



## 2023 Enterprise Risk Landscape for Insurers Enterprise Risk Management Committee September 2023

This article is a publication of the New Zealand Society of Actuaries (NZSA) ERM Committee and it follows up from its first ERM survey of NZ insurers in 2021/2.

The survey revealed the ‘top of mind’ risks at New Zealand insurers as:



- COVID
- Regulatory change
- Economic uncertainty and high inflation
- Climate change
- Cyber and digitalisation
- People and resources
- Supply-chain disruption

It came as no surprise to the Committee that when we conducted another review of the ERM landscape in 2023, most of these key risks are still dominating the global enterprise risk landscape.

We reflect on some of these risks here. With this article, we bring these key risks to wider attention and highlight areas where actuaries can lead the debate for developing company specific risk management tools to manage and mitigate these risks.

Since our last survey, financial markets have endured a remarkable level of volatility, which has almost become

the norm in recent years. Efforts to establish a “new normal” after COVID-19 were interrupted by the Russian invasion of Ukraine, and a wave of food and energy crises. Central bankers have announced a series of interest rate hikes to tame inflation, ending the “lower for longer” regime that has persisted since the Global Financial Crisis.

Amid these changes, societies worldwide are experiencing the heightened effects of human-caused climate change, which has resulted in the increasing financial costs of extreme climate events. The funding required as companies prepare for the necessary transition to net-zero will likely introduce more volatility to the financial markets in the years to come.

In this article, we cover five of the key risks that continue to dominate the risk agendas of New Zealand insurers:

- **Economic uncertainty and high inflation:** The risks concerning NZ insurers against the backdrop of persistent high inflation and the subsequent multiple rate hike actions implemented by central banks.
- **Climate change:** How insurers are being impacted by climate change risks and how scenario techniques can be used to help them integrate climate related risks and opportunities into their business planning and into their risk management strategies in the pursuit to achieving net-zero.
- **COVID-19:** Considerations for actuaries who will be setting pricing and valuation assumptions for COVID-19, as well as risk management considerations and shortcomings highlighted by the recent pandemic.
- **Cyber:** Emerging cybersecurity trends, including examples of recent cyber-attacks and how insurers can potentially mitigate these risks.
- **Regulatory change:** An outline of the key changes happening in the regulatory environment for NZ insurers.

## Economic uncertainty and high inflation

On a global scale, monetary policy has been tightened significantly across most of the world to cool down economies that had become overstimulated in the wake of COVID-19. This monetary tightening has also exposed poor risk management and supervisory practices that had flourished in the era of low interest rates, most notably with several US banks running into distress earlier this year. As a result, both in the US and Europe lending standards have been tightened substantially in recent months.

A sustained high inflation environment was a much-talked-about theme among insurers in the 2022 ERM survey findings, with insurers concerned that it would cause volatility in mid-to-long term government bond yields. For New Zealand, it appears that inflation might have just passed its peak, and whether the Reserve Bank of New Zealand's (RBNZ's) tightening cycle is over for now will likely depend on several economic factors both in New Zealand and globally.

The recession outlook for NZ is revised to unlikely (or to last for a short period of time) by some economists which is mainly driven by the large flux of net inward immigration that has been the case since the beginning of this year and is expected to continue. In the short-term, however, economic growth is expected to be subdued, which can impact the profitability of the companies and lead to a potential increase in unemployment rates.

