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2024 General Insurance Industry Stress Test Results.

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1. Executive summary[1]

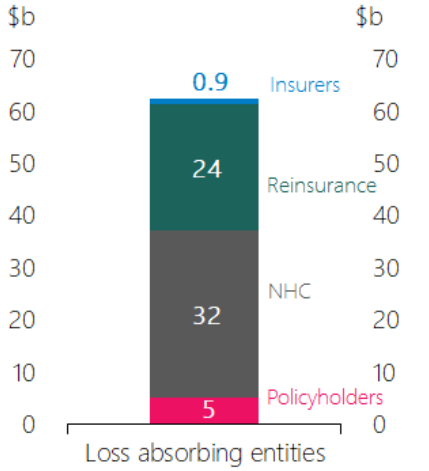
We use stress testing to assess the resilience of banks and insurers to severe but plausible risks. The 2024 general insurance stress test included seismic and cyber risk scenarios. Seven large insurers which accounted for approximately 80 percent of the general insurance market participated in this stress test.

Financial impact from the seismic scenario

The seismic scenario was based on a very severe event, to enable testing of entities preparedness and recovery plans. The event included a magnitude 8.7 earthquake on the Hikurangi Subduction Zone (HSZ), a subsequent tsunami and major aftershock. This resulted in a sharp fall in GDP and loss of productive capacity. The scenario represented a **1-in-1,200-year loss event.** This is beyond the level of risk required to be covered by insurers' solvency requirements.

Participants, who accounted for around 70 percent of the general insurance market, modelled **$62 billion of losses** (insured value of damaged properties).

Figure 1: Distribution of $62bn loss



Approximately half of the claims were paid by the government-guaranteed Natural Hazards Commission (NHC), 39 percent were covered by reinsurance arrangements, 8 percent retained by policyholders and the remainder covered by the insurers (Figure 1).[2]

As intended, given the severity of the selected scenario, locally incorporated insurers modelled a significant fall in their capital. The aggregate solvency ratio fell from 168 percent at the start of the stress test to 11 percent (compared to the minimum requirement of 100 percent for licenced insurers) at the end of year 1. In response, participants identified a range of actions to rebuild their capital levels including capital injections, repricing (especially in risk-affected areas), adjustments to reinsurance cover and cost cutting. The identification and assessment of these actions was a key focus of the stress test.

Insights from the seismic scenario

- **Despite the severity of the scenario, all policyholder claims could be met.** The results of the stress test indicate that existing policyholder claims could be met in this scenario beyond our solvency risk appetite of a 1-in-1,000-year loss event.
- The high proportion of claims paid out by reinsurers and the NHC suggest that **policy changes since the 2010/11 Christchurch earthquakes have added to the resilience of the system.** This includes the introduction our 1-in-1,000-year loss solvency standard, and the increase in the monetary cap on NHC payments to $300,000 plus GST per dwelling.

1 Key insurance terms used in this bulletin are provided in the appendix.
2 Under the Natural Hazards Insurance Act 2023, sections 108 and 112 obligate the New Zealand Government (the Crown) to provide the necessary funding for NHC claims when the Natural Hazard Fund is insufficient.

- **More accurate loss estimation should aid pre-event planning.** Catastrophe modelling in this stress test incorporates the latest earthquake science in New Zealand including the 2022 update to the GNS Science lead National Seismic Hazard Model.
- **Capital injections from parent companies and ongoing availability of reinsurance were identified as critical to enabling insurers to continue to offer cover following such an event** and maintain the functioning of the insurance market. Other actions insurers identified to improve their solvency ratios and continue as a going concern included repricing, adjustments to reinsurance cover and cost cutting measures.
- Insurers expected to pass on higher reinsurance costs to policyholders with properties at higher risk receiving the highest premium rise, hastening the move to risk-based pricing.
- Whilst the stress test is not used for setting capital, **we encourage all participating insurers to use the results to inform their solvency positions**, including management buffers, reinsurance arrangements and recovery planning. We encourage insurers who did not participate to consider using this scenario in their own stress testing and solvency planning.
- The results highlighted the **importance of the Reserve Bank working with the industry** to ensure insurers could return to required solvency positions. This includes how we deploy distress management powers rapidly and at scale and how we assess ongoing viability of insurers to avoid any unnecessary winddown of insurers.
- The exercise has provided valuable input into the Reserve Bank's recovery planning and the next stage of our review of Solvency Standards.[3]
- A seismic event of the magnitude modelled in this scenario would have far-reaching impacts for New Zealand as a whole.[4] While there is a high degree of uncertainty over total economic costs, experience with the Canterbury and Kaikoura earthquakes suggest the Crown could be exposed to over 50 percent, through its indemnity of NHC, coverage of uninsured public assets and funding of recovery support programmes. **Ensuring sufficient fiscal buffers to manage such shocks is critical** and has been identified as a key consideration of the Treasury's current consultation on fiscal policy.[5]

