to higher environmental standards to increase their future risk resilience. Build-back-better can be illustrated with the FEMA '50% rule' as part of the US National Flood Insurance Program. This rule mandates that if a home incurs damage for more than half its value, it must be brought up to current building codes and floodplain regulations, such as elevating properties close to water with stilts[22]. Resilient claims management also includes 'repair over replace' solutions, which minimize carbon emissions and the use of natural resources (for example, where a damaged car is repaired locally with used car parts).

Insurers can mobilize their expertise, financial resources, and influence to support society's collective risk management. The insurance industry (in particular the largest insurers and reinsurers) holds valuable data and research related to economic losses from natural disasters, which they should consider sharing more widely and more systematically with public authorities to support the management of environmental risk for the collective benefit of society and the economy, and not just for their own portfolio of clients. Insurers

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[21] ENVIRONMENTAL LIABILITY DIRECTIVE – FINANCIAL SECURITY AND THE POLLUTER PAYS PRINCIPLE (Actuarial Association of Europe, 2022)

[22] FEMA's 50% rule could make it more expensive for homeowners to rebuild after Hurricane Ian (WUWF, 2022)

can also put their significant financial resources to efficient use by directly investing in infrastructure and natural capital. Finally, insurers can leverage their collective influence on society, the economy and policymakers to campaign for measures that prevent the further buildup of climate and nature-related risks, such as better building and zoning codes based on up-to-date hazard maps for flooding or wildfire risks.

The Tragedy of the Horizon for insurance

The insurance sector needs to adopt a more long-term and systemic approach to managing climate and nature risks. Let us consider an example: the use of private fire departments funded by insurers and specifically tasked with preventing and extinguishing fires in insured properties. Such private fire brigades were common in the USA and in London in the 18th and 19th centuries. In recent years, some US insurers have resurrected the practice in affluent but wildfire-prone areas[23]. While funding private firefighting may initially seem cheaper than paying claims for destroyed insured properties, it has obvious limitations. Protecting only some properties may not effectively contain the overall spread of the fire in the area (including its spread back to insured properties), coordination between private and public firefighting brigades may be inefficient, and even if the practice were effective, the unequal access of homeowners to disaster relief may lead to a backlash against the insurance sector.

In the current regulatory context, insurers lack long-term incentives and thus focus on short-term risks and profitability. The one-year contractual horizon of most P&C insurance products (after which the contract can be repriced by the insurer or terminated by either party) or the one-year risk horizon of many insurance solvency frameworks (aiming to ensure that they have enough capital to survive an adverse event occurring over the next year) provide little incentives for long-term systemic risk management. For instance, the reinstatement of a flooded house to higher resilience standards (or, in more extreme cases, paying for the occupants to move to a less disaster-prone area) involves costs that will only be compensated by savings from lower future claims over several years. It will not necessarily make financial sense for the insurer from a one-year perspective (or for the insured if the extra cost is passed on to them through increased premiums). Thus, insurance companies often remain stuck in the 'Tragedy of the Horizon'[24].

Insurers typically react to growing climate and nature risks by increasing prices or withdrawing coverage. In practice, making changes in insurance products to manage environmental risks better usually means a direct dialogue with the insurer's clients. Short of engaging in these challenging and time-consuming client conversations to mitigate the buildup of risk over time, the default option for insurers is to increase the insurance premium or terminate the contract as losses and uncertainty continue to grow. Annual repricing or exclusions are being observed in many regions, such as the US states of California (for wildfires) and Florida (for hurricanes and flooding), where most insurers have either massively increased premiums or have withdrawn altogether[25]. Such behavior may make financial sense from the short-term point of view of a single insurer, but since all insurers essentially react alike, it contributes to fueling systemic issues of affordability and insurability, thereby endangering financial, economic and social stability. For instance,

[23] Private Fire Departments & Firefighting: A Growing Trend (Frontline Wildfire Defense)
[24] Breaking the tragedy of the horizon – climate change and financial stability (Mark Carney, 2015)
[25] Why California and Florida Have Become Almost Uninsurable (New York Times, 2023)

uninsurable homes experience a significant drop in value due to increased physical risk, higher costs of ownership, and a reduced pool of cash-only buyers (since most buyers rely on mortgages that require insurance)[26]. Even for insurers themselves, it is not a viable long-term strategy to simply keep pricing out or excluding more clients to preserve short-term profit margins.

Other climate and nature challenges for insurance companies

In a highly intermediated industry, insurance agents and brokers can make it challenging for insurers to implement proactive environmental policies. Insurance intermediaries are usually remunerated based on the volume of premiums for the insurance business they procure. If they simply aim to maximize this volume without proper consideration for the ultimate risks linked to climate change and nature loss, it goes against the vested long-term interest that the insurance industry (including, ultimately, agents and brokers themselves) has in risks remaining affordable and insurable in the future. By being positioned in the value chain between insurance companies and their clients, agents and brokers may also hinder the discussions between insurers and insured related to risk prevention, at least until they adopt a more proactive approach to climate and nature topics.