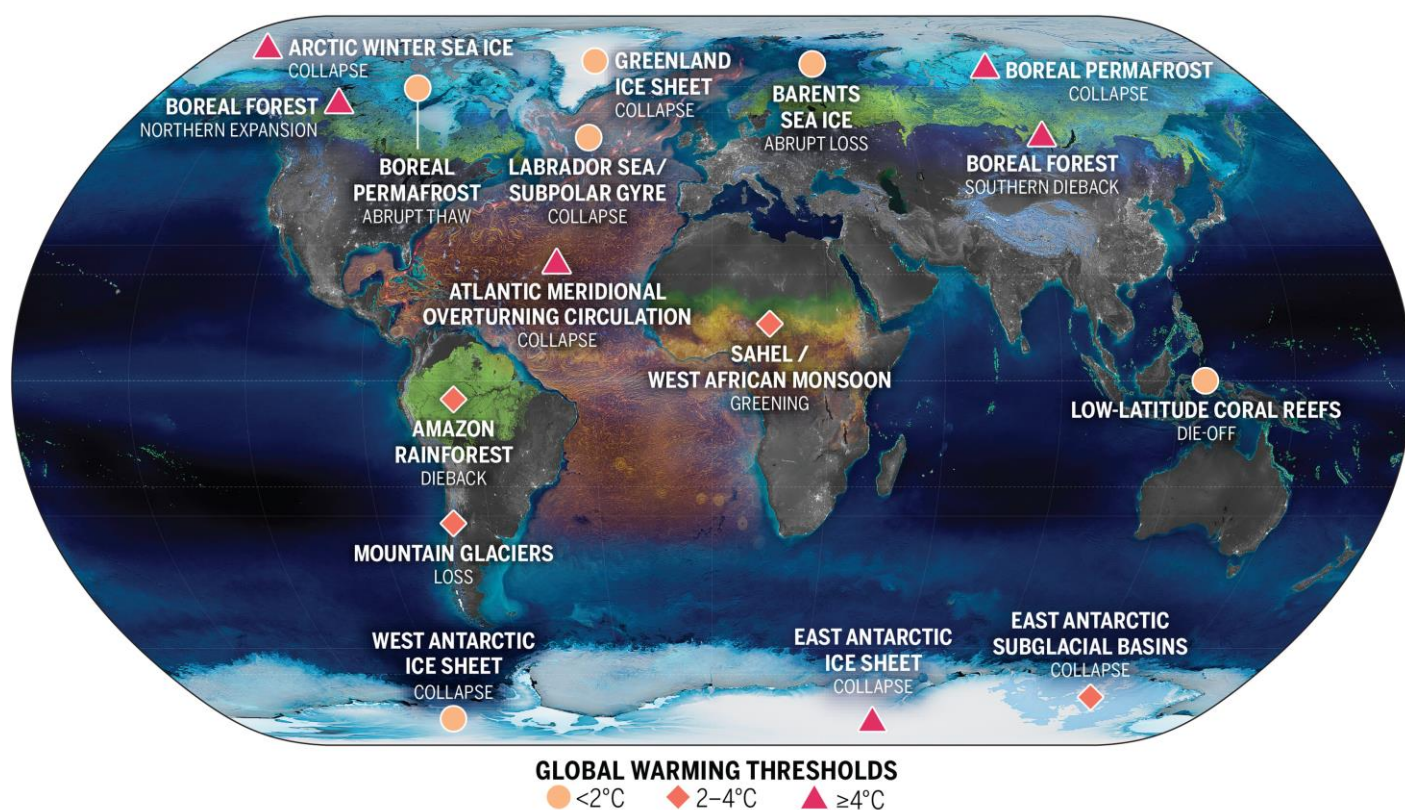
The potential economic slowdown is likely to have varying impacts across the insurance industry. It is likely to lead to higher lapse rates for insurers, as customers of all types of insurance products experience affordability issues and reduce their cover or stop taking out policies altogether. Inflation-driven increases in claims costs can be problematic for health and general insurers if they are unable to pass on the increased costs via their premiums. Similarly, wage inflation coupled with low unemployment would further push up labour costs. As a result, companies may be looking to further reduce their cost bases wherever they can.

It may be argued that some of the additional costs to the insurers can be offset by higher investment returns from cash and bonds when compared to the interest rates that were available before the RBNZ rate hikes started during 2021. However, this partial compensation that the investors are receiving in a very high inflationary environment will likely be temporary given that the long end of the yield curve continues to stay lower than the short end of the curve.

At such times of ongoing uncertainty in the financial markets, insurers will need to be vigilant in tracking indicators of economic deterioration and be prepared to respond accordingly. It is necessary for companies to strike a fine balance and monitor a range of financial metrics to review and adjust their asset allocation decisions and even be prepared to revise their existing ALM policies and practices.