Ultimately, this scenario highlights the importance of all stakeholders, individually and collectively, understanding the risks and preparing for these types of events.

Financial impact and insights from the cyber risk scenarios

The stress test included three cyber risk scenarios: a major data security breach; an outage of an important cloud service provider; and a ransomware attack. These events affect policyholders. The purpose of these scenarios is to assess the size of the cyber-related policyholder claims and the impact on general insurers' profit and capital.

The reported losses were much smaller than the seismic scenario. However, given the size of the exposure the relative effect on profitability was significant, reducing annual aggregate profit by one-third in the cloud-down scenario.

3 The seismic risk capital charge is scheduled for review as part of stage 2 of the Interim Solvency Standard review.
4 Some banks highlighted risks from a major earthquake and withdrawal of insurance in its aftermath, in their 2024 Reverse Stress test.
5 treasury.govt.nz/publications/media-statement/treasury-consults-responding-future-economic-shocks

Insights from the cyber scenario included:

- Reinsurance covered a large portion of claims on insurers.
- Insurers used the exercise to improve data collection, develop modelling, and inform risk appetite.
- The test highlighted exposure of particular industries to cyber risks and the need for greater clarity in policy wording regarding coverage.

Next Steps

Participating insurers provided positive feedback on the exercise. We will be providing them with recommendations and peer group comparisons to support development of their risk management and modelling capability in relation to significant seismic and cyber events.

The results from the seismic scenario will be used to inform our recovery planning in the case of an extreme event. The results will also help inform our current review of the solvency standard.

We will continue to engage with our government counterparts and key stakeholders to support system preparedness, particularly in relation to seismic and cyber scenario testing.

2. Introduction

This document outlines the findings of the 2024 general insurance stress test. It provides background on the scenario, the aggregate results including industry losses, and highlights the insights gathered to support the industry and system resilience to cyber and seismic shocks.

Objectives of the 2024 general insurance stress test

This stress test had four main objectives, to:

- Assess the resilience of the insurance sector to severe seismic and cyber risk scenarios.
- Identify management recovery and mitigation plans available to insurers to mitigate the impact.
- Build industry capability and generate new insights.
- Feed into the Reserve Bank's supervisory risk assessments.

To meet these objectives, we intentionally selected a very severe seismic scenario, one that was beyond the level of risk required to be covered by insurers' solvency requirements. The scenario was sufficiently severe to test the recovery and mitigation plans of insurers. It also prompted wider discussions on the appropriate industry and whole of government response to a severe seismic stress.

Scope of the exercise

Stress tests are resource intensive exercises, and we would like to thank AA Insurance, AIG Insurance New Zealand, IAG New Zealand, Tower Insurance, Vero Insurance New Zealand, Chubb Insurance New Zealand and QBE Insurance (New Zealand) for their participation and contributions. They comprise approximately 80 percent of New Zealand's general insurance market. Five insurers modelled the effect of the seismic scenario, and three insurers submitted detailed results for the effect of the cyber risk scenarios.

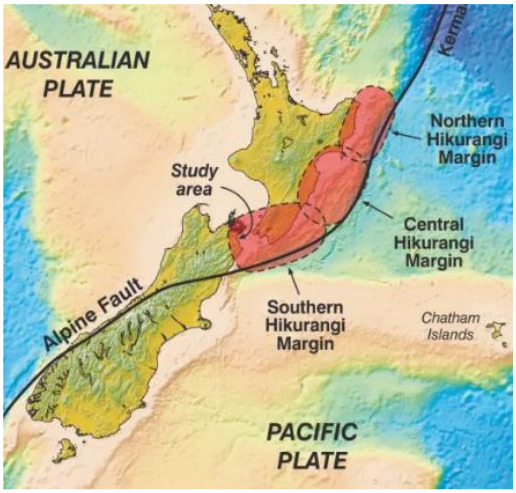
We would also like to thank Moody's RMS, Verisk Extreme Event Solutions (Verisk) and GNS Science for their assistance in developing the seismic scenario, and CERT NZ for their input into the cyber risk scenarios.