Insurers often lack comprehensive and reliable data to assess and manage the climate- and nature-related risks of the activities they insure. Data availability and collection is slowly improving for climate mitigation and carbon dioxide emissions, thanks to the existence of agreed standards (the Greenhouse Gas Protocol), a single reference metric (tons of CO2 equivalent), and to the growing number of countries which require large corporations to disclose their emissions. However, for biodiversity and nature in general, the lack of standardized methodologies, the multiplicity of potential metrics, and the absence of comprehensive data are obstacles for insurers. Such data challenges are further compounded when insurers are not in direct contact with the ultimate policyholders insured, which may notably be the case for brokered insurance business or for treaty reinsurance.

Individual insurers face a classic collective action problem and a lack of regulatory incentives to address it. Financial stability and insurability are public goods, but no single insurance company can solve the problem of increasing physical and transition risks by itself. If ambitious policies are pursued only by a select group of leading insurers, competitors less concerned with reputational issues or based in jurisdictions with weak environmental regulation may continue to support harmful activities and contribute to the further buildup of risk. Such 'free riders' might even increase their short-term profits, as they are able to charge higher premiums to customers facing a reduced supply of insurance. This is because a given economic activity may, at the same time, create negative long-term risk externalities and remain a profitable short-term financial opportunity for the insurer (such as, for instance, an operationally well-run coal power plant insured for property damage). A voluntary increase in due diligence efforts or in demands made on policyholders might thus appear futile and a bad short-term financial calculation for an individual insurer faced with non-cooperative competitors. Absent a proactive and even regulatory playing field, such efforts may be reduced to the bare minimum necessary to manage immediate compliance, reputation and litigation risks.

[26] The 9th National Risk Assessment: The Insurance Issue (First Street, 2023)

CHALLENGES FOR POLICYMAKERS, REGULATORS AND INSURANCE SUPERVISORS

Tackling the climate insurance protection gap

The increase in climate risk leads to a growing climate insurance protection gap. As underwriters and risk managers, the insurance sector has a key role to play in supporting climate adaptation and society's resilience against natural disasters. However, as the physical risks linked to climate change continue to grow rapidly, insurance is becoming more expensive and, in some cases, even unavailable. For instance, EIOPA has estimated that only around a quarter of the economic losses caused by extreme weather and climate-related events are insured in Europe (hence a 75% protection gap), with large disparities across European countries [27]. The reasons behind this protection gap include the growing unaffordability of insurance premiums against natural disasters and the unavailability of insurance where insurers or reinsurers decide to exit specific risks or regions if they deem that the risks have become uninsurable. This is what has notably been happening in recent years in the US state of California for wildfires [28] and Florida for hurricanes [29]. Overall, insurance against natural disasters is expected to become significantly more expensive and the corresponding insurance protection gap is expected to increase in most regions because of climate change and nature loss.

The climate insurance protection gap has far-reaching financial, economic and fiscal consequences. Uninsured natural disasters can cause economic damage with a direct and indirect impact on GDP over prolonged periods of time due to a lack of available funds to enable full reconstruction and fast economic recovery. This may be further compounded by supply chain disruptions[30] such as the prolonged 2023 drought affecting the Panama Canal and hindering its role as a major global trade route. Such adverse developments negatively impact government finances and debt due to a higher disaster relief burden, lower tax revenues, or direct physical damage to public assets, and may lead to second-order fiscal shocks. Extreme climate events can also fuel systemic risk for the financial system, notably through reduced collateral values and loan repricing for financial institutions with a concentrated exposure in high-risk areas [31]. As a result of increasing physical risks, unaffordability and uninsurability, many homeowners may be simultaneously faced with economically unsustainable properties that they can only sell at a large discount, thereby triggering a region-wide real estate devaluation.

[27] DASHBOARD ON INSURANCE PROTECTION GAP FOR NATURAL CATASTROPHES (EIOPA, 2023)
[28] California insurance market rattled by withdrawal of major companies (Associated Press, 2023)
[29] The Home-Insurance Crisis That Won't End After Hurricane Season (The New Yorker, 2024)
[30] Global supply chains amplify economic costs of future extreme heat risk (Sun & al., Nature, 2024)
[31] Policy options to reduce the climate insurance protection gap (ECB/EIOPA, 2023), section 1

Public intervention can support failing insurance markets through hazard prevention, public-private risk sharing or subsidization. This may take the form of Public-Private Partnerships (PPPs), mandatory insurance, and other regulatory or fiscal measures. Mandatory insurance against natural disasters would close the protection gap by eliminating both risk selection from insurers and anti-selection from policyholders, but it might also lead to insurers withdrawing from certain jurisdictions (as has happened in California for wildfire insurance when insurers were not allowed to reprice contracts in line with future expected risks[32]). Success stories for mandatory insurance against natural disasters (such as in France) typically also involve the setting up of PPPs or similar risk pooling mechanisms. Many different sorts of PPPs are already in place across the world, with notable variations around:

- the type of peril(s) covered
- their geographical scope
- their funding mechanisms (e.g., by collecting premiums or through taxes)
- the risk-sharing arrangements between public and private actors
- their legal structure.