In addition, common risk management tools such as stress and scenario testing techniques can be useful for insurers to test the impacts from short-term heightened inflation and the longer-term adverse effects to their business profitability and capital levels by projecting the scenarios of increased claims and other operational costs. By using these risk management techniques, insurers can determine how well these effects are being factored into their strategic planning and future management actions.

## Climate change



The location of climate tipping elements in the cryosphere (blue), biosphere (green), and ocean/atmosphere (orange), and global warming levels at which their tipping points will likely be triggered. Pins are coloured according to the central global warming threshold estimate being below  $2^{\circ}\text{C}$ , i.e., within the Paris Agreement range (light orange, circles); between 2 and  $4^{\circ}\text{C}$ , i.e., accessible with current policies (orange, diamonds); and  $4^{\circ}\text{C}$  and above (red, triangles).

Source: Armstrong McKay et al.(2022). See no. 3 in the further reading list

The world is currently experiencing a climate crisis, with rising global temperatures and increasingly extreme weather events such as heatwaves, droughts, and floods. It is becoming more and more common to hear the news of scorching heatwaves, tragic wildfires, devastating floods and the many lives being impacted by these world-wide. The climate crisis is already happening and now is the time to plan for climate action and for climate adaptation.

As the importance of integrating climate change-related risks and opportunities into economic projections is being realised, many financial institutions world-wide are looking for effective ways to understand and quantify the financial risks from climate change to form an appropriate response strategy.

The climate-related risks are divided into two main categories: physical and transition risks. Physical risks are direct effects from rising temperatures which result in catastrophic weather events such as floods, wildfires and landslides. They can be acute and potentially transient and diversifiable or chronic and systemic, but they do not consider any behaviour or policy response. In contrast, transition risks are permanent shifts driven by policies, technologies, laws and similar actions designed to shift the economy toward lower fossil-fuel consumption.

Insurers are exposed to physical risks as underwriters of insurance products. Due to the rise in the severity and the frequency of catastrophic weather events, insurers will experience a rise in insurance claims world-wide. Insurers are also exposed to transition risks through their asset portfolios which can fall in value if invested in emissions-intensive sectors for example.

## Recent developments for climate scenarios

We are seeing the emergence of climate scenario techniques in the recent years which are used by financial institutions to integrate climate related risks and opportunities into their future planning. These climate scenarios can enable a structured exploration of a range of plausible future outcomes that can help build an understanding of how these financial risks will materialise. These types of insights can be used by insurance companies in taking the appropriate actions in relation to their insurance products and asset strategies.

A significant challenge with the climate-change scenario models is that they are complex and nuanced, requiring sophisticated model builds that link different models together – physical climate models, economic models, insurance models and asset models. Many assumptions are required and, as with any model, it is a simplification of reality – model users must therefore understand the limitations and uncertainties.

The other significant limitation of the current models is that they exclude some of the most severe impacts expected from climate change, such as the ‘tipping points’ – thresholds which, once crossed, trigger irreversible changes, such as the loss of the Amazon rainforest or the West Antarctic ice sheet. Once tipped into a new state, many of these systems will cause further warming – and may interact to form cascading risks. The triggering of multiple climate tipping points will collectively act to further accelerate the rate of climate change and the physical risks faced.

Ignoring these potential cascading risk scenarios in climate risk modelling will significantly understate the physical risks. An example of understating of the physical risks can be observed in one of the Task Force on Climate-related Financial Disclosures (TCFD) scenarios which show benign, or even positive, economic outcomes in hot-house world scenarios of 3°C or more of warming. This in return can mis-inform the policy makers and slow down the climate actions world-wide.

It is important that regulators world-wide address these limitations with the climate models and make the necessary adjustments to allow for more realistic climate scenarios that reflect the catastrophic downside risks of a hot-house world.

It is also important to recognise that there is no real historical evidence to model climate change into the future and therefore, actuaries will have an important role to play when communicating the uncertainty of future outcomes using the results from these models.

Actuaries can also help with the realistic climate scenario narratives reflecting the emerging reality of climate change that cannot be modelled and will be able to provide insights on potential impacts from these very extreme scenarios to the key decision makers.