3. Seismic scenario

3.1 Scenario description

The seismic scenario is based on a main earthquake of magnitude 8.7 rupturing the central and adjacent sections of the HSZ. The main earthquake immediately causes a tsunami followed by a major aftershock of magnitude 7.7 one month later and smaller seismic shocks for a further 12 months. The New Zealand economy experiences an initial sharp fall in GDP and loss of productive capacity. This is followed by a demand surge from the rebuild of affected property and a government relief package. The Reserve Bank raises the official cash rate to rein in inflation.

Figure 2 – Hikurangi Subduction Zone
Source: GNS Science



The seismic scenario was designed through consultations and discussions with various stakeholders, including GNS Science, Victoria University of Wellington, the Bank of England Prudential Regulation Authority, East Coast LAB, National Emergency Management Agency (NEMA), NHC, participating insurers, and two catastrophe model providers - Verisk and Moody's RMS. The economic impact variables were developed by the Reserve Bank.

The scenario was expected to generate losses greater than our solvency standards for seismic risk. Industry losses for the main earthquake were set at approximately a 1-in-1,200-years. This is intentionally beyond our solvency standard of a 1-in-1,000-year loss event for individual insurers. It is designed to test mitigating actions and inform recovery plans of participating entities. This is a similar approach used in the 2024 Bank Reverse Stress Test where we targeted scenarios which caused a breach of the regulatory capital ratio.

Participating insurers were required to model the effect of the stress scenario on profits and solvency over three years.[6] Insurers were also required to model a simple base case that represents a 'business-as-usual' projection, without factoring in the impacts of the seismic scenario.

The impact of the stress scenario could then be assessed against the base case for the similar reporting period from 2024 to 2027. Scenario results were provided before and after mitigating actions. Mitigants are significant recovery actions that would require planning and implementation, rather than automatically flow from the scenario.

6 AA Insurance, IAG New Zealand, Tower Insurance, Vero Insurance New Zealand Limited and QBE Insurance (New Zealand) representing approximately 70 percent of general insurance market participated in the seismic scenario.

Box A: Earthquake insurance loss modelling

Earthquake modelling was used to identify the scenario and estimate the cost to insurers. This section breaks down the modelling approaches to make it easier to interpret the stress test results.

There are three steps in estimating the effect of a seismic event: identifying the characteristics of the earthquake; defining the characteristics of properties at risk; and calculating the financial impact.

1. Identifying earthquake characteristics

The main damage caused by earthquakes comes from ground shaking.[7] The ground shaking is affected by factors such as the location of the earthquake (the closer to the property the more damage), depth of the earthquake (the closer to the surface the more damage), force or energy released (expressed in moment magnitude), the frequency spectrum of the seismic wave (tall buildings are typically affected by lower frequencies than short buildings) and the site soil type that might amplify or dampen the shaking.

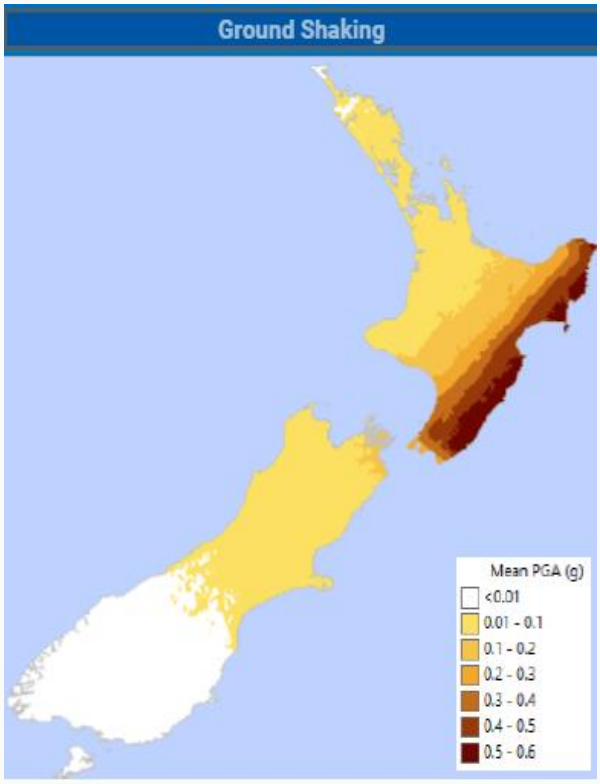
These factors are set out in a 'Hazard' model defined by a set of mathematical equations called the Ground Motion Prediction Equations. The intensity of the shaking at each location is expressed in ground acceleration for a range of frequencies, with the Peak Ground Acceleration (PGA) being the highest value in the spectrum. Figure A.1 shows the PGA ranges for this simulation with areas shaded in brown most impacted.