PPPs have many potential advantages, such as the pooling of expertise and data, the link to public prevention measures, and improved access to financing and reinsurance. Successful and economically viable insurance PPPs generally require concertation and buy-in not only from governments and insurers but also from wider groups of stakeholders such as consumers, financial supervisors, taxpayers, local governments, and risk experts[33].

Multi-year insurance against natural disasters may also be part of the solution. Currently, most P&C insurance products (such as property insurance) are annual contracts. This one-year horizon originally reflected a balance of the rights of each party to the contract:

- The insurance company is free to reassess the risks every year and adapt their coverage in line with their risk and profitability objectives.
- The individual customer is free to move to another insurer if they can find lower premiums or more favorable conditions.

However, this symmetry breaks down when most insurers react in the same way by increasing prices or withdrawing coverage. Customers thus become unable to find affordable insurance coverage, or sometimes any insurance at all, as is happening for instance, in some areas in Australia[34]. Insurance companies argue that guaranteed coverage for multiple years in the context of growing risks would force them to keep exorbitant amounts of capital, making them unattractive to investors and customers alike[35]. However, multi-year P&C insurance contracts, while less common than annual policies, already exist in certain markets and for specific types of coverage, such as fire insurance in Japan. The broader provision of long-term insurance against natural disasters could be supported through a mix of system-wide risk prevention measures (to ensure that future risks remain manageable) and policy or regulatory incentives (to address the costs of additional capital).

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[32] California's Sustainable Insurance Strategy (California Department of Insurance, 2023)
[33] See also CLIMATE RESILIENCE DIALOGUE Final report (European Commission, 2024), section 4.1.
[34] How climate change is causing an insurance crisis in Australia (World Economic Forum, 2022)
[35] Multi-year contracts to improve risk management culture (Geneva Association, 2013)

Integrating climate and nature into prudential capital frameworks

Insurance regulators and supervisors have started to investigate the potential inclusion of environmental risks into capital requirements. In principle, there are two main approaches to incorporating these risks into prudential frameworks, which are not mutually exclusive and may be applied in conjunction:

- through lower capital requirements for insurance companies whose investment and underwriting activities reduce their exposures to climate and nature risk and/or contribute to related mitigation or adaptation measures, thus decreasing the risk for themselves and the financial system
- or through higher capital requirements for insurance companies whose activities expose them to higher climate and nature risks and/or contribute to further build-up of these risks.

The integration of climate and nature into prudential frameworks is still lagging. Some jurisdictions have introduced climate stress testing for financial institutions (notably the European Union, the Netherlands, the UK, France, Canada, or Australia), but so far, it has not been linked to capital requirements. In parallel to supervisory stress testing, several countries are also issuing climate risk guidance requiring insurers to consider climate risk scenario analysis in their Enterprise Risk Management (ERM) frameworks. Such requirements may be expressed either directly in prudential frameworks or indirectly through the adoption of mandatory climate reporting standards, which themselves include climate scenario analysis, such as the principles of the Taskforce for Climate-related Financial Disclosures (TCFD)[36]. However, direct changes in capital charges for insurers are still the exception. One example involves the European Union and its Solvency II framework, where there is a planned update of the capital charges for natural catastrophe insurance risk[37]. EIOPA has also recommended in 2024 to increase capital charges on insurers' fossil fuel investments due to heightened transition risks[38].

A macroprudential approach to climate and nature risk is missing in insurance prudential frameworks. Prudential frameworks for insurance predominantly adopt a micro-prudential perspective without explicit accounting for the potential build-up of systemic risk across insurers' investment and underwriting activities, across the insurance sector, and across the wider financial system. While the design and implementation of systemic capital buffers for climate risk requires careful consideration[39], the insurance sector is a prime candidate for this due to its multiple systemic roles. There is also no dedicated prudential treatment for globally systemically relevant insurance companies (G-SII). The latest G-SII list, which was published in 2016[40], made no specific consideration regarding climate and nature risks, and no reinsurer was included in the list[41]. In the context of increasing physical risks and an uncertain transition, the assumption that insurance and reinsurance are not systemic and that risks can always be diversified is worth re-examining.

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[36] Storming the capital: climate risk and prudential capital requirements (Crugnola-Humbert J., 2023)
[37] EIOPA consults on natural catastrophe risk reassessments in the standard formula (EIOPA, 2024)
[38] EIOPA recommends a dedicated prudential treatment for insurers' fossil fuel assets to cushion against transition risks, (EIOPA, 2024)
[39] Principles for addressing climate systemic risks with capital buffers (Ikeda S. & Monnin P., 2024)
[40] 2016 list of global systemically important insurers (G-SIIs) (FSB, 2016)
[41] See also 'Why (Re)Insurance is not Systemic' (Journal of Risk & Insurance, Kessler D., 2014)