## The transition to net-zero

Developing climate resilience and transition to net-zero strategies requires coordination and planning within an organisation. The companies who will be successful in this pursuit will be those that can understand the second order effects to the company due to climate change risks, that can develop business strategies addressing insurance and asset performance issues from these risks and that can respond to societal expectations to reduce their carbon footprint.

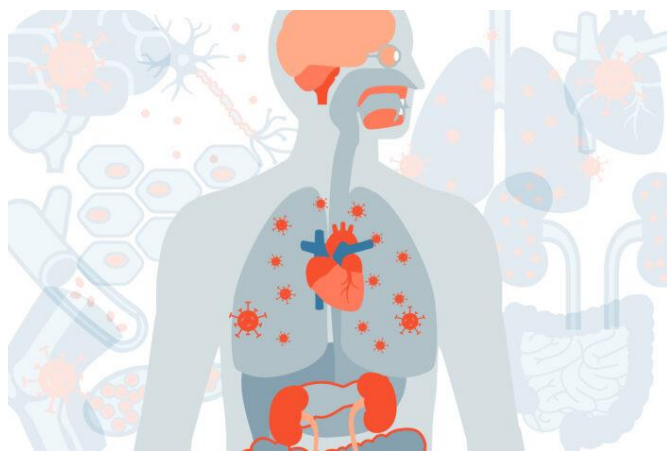
This will be facilitated by establishing robust risk management frameworks and a dedicated risk governance structure, such as:

- The board and executives setting the tone for a response to transition risks,
- Governance structures that enable a joined-up approach across business units,
- A commitment to actionable net-zero transition plans with clear targets,
- Keeping abreast of policy and regulatory developments.

Actuaries' training in risk assessment and measurement can help fill gaps in knowledge and quantify, compare and prioritise the uncertainties in alternative future courses of action. Taking an actuarial approach to climate-related risk management is useful when considering adaptation actions (i.e., identify exposures/vulnerabilities, obtain data/information, assess/model, plan, finance, implement, monitor). Further, adaptive thinking requires both a short- and long-term perspective, applied holistically, to optimise societal outcomes.

It is also promising to see the emergence of a variety of positive tipping points in human societies that can propel rapid decarbonisation, in areas including new renewable energy technologies, transportation, agriculture, ecosystem regeneration, politics and public opinion. This concept could unlock the stalemate – the sense that there's nothing we can do about climate change.

## COVID-19



Our previous survey was conducted during the COVID-19 pandemic where several related risk themes and uncertainties were continuing to emerge.

In 2023, we appear to be transitioning to a world where COVID-19 is largely accepted as a disruptive temporary illness and therefore our view is that it will become part of the business-as-usual activities for insurers.

In this section, we reflect on what we may have learnt from the COVID-19 experience to date, as well as considering other relevant impacts that are worth considering by actuaries working in wider risk management fields.

## Mortality experience

Given New Zealanders were spared of the community-wide infections during the first few years of the COVID-19 pandemic, it will take several years before actuaries can start to incorporate the potential impacts of COVID-19 into New Zealand mortality rates.

New Zealand COVID-19 mortality analysis will certainly be able to leverage from international experience. However, actuaries working with international data sets need to be careful in distinguishing between the experience over the height of the COVID-19 pandemic where there were no vaccinations and the more recent experience of COVID-19 as endemic.

The links to some of the recent experience studies, one in Australia and one in the UK can be found under the references section.

## Morbidity experience

One of the contradicting experiences by many insurers (including internationally) during the COVID-19 period was that many experienced a reduction in income protection and disability type claims. Where incidence and termination rates have improved during lockdown periods, this was speculatively attributed to:

- Reduced accidental event exposure due to the levels of restrictions placed on population mobility (also potentially driving the reduction in mortality observed),
- More flexible working arrangements supporting staff with physical or mental workplace challenges to continue working,
- Stronger employment conditions and staff shortages supporting staff to return to work, including in altered roles,
- Improvements in claims management practices and resourcing.

Separately, many insurers were concerned that delayed diagnosis of ailments, due to reduced access to medical diagnostic services, may subsequently lead to a surge in claims once the backlog had cleared. In addition, many feared a surge in mental health claims, brought on by the additional stresses caused by the pandemic, both due to personal and family health concerns, as well as the financial challenges faced by many.