2. Property characteristics

Another set of equations captures the impact of the level of ground shaking on the **building structure**. The features of the property are important for this part of the modelling.

These include the material used in the construction of the building, the height (in terms of number of stories) of the building, the building location, the year of the build (which gives an indication of the building code), the sum the property is insured for, replacement value and the purpose (occupancy) such as house, office, warehouse, factory etc.

Figure A.1: Earthquake intensity of shaking
Source: Verisk



The specification of the earthquake and property characteristic is used to estimate the damage to individual properties from an earthquake. The models often put a range around the damage to account for unknown information about the property such as the quality of building materials and any repairs undertaken

The table below shows that while insurers had good knowledge of the address, occupancy and age of buildings there was significant missing data on the number of stories in a building and the construction type at the start of the stress test.

Table A1: Property characteristics – percentages expressed on gross sum insured

Occupancy type	100
Address	96
Year built	89
Construction type	69
Number of stories	57

7 We focussed this note on ground shaking which is the most damaging seismic 'peril'. Other lesser perils include fire, liquefaction, landslide and tsunami were in scope.

3. Financial impact

The damage and repair costs, 'Ground-up losses', are calculated for each property. The modelling of the financial impact also takes account of additional inflation for labour and materials, referred to as 'demand surge' (or Post Loss Amplification), that generally arises from a rebuild of this size. The demand surge can be a significant component. For this stress test, we provided a range for the **increase in losses from demand surge between 15 and 25 percent** based on historical experience and insurers' expectations.

The financial modelling determines how much of the losses are policyholder claims against insurers. This will exclude losses borne by policyholders through excesses or policy limits written into the contract and the claims to be paid by the NHC.

The NHC provides the first layer of cover in the event of a natural disaster for insured residential dwellings (i.e. stand-alone houses and apartments). The NHC sets a cap of $300,000 plus GST per dwelling for building, rebuilding and repair for the disaster.

The losses remaining after those due to be paid by NHC, and the small portion retained by policyholders, are claims on insurers. These claims can be funded directly from insurers' own resources or indirectly through their reinsurance catastrophe cover.

Choice of scenario

The choice of scenario was informed by the same modelling approach. This work was carried out by two of the leading catastrophe risk modellers of New Zealand – Moody's RMS and Verisk. Their brief was to identify a very severe but plausible seismic scenario that would test the capacity of insurers to pay claims.

We narrowed the range of hypothetical events by specifying the location – along the HSZ – and the severity, set to a 1-in-1,200-year loss event.

The catastrophe risk modellers estimated the losses for the total New Zealand insurance industry using their anonymised industry property data for potential earthquakes that might occur over 100,000 yearly simulations of seismic activity. This includes over 300,000 individual earthquake events. From the earthquakes generated, the seismic activity located along the HSZ and closest to a 1-in-1,200-year loss event (i.e. the 83rd highest loss event out of the 100,000 simulations), were eligible for the stress test.

There were a few events that met the criteria. For this stress test, all five insurers selected a specific scenario - an **earthquake of magnitude 8.7 off the north-east coast of the North Island** of New Zealand (shown in Figure A.1 above).

An 8.7 magnitude earthquake is likely to trigger a major aftershock(s) and subsequent smaller shocks. We prescribed a large magnitude 7.7 aftershock as part of the seismic scenario aligned to GNS Science research on the topic.[8]

Whilst the single event modelling is based on a range of scientific studies, there is less data collected on aftershocks. Given the uncertainty associated with aftershock modelling, we did not require insurers to run their own models. Instead, we asked insurers to include losses from the aftershocks equal to 15 percent of the main shock.[9] Additional seismic activity added another 2 percent (of the main shock amount) to the losses. The inclusion of the aftershocks is quite innovative and does not appear to be included in other regulator's stress tests.