The need for better transition plans for the insurance sector

Decarbonization commitments cascade down from the international to the national level and to individual companies. 194 countries (as well as the EU) have ratified the Paris Climate Accords signed in 2016, comprising around 98% of global greenhouse gas (GHG) emissions. At the time of writing, 147 countries have either proposed, pledged, adopted in policy objectives, or enshrined in law net-zero emission objectives, usually with a horizon of 2050[42]. Such net-zero commitments ultimately cascade down to companies (including insurers), which may be obligated to adopt a climate transition plan and outline a decarbonization pathway. This is notably the case in the European Union (under the Corporate Sustainability Reporting Directive and the Corporate Sustainability Due Diligence Directive), Brazil, Japan, the United Kingdom and Switzerland. Several standard setters are elaborating guidelines specifying what climate transition plans should include, such as the Transition Plan Taskforce (now integrated into the IFRS Foundation's International Sustainability Standards Board) or the Science-Based Target Initiative[43].

The insurance industry's voluntary coalition-building efforts to support the transition to a net-zero emissions economy have been derailed. A global coalition of large insurers and reinsurers convened by the United Nations Environment Programme Finance Initiative (UNEP FI) formed the Net Zero Insurance Alliance (NZIA) in 2021. The NZIA was a sister institution to the Net-Zero Banking Alliance, the Net Zero Asset Managers initiative and the Net-Zero Asset Owner Alliance (the latter two also comprise insurance companies among their members). The NZIA published its methodology and target-setting standard in January 2023[44], which included objectives relative to emissions reduction, customer engagement and to insuring the transition. However, the Alliance disbanded a few months later due to threats of antitrust legal action from a coalition of US Republican states[45]. Although they were not tested in court, these threats prompted the NZIA members with significant exposure to the US market to leave the alliance[46]. In parallel, several jurisdictions, such as the EU and the UK, have started adapting their competition laws to facilitate climate-related coalition-building efforts.

A lack of standard methodologies for emissions measurement hinders the rollout of decarbonization plans for insurers' underwriting and claims management activities. Climate transition plans for the insurance sector need to encompass not only the insurer's own operations but also their financed emissions, insured emissions, and the emissions associated with claims management activities. The Partnership for Carbon Accounting Financials (PCAF), a Dutch-based industry-led partnership to facilitate transparency and accountability of the financial industry to the Paris Agreement, has published a comprehensive standard for financed emissions. However, the first version of the corresponding PCAF standard for insurance-associated emissions[47] considered only motor and commercial insurance. There is currently no standard for the emissions associated with

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[42] With a few exceptions such as Germany (earlier, 2045), China and Russia (later, 2060) and India (2070)
[43] FINANCIAL INSTITUTIONS NET-ZERO STANDARD Consultation Draft V0.1 (SBTi, 2024)
[44] NZIA Target-Setting Protocol Version 1.0 (NZIA, 2023)
[45] Open letter to the NZIA (Office of the Utah Attorney General & al., 2023)
[46] UNEP FI re-launched a Forum for Insurance Transition in 2024 with a broader stakeholder group, but so far without most of the large insurers and reinsurers who had left the NZIA.
[47] Insurance-Associated Emissions / GLOBAL GHG ACCOUNTING & REPORTING Standard / PART C (PCAF, 2022)

property or health insurance, for instance[48]. The emissions linked to insurers' claims management (such as repairing and replacing damaged assets) are also not covered by the standard.

Credible climate transition plans for the insurance sector require a holistic approach to climate-related impacts, risks and opportunities[49]. This notably includes:

- The necessity for insurers to adopt not just long-term net-zero commitments but also to set interim targets, to start implementing concrete measures to decarbonize their portfolios and to support the transition, and to proactively collect the data necessary to track their financed and insurance-associated emissions.
- The need for consistency within insurance companies' transition plans between the objectives and measures related to their investments and those related to their insurance activities. Although progress can be observed[50], there often remain discrepancies between what insurers finance and what they underwrite.
- The incorporation of a long-term and forward-looking approach to climate-related impacts, risks and opportunities in insurers' transition plans. Actuarial pricing is generally based on statistical models, which means that the insurance industry may be slow to insure new technologies needed in the climate transition.
- The inclusion of insurance intermediaries in the scope of mandatory transition plans. Absent an active role from insurance brokers in the decarbonization of the business they procure, insurers and reinsurers will be limited in their engagement with their clients and data collection.
- The tension between the imperative for insurers to adopt net zero transition plans, and the fact that the world is currently not on a Paris-aligned trajectory. This means that insurance companies may be subject to physical and transition risks not aligned with their own strategic decarbonization pathway. The links between a company's strategy (what it strives to achieve) and its risk management (what it must be able to withstand) require more explicit attention.

In addition to climate transition plans, insurers also need to start working on nature-related transition plans. The equivalent for nature of the Paris Climate Accords is the Kunming-Montréal Global Biodiversity Framework, which was adopted in 2022 and sets an ambitious goal to protect 30% of the planet's land and seas by 2030. At the moment, few jurisdictions require companies to adopt nature-related transition plans. This is the case in France, where nature transition plans aligned with long-term biodiversity objectives are required for investment activities. This will also be the case in the European Union under the Corporate Sustainability Reporting Directive for those companies which assess nature-related topics as material to their impacts, risks and opportunities.