To date, the data in New Zealand has not shown a noticeable change in claims experience, and therefore, many insurers have started releasing their short-term pandemic overlay provisions.

The impacts of long-COVID and other longer-term impacts of COVID-19 remain uncertain. Like any other new diseases that emerge and evolve over time, actuaries will be continuing to make assumptions to the best of their knowledge and revise their assumptions as more reliable data is collected on longer-term effects from COVID-19.

## Operational impacts

Perhaps some of the biggest lessons for risk managers arising from the COVID-19 experience were derived from the operational challenges experienced.

Actuaries considering data covering COVID-19 lockdown periods in setting assumptions, should also consider if there were any altered operating conditions experienced during this period that may impact their future experience data, such as altered notification and processing times to claims, altered lapse behaviours, and altered new business sales patterns.

During the peak of the pandemic, P&C and travel insurers had to adjust their pricing due to changing business risk exposures, such as travel interruptions due to lock downs, compounded by the ambiguity introduced in the interpretation of insurance policy wordings. Some of these cases resulted in negative publicity for insurers, leading to litigations in multiple jurisdictions. These costly learnings meant that insurers had to review their operational processes and controls for checking data quality and the policy wordings.

The adverse effects on staffing and logistics were significant in New Zealand throughout the pandemic, with global supply chain disruptions impacting the sourcing of building and replacement parts as well as leading to a shortage of staff in many key business value chains including claims and underwriting. This further heightened the need for New Zealand insurers to refine their disaster recovery and business continuity plans, as well as accelerating their move to digital platforms.

Business continuity and Health and Safety protocols and plans were also tested to their limits during the early days of the pandemic by the sudden need to switch to remote working, putting strain on infrastructure, raising technology risks and putting service delivery under strain.

## Stress and Scenario Testing

The insurers who ran additional pandemic stress and scenarios mostly considered the first order mortality and morbidity impacts. Some also factored in financial market and economic impacts, but few if any, had considered the second and third order impacts to new business, cyber risk and operations caused by a sudden shift to remote working and the further knock-on impacts of the lockdowns as well as economic and social changes experienced.

One key learning for the actuaries who took part in these types of stress and scenario analysis was the need to adequately source views from a diverse pool of subject matter experts across the business when defining and mapping out the wider impacts from pandemic scenarios.

This type of enterprise-wide risk management approach can benefit insurers by enabling broader and more robust scenario analysis with narratives, helping identify linkages and connections between risks and probable impacts which can lead to more effective management actions and responses for the organisation.

## Cyber

Over the last few years, we have seen an increase in cyber risk globally which can be attributed to:

- COVID-19 and the move towards more distributed remote workforces,
- The adoption of multi-cloud services where organisations use cloud services from more than one provider,
- The security skills gap and the shortage of cyber security professionals.

Many forecasts predict cybercrime costs to skyrocket over the coming years. Over the last 12 months alone there have been multiple cyberattacks that have affected large businesses and millions of users in Australasia. Three of the largest recorded cyber-attacks in the region were:

- Latitude - 14 million customers. Full names, addresses, phone numbers, driver licence numbers and passport numbers leaked.
- Optus - 9.8 million customers. Full names, addresses, phone numbers, driver licence numbers and passport numbers leaked.

- MediBank - 9.7 million customers. Full Names, dates of birth, passport numbers, medical information and records leaked.

In our opinion, the MediBank cyber incident is of particular interest due to similar risk incidents that can happen in an insurance company. Medibank has suffered reputational damage which could impact lapse and new business sales rates. Furthermore, under the Australian Prudential Regulatory framework, APRA has added a supervisory adjustment of 25% to Medibank's capital requirements, equivalent to an increase in capital requirements of \$250m. As a result, MediBank will need to invest heavily in cybersecurity, remediation and possibly raise capital through debt instruments because of this cyber-attack.<sup>1</sup>

In cases such as the MediBank and Optus hacks, access to the systems is achieved through acquisition of legitimate credentials and phishing emails.<sup>2</sup> Therefore, it is extremely difficult to mitigate these risks through systems alone and demonstrates the importance of staff training to identify and mitigate cyber risks as a key component of cyber security, in addition to measures such as "2 Factor Authentication".