Limitations of the modelling

The results are based on models using the most up to date scientific data, including the 2022 revision of the National Seismic Hazard Model. However, there are uncertainties around earthquake modelling, assumptions used by insurers in the model and potential inaccuracies in property data. The results in this paper shed light on the impact of a major earthquake but should be interpreted with care.

8 https://www.eastcoastlab.org.nz/assets/Uploads/HRP2.pdf

9 We worked with Verisk on the calibration of the aftershock. Verisk identified a set of hypothetical aftershocks that could be triggered by the main earthquake. This indicated a mid-range of approx.15 percent of additional cost compared to the main earthquake.

3.2 Aggregate losses

The total sum insured for property risk for the five participating insurers at the start of the stress test was approximately $2 trillion across New Zealand. This represents almost five times the size of New Zealand's GDP.[10] Of these properties, almost one quarter were at least somewhat affected by this event. Insurers estimated total losses of $62.4 billion for the affected properties.

Table 1: Aggregate losses and distribution of losses ($ billion)

	Mainshock	Aftershocks	Total
Ground-up losses	53.3	9.2	62.4
of which: Born by Policyholders	4.4	0.9	5.3
Claims on NHC[11]	27.3	4.7	32.0
Claims on Insurers	21.5	3.6	25.1
Insurer claims ceded to Reinsurers	*21.2*	*3.1*	*24.2*
Claims retained by Insurers	*0.3*	*0.5*	*0.9*

Insurers used their own modelling (similar to the approach outlined in Box A) and their property data to estimate the losses from the main shock which contributed $53.3 billion.[12] The results for the aftershocks (the magnitude 7.7 aftershock plus smaller events) followed our guidelines and increased losses by an additional 17 percent.

Ground shaking was the major peril causing 81 percent of total losses. Liquefaction contributed 14 percent of the losses and the tsunami only 3 percent of total losses.[13] However, the attribution of losses to the tsunami may be difficult to isolate and is dependent on the exact location of properties on the shoreline most liable to be affected by the tsunami.

Wellington and the east coast of the North Island, closest to the seismic event, experienced 78 percent of the losses. The rest of the North Island accounted for 16 percent of losses with a small portion of the South Island impacted.

Aggregate claims on NHC

The NHC has a crucial role to play in funding this event, with approximately half of the total losses in the stress scenario due from the NHC.

10 Nominal GDP in 2024 was $425 billion, stats.govt.nz/indicators/gross-domestic-product-gdp/

11 The NHC cost will be larger to the extent that they also pay for some land damage – not the responsibility for private insurers and outside the scope of our exercise icnz.org.nz/industry/cost-of-natural-disasters/

12 Most insurers assessed the main earthquake above a 1-in-1,000 years loss for their own business but less than a 1-in-1,200 years loss.

13 Liquefaction is triggered by ground shaking which causes water-saturated layers of sand and silt beneath the ground surface to lose strength causing damage to buildings. Liquefaction is part of the ground shaking modelling.

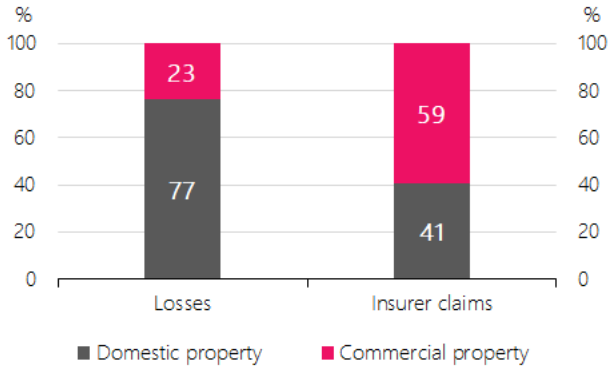
Participating insurers modelled $27.3 billion of claims would be covered by NHC from the mainshock as shown in Table 1. NHC is liable for the first part of the claim on insured residential buildings.

Because the aftershock occurs more than 48 hours after the main earthquake, the NHC is liable to pay up to an additional $300,000 on insured residential buildings already damaged from the main earthquake, and buildings not previously affected. Insurers estimated the cost to the NHC from the aftershock at almost $5 billion. In practice, it would be difficult to separately identify the cost between the main earthquake and aftershocks and this would add complexity in identifying claims for NHC and private insurers.