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[48] An extension of the PCAF standard for project insurance and treaty reinsurance has been recently proposed, see New methods for public consultation (PCAF, December 2024)

[49] Closing the Gap - The emerging global agenda of transition plans and the need for insurance-specific guidance (UNEP-FI Forum for Insurance Transition to Net Zero, 2024)

[50] Insurers embrace climate change investments as catastrophe costs mount (Financial Times, 2024)

Creating incentives for insurers to address climate and nature risk

In the absence of an even regulatory playing field, there are limitations to what can be achieved through voluntary action by individual insurers. Some insurers are already taking a longer-term view to their risk exposures and are adopting related policies on climate and nature-related risks. However, the implementation of such policies is mostly pursued by large insurance companies that are based in front-running jurisdictions (typically in Europe) and are subject to a converging set of regulatory, litigatory and reputational pressures. The business that they stop financing or insuring may be picked up by other financial actors such as, for instance, offshore reinsurers or state insurers, hedge funds, private equity and sovereign wealth funds). This is akin to the issue of tax havens and fiscal optimization, as there is a widening gap between what is legally allowed in many jurisdictions and the voluntary best practices from a few leading countries and corporations[51].

Prudential capital and risk regulations are lagging behind sustainability disclosure requirements. Influential reporting standards and regulations, such as the principles put forward by the Task Force on Climate-related Financial Disclosures (TCFD), the Task Force on Nature-related Financial Disclosures (TNFD) and the European Corporate Sustainability Reporting Directive (CSRD), are an important first step to catalyze change. However, they only apply to large companies in selected jurisdictions, and they focus primarily on providing more information to investors and stakeholders, so their concrete impact on redirecting capital flows to reduce environmental risks and support financial stability is limited. Even the occasional direct initiatives, such as the call in 2016 by then-California Insurance Commissioner Dave Jones for insurers to divest from fossil fuels and the establishment of a public database of such investments[52], have primarily relied on fostering transparency. More concrete supervisory expectations are thus needed to turn the growing number of disclosure requirements into actual incentives for the insurance sector.

Another specific but important issue is what insurers do when they act as asset managers but are not the asset owners. This is notably the case for those life insurance saving contracts where the choice and ownership of the investment remains with the insurance policyholder, such as unit-linked insurance products. Most life insurers apply their climate strategy only to the assets they own and not to the broader portfolio of assets they manage. While they may not be able to apply their own investment policy in full to these managed assets (for legal or commercial reasons), they can still implement more ambitious risk-mitigation strategies in the catalogue of funds that policyholders can choose from. Building on the findings of behavioral finance, they can also make such strategies the default option, thus reducing climate and nature risks for a larger part of their assets under management. This is another illustration of the tangible influence that insurers could exert to decrease climate and nature risk, which can be incentivized by regulatory measures.

[51] The two issues intersect, as several offshore financial centers are also major regional or global insurance or reinsurance hubs such as Bermuda, Luxembourg, Singapore or Switzerland

[52] Climate Risk Carbon Initiative (California Department of Insurance)

Finally, insurance companies and those who oversee them need to better identify and address the potential trade-offs between different sustainability-related risk mitigation strategies. Such trade-offs may not notably happen:

- Between financial risks and external impacts. For instance, solar panels on roofs help reduce CO2 emissions and thus climate-related physical risks, but they may be damaged by hail and cause additional insurance claims.
- Between climate change mitigation and adaptation. For instance, air conditioning may help adapt to heat waves, but the corresponding increase in energy use may further reinforce climate change, which is a typical case of maladaptation.
- Between climate and nature. For instance, reforestation involving the planting of a single species of trees in geometrical patterns may be positive for CO2 absorption but may have adverse effects on biodiversity.
- Between environmental risks and social considerations. For instance, the increase in electric vehicles relies on the extraction of rare minerals under inadequate working conditions, such as cobalt mining in the Democratic Republic of Congo[53].

Addressing technological and social challenges

Advances in data gathering and processing enable an increasingly granular risk selection, which may undermine insurance's foundational principle of mutualization. Recent technological developments, such as the increasing use of Artificial Intelligence (AI), machine learning, Big Data, satellite imagery and geolocation, have been hailed as a transformative opportunity for the insurance industry to better evaluate, inter alia, climate- and nature-related risks[54]. Risk assessment and selection are at the heart of insurance, and new technologies may allow insurers to extend coverage to previously underinsured regions (for instance, with the development of parametric insurance in Africa[55]). However, the highly granular risk view made possible by such techniques also fosters an increasingly individual risk selection. Whereas insurers used to assess natural disaster exposure for a given neighborhood, new hazard maps now allow them to drill down to the level of each street or even individual homes. This is like the use of predictive diagnosis techniques in health insurance: at some point, individual risk selection fosters de-mutualization, with insurers excluding or pricing out an ever-increasing number of at-risk customers. If the balance between risk selection and mutualization breaks down due to the use of new technologies available to insurers, this will reinforce the downward spiral of unaffordability and uninsurability, thereby endangering not only the insurance sector's long-term business perspectives but ultimately wider social, economic and financial stability as well.