Closer to home, Wellington based IT provider, Mercury IT was the victim of a ransomware attack by the LockBit 3.0 cybercrime gang in November 2022. Several organisations that use Mercury IT as their IT provider had some of their data released on the dark web after the attack. A New Zealand Insurer and the Ministry of Justice were among the organisations affected by this incident. According to the US Cybersecurity & Infrastructure Security Agency (CISA) LockBit 3.0 operates a Ransomware-as-a-Service (RaaS) model, where affiliates pay to launch ransomware attacks developed by the gang.

In the case of the New Zealand based Insurer, systems were encrypted, removing access to core systems integral in the running of the business.<sup>3</sup> The incident highlights how as organisations focus on strengthening their own cyber security, their exposure to cyber threats in the supply chain is increasingly becoming the weakest point in their defences.

## Emerging cyber security trends

Emerging cybersecurity trends include the increasing use of insider threats and the targeting of critical infrastructure networks. In their [Annual Cyber Threat Report for 2022](#), the Australian Cyber Security Centre (ACSC) also identified five key cybersecurity trends for the period July 2021 - June 2022, including the fact that cyberspace has now become another domain of warfare and that ransomware remains the most destructive cyber-crime.

In their [Top Cybersecurity Predictions for 2023](#), the Centre for Internet Security's experts expect an increase in (and the use of) insider threats. This could range from disgruntled employees motivated by revenge, or external actors leveraging insiders, both witting and unwitting as seen in the recent attacks on Okta and Nvidia in the commercial sectors.

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<sup>1</sup> Financial Review. Medibank's \$250m hit big enough to scare others into cyber action (27 June 2023)

<https://www.afr.com/chanticleer/medibank-s-250m-hit-big-enough-to-scare-others-into-cyber-action-20230627-p5djr1>

<sup>2</sup> The Guardian. Medibank hack started with theft of company credentials, investigation suggests (24 October 2022)

<https://www.theguardian.com/technology/2022/oct/24/medibank-hack-started-with-theft-of-staff-members-credentials-investigation-suggests>

<sup>3</sup> Tech Monitor. New Zealand businesses ransomed by LockBit 3.0 after Mercury IT cyberattack (20 December 2022)

<https://techmonitor.ai/technology/cybersecurity/mercury-it-cyberattack-new-zealand-lockbit-ransomware>



## Why managing cyber risk is important

Insurance plays an important role in the economy in providing economic stability by protecting businesses and individuals from risks. Cyber risks, although presenting a downside risk to insurers/reinsurers, also presents an opportunity for insurers to play their part in reducing risk through risk transfer and allowing individuals and businesses to mitigate financial loss in a time of increasing risk and uncertainty.

Regulators are also showing an increasing interest in the cyber risks faced by the firms under their supervision. In April 2021, the RBNZ published [guidance on cyber resilience](#) that provides high-level, principle-based recommendations and serves as a governance framework for managing cyber risk, which entities can tailor to their specific needs and technologies. As actuaries we need to be aware of the material downside risks to the financial condition of our firms, and in the case of appointed actuaries, be able to discuss these risks and how they are managed within the Financial Condition Report.

## Mitigating cyber risk

Mitigating cyber risk involves employing certain strategies, such as securing the organisation's network, setting up logs and alerts to track unusual activity, installing software updates, regularly backing up data, and creating incident response plans.

Cyber insurance also plays a role in mitigating risk, as it provides financial protection and a badge of quality that demonstrates an insurer has assessed the insured as a good risk. However, even with the best technological defences, most cyber events are due to human error, highlighting the continued importance of education and awareness alongside technological developments.

Cyber risks are a growing concern for insurers and other financial institutions. As the threat landscape continues to evolve, it is essential for businesses to take proactive measures to manage cyber risks, including staff training, cybersecurity strategies, and cyber insurance. By doing so, they can protect themselves from the financial and reputational fallout of cyberattacks and contribute to a more secure and resilient economy.