[53] Why Cobalt Mining in the DRC Needs Urgent Attention (Council on Foreign Relations, 2020)
[54] Climate change is a major challenge for insurers, but AI and cloud can help (IBM, 2022)
[55] Parametric insurance: an effective tool in helping Africa fight climate change (UNDRR, 2022)

The adoption by insurers of AI creates new sustainability-related challenges. Environmentally speaking, AI models require a highly resource- and energy-intensive physical infrastructure, thereby potentially fueling further carbon emissions[56]. Socially disadvantaged populations also tend to live in places more affected by climate change, pollution and the degradation of nature, so more granular geographical data will lead to higher implicit 'poverty premiums' in the price they pay for insurance, thereby reinforcing preexisting socio-economic biases[57]. Finally, from a governance point of view, the 'black box' nature of machine-learning algorithms and the lack of accountability in automated underwriting processes will make it difficult to identify and remediate such biases. The insurance sector has a key role to play in a Fair Transition, notably to ensure that the environmental transition does not lead to a sharpening of social inequality due to lower accessibility, availability and affordability of insurance for the people who need it the most. However, in the absence of coordinated policy, regulatory and supervisory guardrails (such as the EU AI Act, which specifically mentions insurance[58]), the unchecked deployment of AI in insurance may compound pre-existing negative trends rather than help improve them.

Increasing climate and nature risk may also impair the ability of the insurance sector to fulfill its other social functions. Insurance products span a wide range of purposes, which extend from comfort products (e.g. replacing damaged or stolen luxury items) to covering basic social security needs that the state has externalized to private insurance markets (e.g. health insurance in some countries). To preserve the insurance sector's capacity to fulfill its role in social, economic and financial stability, an increased level of mutualization of risks and profits may be needed between the more profitable comfort products sold by the insurer and the more socially necessary types of coverage (including against natural disasters). Such cross-subsidies between various insurance products (and thus commercial deviations from the actuarial risk premium) are nothing new: they predate current considerations related to climate and nature risks, and they can be motivated by a combination of the insurer's commercial strategy, social consensus, and regulatory prescriptions and incentives.

[56] The AI Boom Could Use a Shocking Amount of Electricity (Scientific American, 2023)
[57] Social Sustainability in Insurance: What, Who and How (Crugnola-Humbert J. & al., 2024)
[58] REGULATORY FRAMEWORK APPLICABLE TO AI SYSTEMS IN THE INSURANCE SECTOR (EIOPA, 2024)

MAIN POLICY RECOMMENDATIONS

We formulate below ten main policy recommendations addressed to policymakers, regulators, and insurance supervisors. These recommendations aim to ensure that insurance markets function properly despite growing climate and nature-related risks, to protect insurance consumers, and to safeguard financial stability.

Increased micro- and macroprudential focus on climate and nature risks

(1) The insurance sector and those who oversee it must acknowledge and address the systemic impacts insurers have on climate, nature and financial stability. If insurers are not required to mitigate their external impacts, the pursuit of short-term business opportunities will prevail, and the insurance sector may continue to fuel the transition and physical risks which ultimately threaten both its own business model and the stability of the financial system as a whole. Policy incentives, regulatory guardrails and supervisory expectations should thus require insurers to better identify and manage the consequences of their investments, underwriting and claims management activities on the rest of the economy. For instance, policymakers, regulators and supervisors should ensure that insurers do not simply stop covering the most vulnerable regions and populations against natural disasters, while at the same time financially supporting activities which contribute to further climate change and the destruction of nature. Insurance regulators and supervisors should explicitly acknowledge the insurance sector's role in financial stability and add macroprudential tools to their existing micro-prudential frameworks. They should also consider reviving the identification of systemically relevant insurers and reinsurers.

(2) Transition plans should be integrated into prudential supervision[59]. This includes both a micro-prudential and a macroprudential aspect:

- From a micro-prudential and risk management perspective[60], insurers should prepare contingency plans so that they are ready to withstand various climate and nature scenarios, involving different plausible mixes of physical and transition risks as a result of the (still unknown) collective pathway the world actually follows. Such plans should be included in their ERM (Enterprise Risk Management) frameworks, and supervisors should impose micro-prudential capital add-ons if these risk plans are absent or not credible.
- From a macroprudential and strategic perspective, insurers should steer their business activities in line with transition plans aligned with the Paris Accords (for climate) and with the Kunming-Montréal Global Biodiversity Framework (for nature) so as not to fuel further risks to financial stability. This strategic transition plan should not simply be included in public disclosures, but it should also be reported to and assessed by financial supervisors. Supervisors should impose capital add-ons if this strategic plan is absent or not credible, but this time with a macroprudential justification.

[59] Supervisory thinking on insurance-related climate transition plans (SIF, 2024)
[60] CONSULTATION PAPER on the proposal for Regulatory Technical Standards on management of sustainability risks including sustainability risk plans (EIOPA, 2024)

Insurance companies' transition plans should be science-based. They should contain interim target setting and short-term actions. They should address their whole value chain, including their claims management activities. They should also address the potential trade-offs between the impacts, risks and opportunities linked to climate, nature, and social topics. They should include sector-specific policies related to the activities aligned with the transition or which have high negative impacts. Insurance intermediaries such as brokers should also adopt and implement transition plans for the insurance business they procure.

(3) The prudential treatment and capital requirements for insurers should be monitored and adapted to keep up with evolving climate and nature risks. Again, this includes a micro-prudential and a macroprudential aspect and relates to both the investments and the underwriting activities of insurance companies:

- Capital charges for insurers' underwriting risk, as well as their pricing and reserving guidelines, should remain up to date with the latest developments in environmental science so that the price signal of insurance for physical risks is accurate and can be explicitly factored in economic decisions. Where public support is needed to keep providing affordable insurance against natural disasters for certain regions or populations, other levers should be used (such as subsidies or the establishment of PPPs), rather than keeping capital or reserves artificially low.
- From a micro-prudential perspective, capital charges should be increased for insurers' investments in fossil fuel developments and in other activities with a high negative impact on climate and nature due to their higher exposure to transition risks (as has recently been recommended by EIOPA for European insurers).
- From a macroprudential perspective, a new systemic capital buffer should be created and applied to investing in or insuring high-impact corporations, which have no credible transition plan in order to disincentivize insurers from fueling further physical risks to financial stability. In addition, supervisors could also collect and publish insurers' exposure to such sectors, as was done in France for investments[61].
- Conversely, financial supervisors could grant on-demand capital relief for insurers whose business activities contribute in a verifiable way to prevention, mitigation and adaptation to climate and nature risks, subject to an assessment by the supervisor or by a delegated knowledgeable third party that the measures implemented by the insurer reduce these risks.

[61] Second ACPR and AMF's joint report: Sectoral policies and fossil fuel exposure of French financial market participants (ACPR, 2021)

A forward-looking and long-term perspective

(4) Insurers and their supervisors should adopt a forward-looking and long-term perspective to address climate and nature impacts, risks and opportunities. Insurance is an industry traditionally based on statistics, but insurers and actuaries need to go beyond historical data and integrate exploratory long-term scenarios and forward-looking risk considerations for pricing, reserving and capital purposes. In some jurisdictions, this may require overhauling existing approaches, as was recently done in California to allow the use of expected future risk changes in insurance premiums [62]. Regulators and financial supervisors also have a key role to play in supporting the development of long-term insurance. Affordability and insurability are inherently long-term issues, but they are mostly managed by insurers through the lens of annual contracts. In many cases, investments by policyholders or insurers in risk mitigation measures to increase resilience will only pay off over several years, so they may not be implemented unless there are policy and regulatory incentives to support long-term insurance. This may include the standardization of multi-year insurance contracts to make them transferable between insurance providers, as well as financial support or tax relief for buyers and sellers of long-term insurance.

(5) Insurance regulators and supervisors should monitor and, if necessary, limit the use by insurers of Big Data, Artificial Intelligence and geolocation technologies. If such technologies are used shortsightedly for immediate gains in risk selection and without sufficient consideration for their longer-term consequences, they may ultimately endanger insurance's core business of pooling risks together and reinforce existing issues around affordability and insurability for natural disasters. This may also create negative social externalities and risks since disadvantaged populations are the most exposed to climate change and environmental degradation and most need affordable insurance against them.

Further actions from public authorities to support insurance markets

(6) Public authorities should intervene in failing insurance markets to support insurability and the affordability of insurance against climate and nature risks. This may require creating new forms of Public-Private Partnerships (PPPs), regional risk disaster facilities, mandatory insurance and subsidies, or strengthening and expanding existing ones. This endeavor goes beyond the sole remit of regulators and financial supervisors. It requires broad system thinking and support from governments, the insurance and reinsurance industry, taxpayers, consumers, and others in the insurance value chain so that such measures are set up in an economically and politically sustainable way.

(7) Public authorities and financial supervisors should support and promote best-in-class open-source data repositories and risk assessments. This notably includes climate and nature risk models for insurance professionals, as well as high-quality hazard maps for the general public. In doing so, public authorities might face resistance from large insurers and reinsurers who have developed such tools internally and who consider it a proprietary competitive advantage. However, the collective long-term benefit for financial stability should prevail. Otherwise, smaller insurers, SMEs and individuals will keep struggling to assess the risks they are exposed to.

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[62] Commissioner Lara unveils next steps in his strategy to expand coverage options for Californians in areas of high wildfire risk (California Department of Insurance, 2024)

(8) Public authorities should raise risk awareness and support risk prevention measures before natural disasters. This includes early warning systems, better building and zoning codes, resilient infrastructure, or nature-based solutions which act as buffers against floods or wildfires. Governments should do so in partnership with the insurance sector and leverage insurers' risk expertise to design and implement coordinated risk mitigation measures. Public leadership is necessary to contain risk on a collective scale, which is something that individual insurers cannot achieve on their own since they are primarily looking after their own client portfolio and after the interests of their shareholders.