## Regulatory change

In the last few years, regulatory changes relating to conduct, solvency and accounting standards have been taking shape. This has had significant impacts on insurers not just financially but also in interpreting changes, reassessing and managing vulnerabilities, and ensuring they are well-equipped to meet new standards. Recently floods and storms in the upper North Island have raised issues regarding red zoning and managed retreat.

## Conduct of Financial Institutions (CoFI) Legislation

Licence applications under the new Conduct of Financial Institutions (CoFI) regime open 25 July 2023. Assuming no further changes, by 31 March 2025, insurers, banks and non-bank deposit takers will be required to hold a financial institution licence to continue providing services to New Zealand consumers. The licence will be issued by the Financial Markets Authority (FMA), who looks after conduct regulation of financial institutions. This will be in addition to the prudential licence issued by the RBNZ.

Most insurers have established sizeable programmes to meet the requirements of the CoFI legislation. The CoFI legislation does not prescribe requirements but rather sets out principles that institutions will need to comply with. This has led to some concerns as to how the FMA will approach monitoring and enforcement.

The FMA has published a range of guidance, including what needs to be included in a “fair conduct programme”, which is the set of activities that an organisation undertakes to ensure it delivers good customer outcomes.

The CoFI regime also has significant implications for sales remuneration. Essentially volume-based bonuses or remuneration will not be allowed. The implications of this for existing intermediated distribution channels is a key consideration for institutions.

Boards will turn their minds to three key aspects: how they define “good customer outcomes”, how these outcomes are to be measured, and what assurance arrangements need to be in place to give them comfort that those outcomes will continue to be consistently delivered.

## **IFRS 17**

NZ IFRS 17 comes into mandatory effect from the start of the financial year commencing on or after 1 January 2023 for insurers. Compliance with IFRS 17 has generally been a significant exercise for insurers, involving changes to accounting policies and IT platforms, data capture, account presentation and liability assessments.

The major areas of concern for insurers have included impacts on disclosed shareholder capital, on-going profit recognition and reporting, stakeholder education and disclosure requirements. For actuaries, the liability assessment challenges have included aggregation requirements, contract boundary conditions, grouping, onerous contract testing, establishment of risk adjustments and liquidity requirements for discount rates.

As a new standard with significant changes, international thought has been developing on how the standard is to be interpreted and complied with. Approaches to risk adjustments are one area where this has particularly been the case. Other areas that may evolve in the future include aggregation, application of “facts and circumstances” to onerous contract testing, and policy grouping.

One of the benefits of IFRS-17 is likely to be that the grouping requirements will mean a greater level of transparency to stakeholders and Boards regarding profitable business. This is not to say that companies should not cross-subsidise or loss lead as they see fit, but the requirement to be transparent seems a positive change.

## **Interim Insurance Solvency Standards (ISS)**

The RBNZ ISS came into effect from 1 January 2023. The primary purpose is stated to be to align the solvency standards with IFRS-17 reporting, although some changes have been made to the underlying capital charges. The RBNZ has also taken the opportunity to combine the life and general standards into one standard (as is the case with IFRS-17).

The one important difference with ISS is the presentation of the regulatory solvency margins for insurers. The liability valuation and the regulatory capital requirements are being separated to be more consistent with other solvency regimes world-wide. We understand that there will be a knock-on effect for the insurers’ solvency ratios which overall will be reduced. The indication from the RBNZ about this issue was that this would not necessarily be alarming given that it is mainly due to the structural change to the insurer’s solvency balance sheets from adopting ISS.

There is also a new capital charge being introduced for operational risks, which will increase the capital requirements for insurers who are growing rapidly, and the discounting requirements, where the impact varies according to the level

of interest rates, with more capital being required as interest rates fall. It is now possible that the solvency standard will require adoption of a negative interest rate. There are also new run-off and reinsurance dispute capital charges.

The NZSA has been working with the RBNZ to ensure clarity of the ISS and how it will work.

## Land Zoning and Managed Retreat

The Government has announced areas of red zoning following the storms and floods of earlier in the year, along with the intention to establish a managed retreat framework in response to climate change more generally. Details are yet to be provided, but this is clearly a significant issue for the public and their insurers, both in respect of claims arising out of the storms and future claims and insurability of housing considerations.