(9) Post-disaster, public authorities should incentivize or mandate 'build-back-better' and 'repair-over-replace' claims management approaches to increase resilience. In some cases, subsidizing relocation programs may even be required, as some regions across the world will be lost to recurring pluvial floods, rising seas or desertification. It makes no economic sense to restore as-is a building that will be underwater or burnt every year. In addition to build-back-better, a repair-over-replace approach to claims management will support the circular economy. For such solutions to be feasible and economical for insurers and their clients, new policy initiatives may be necessary, ranging from imposing repairability standards to manufacturers to potential subsidies to compensate for the higher cost of the local workforce. Otherwise, the absence of pricing for environmental externalities will keep it less expensive to ship new parts across the world rather than repair locally.

(10) Policymakers should ensure that insurance is available and affordable to support the development of new technologies needed in the environmental transition. Such technologies often do not have the risk track record required by actuaries and insurance risk managers. In order to make them insurable and affordable, it may be necessary to allow and encourage cross-subsidization in actuarial pricing, based not only on the insured activities' short-term risks but on their long-term impact on the environment and financial stability (such as higher premiums for high-impact industries and lower premiums for green technologies) [63]. Where such cross-subsidization is inappropriate or insufficient, dedicated PPPs sponsored by governments may also be created[64]. Targeted subsidies or tax cuts may also be used.

[63] Décarbonation des passifs d'assurance : virage ou mirage ? (L'Actuariel numéro 52, 2024)

[64] The great enabler: A collection of insurance solutions powering $10 trillion of climate finance (Howden/BCG, 2024)

SUMMARY OF POLICY RECOMMENDATIONS

Table 1 below summarizes the actions that are necessary to implement the policy recommendations, as well as the key stakeholders involved:

Actions / Stakeholders	Regulators Supervisors	Governments Policymakers
1. Acknowledge and address the systemic impacts from insurers on the environment and on financial stability	●	●
2. Integrate climate and nature transition plans into risk management and prudential supervision	●	●
3. Monitor and reflect climate and nature risks in both micro- and macroprudential capital requirements	●	●
4. Adopt a forward-looking and long-term approach to environmental impacts, risks and opportunities	●	●
5. Monitor and supervise the use of Big Data, Artificial Intelligence and geolocation in insurance	●	●
6. Provide targeted public support for insurance markets to protect affordability and insurability	●	●
7. Promote open-source data repositories and risk assessments for climate and nature	●	●
8. Raise disaster risk awareness and support risk prevention measures	●	●
9. Mandate resilient claims management standards (e.g., build-back-better, repair-over-replace)	●	●
10. Provide targeted public support for the insurance of activities needed in the environmental transition	●	●

Table 1

● Primary role

● Secondary role

MAIN REFERENCES (SELECTION, IN CHRONOLOGICAL ORDER)

Global Systemically Important Insurers, EIOPA, Guiné C., May 2014

Breaking the tragedy of the horizon – climate change and financial stability, Mark Carney, September 2015

Guide for Supervisors: Integrating climate-related and environmental risks into prudential supervision, NGFS, May 2020

Climate-Related Disclosures and Risk Management: Standards and Leading Practices, International Actuarial Association, Crugnola-Humbert J. & al., October 2022

NZIA Target-Setting Protocol Version 1.0, NZIA, January 2023

Policy options to reduce the climate insurance protection gap, ECB & EIOPA, April 2023

The global costs of extreme weather that are attributable to climate change, Nature, Newman & Noy, September 2023

Underwriting our Planet: How Insurers Can Help Address the Twin Crises in Climate and Biodiversity, WWF/Deloitte, September 2023

Storming the capital: climate risk and prudential capital requirements in The UK Actuary, Crugnola-Humbert J., September 2023

The climate insurance protection gap, ECB, 2024

Social Sustainability in Insurance: What, Who and How, Actuarial Association of Europe, Crugnola-Humbert J. & al., February 2024

Décarbonation des passifs d'assurance : virage ou mirage ?, L'Actuariel numéro 52, April 2024

Climate Litigation and the Financial Sector, Deloitte Switzerland, Bänziger & Crugnola-Humbert, April 2024

Climate Resilience Dialogue – Final Report, European Commission, July 2024

Factsheet on the regulatory framework applicable to AI systems in the insurance sector, EIOPA, July 2024

Supervisory thinking on insurance-related climate transition plans, Sustainable Insurance Forum, October 2024

EIOPA recommends a dedicated prudential treatment for insurers' fossil fuel assets to cushion against transition risks, EIOPA, November 2024

Closing the Gap - The emerging global agenda of transition plans and the need for insurance-specific guidance, UNEP-FI Forum for Insurance Transition to Net Zero, November 2024

The great enabler: A collection of insurance solutions powering $10 trillion of climate finance, Howden/BCG, November 2024