A particular area of concern is where householders are unable to return to their homes due to red zoning. The houses have in many cases sustained little to no damage, and in only rare cases full damage. As such the payout from insurance will be well less than the value of the house which can now not be occupied. This is clearly a poor outcome for the insured, albeit the insurance policy is responding as designed and priced. Reputational risks for insurers are significant. As managed retreat is enacted more fully, some insureds may expect insurance policies to respond in a way that isn't viable.

## Climate Related Financial Disclosures (CRDs)

Insurers are preparing disclosures as required in relation to Climate Related Financial risks. There is a level of uncertainty as to the specific requirements, leading to compliance and audit risks. More fundamentally, the long-term nature and breadth of the scenarios that are required to be considered raise considerations regarding how insurers should respond strategically to the issue of climate change and what that means for the insurability of a range of property assets. By bringing the potential costs to the fore, insurers will be confronted with information that must enter their strategic considerations. Further, investors may have expectations of how these risks are managed.

## Closing Remarks

As the NZSA ERM Committee, we are keen to continue monitoring the ERM landscape for insurers in NZ. To do this, we would like to hear from the insurance companies about their experience in managing and mitigating the above risks and hear about any other risks that are concerning them and the risk professionals working in insurance.

With this in mind, we would like to undertake another ERM survey concerning insurers in NZ during 2024, so watch this space!

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*Where views are expressed in this paper, they are the collective personal views of the members of the Enterprise Risk Management Committee. This paper does not necessarily reflect the positions of our employers or other members of the New Zealand Society of Actuaries. Any errors are our own.*

## Further reading list

### Economic Uncertainty and High Inflation

1. Westpac New Zealand Limited (2023). Economic Overview. [Economic-Overview\\_QEO\\_report\\_16May23.pdf \(westpac.co.nz\)](#)
2. Ernst & Young Global Limited (2023). Global Insurance Outlook 2 | 2023 Global Insurance Outlook. [ey-2023-global-outlook-report.pdf](#)

### Climate change

3. Research article by Science (Vol. 377, No. 6611) - Exceeding 1.5°C global warming could trigger multiple climate tipping points <https://www.science.org/doi/10.1126/science.abn7950>
4. Institute and Faculty of Actuaries (2023). The Emperor's New Climate Scenarios. <https://actuaries.org.uk/media/qeydewmk/the-emperor-s-new-climate-scenarios.pdf>
5. International Actuarial Association (2023). Various articles on Climate issues. [Climate Issues \(actuaries.org\)](#)
6. United Nations Environment Programme – Finance Initiative (2023). The 2023 Climate Risk Landscape. <https://www.unepfi.org/themes/climate-change/2023-climate-risk-landscape/>
7. Climate risk and sustainability for insurers. A special supplement from Insurance ERM published in July 2023.

### COVID-19

7. An Australian study on COVID-19cx. [How COVID-19 has affected mortality in 2020 to 2022 \(actuaries.asn.au\)](#)
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9. National Cyber Security Centre. Supply Chain Cyber Security. <https://www.ncsc.govt.nz/assets/NCSC-Documents/NCSC-Supply-Chain-Cyber-Security.pdf>
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14. Australian Cyber Security Centre (2023). Essential Eight Explained. <https://www.cyber.gov.au/resources-business-and-government/essential-cyber-security/essential-eight/essential-eight-explained>
15. Actuaries Institute (2022). Cyber Risk and the Role of Insurance. Green Paper. <https://actuaries.asn.au/Library/Opinion/2022/CyberRiskGreenPaper.pdf>

### Regulatory Change

16. CoFI legislation reading material - <https://www.mbie.govt.nz/business-and-employment/business/financial-markets-regulation/conduct-of-financial-institutions-regime/>
17. ISS reading material - <https://www.rbnz.govt.nz/-/media/project/sites/rbnz/files/consultations/insurers/iss-review/interim-solvency-standard-2023-as-amended.pdf>
18. Climate Related Disclosures (CRDs) reading material - <https://www.xrb.govt.nz/standards/climate-related-disclosures/aotearoa-new-zealand-climate-standards/>