Insurers now have the responsibility of co-ordinating all policy claim payments, including that portion covered by NHC. The timely settlement of claims by NHC is important for insurers to progress their own claims and be entitled to reinsurance recoveries. The Crown guarantees the NHC liabilities and has a number of options for funding the shortfall. Claims on NHC in this stress test are well above NHC's current reinsurance cover of $11 billion[14] and its equity as of June 2024.[15] Claims are expected to be paid out over an extended period during which Crown support will be required by NHC.

The NHC cover mainly applies to residential dwellings. It does not extend to commercial property. Figure 3 shows that while the majority of losses in this stress test came from domestic property, the majority of claims on private insurers (after allowing for NHC cover) came from commercial property policyholders.

Figure 3: Split of losses and claims between commercial and domestic property



Aggregate claims on participating insurers

Insurers were left to pay out an aggregate $25.1 billion in claims to policyholders after NHC's coverage. This was mainly achieved through reinsurance catastrophe cover, which covered 97 percent of insurers' (post-NHC) claims. This is much higher than the coverage at the time of the Canterbury earthquakes (which was closer to 70 percent). The main factors driving this change have been the introduction of the Reserve Bank's 1-in-1,000-year solvency standard and the increase in the NHC cap from $100,000 to $300,000.

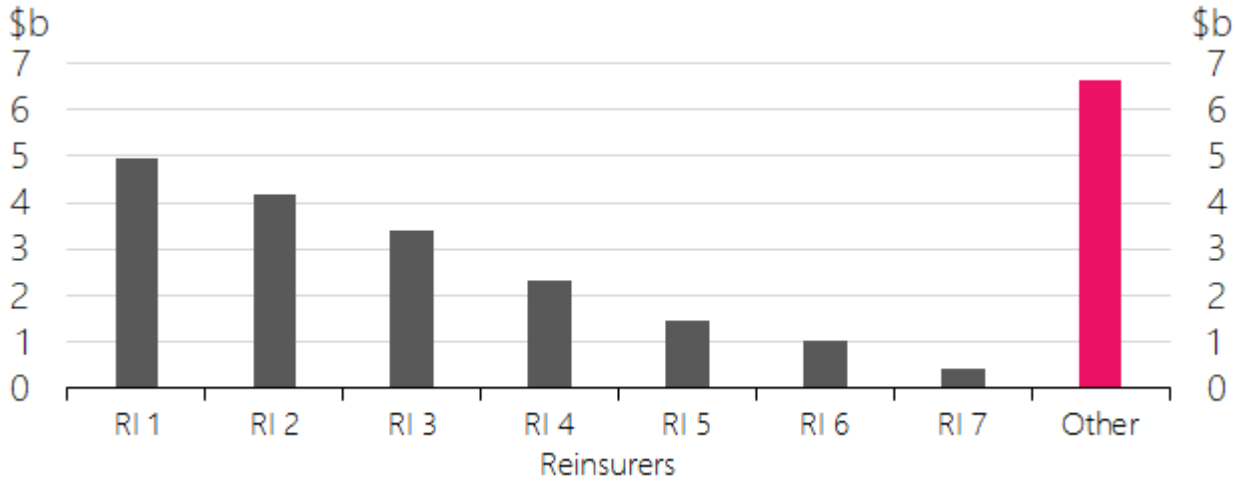
Insurers had sufficient catastrophe cover to pay the claims from the main earthquake, as they usually purchase a buffer above the solvency requirement. A small portion ($0.3 billion) was retained by insurers due to excesses and cover limits under the reinsurance contracts. Insurers were also prepared for the aftershock in the scenario as the solvency standards require insurers to have prepaid for one reinstatement of their catastrophe cover, or to hold sufficient capital to do so. This restored the catastrophe cover by the time the large aftershock occurred one month after the main shock. The aftershocks generated insurer claims of $3.6 billion, with $3.1 billion ceded to reinsurers.

The ceded losses from private insurers to reinsurers appeared to be well diversified across the reinsurance market. Approximately 70 percent of the claims were distributed among seven

14 $9 billion for the first event and $2 billion for the second event
15 naturalhazards.govt.nz/assets/Publications-Resources/Natural-Hazards-Commission-Toka-Tu-Ake-Annual-Report-2023-2024.pdf

reinsurers as shown in Figure 4. For the large global reinsurers, the claims were less than half of their annual profit.

Figure 4: Aggregate claims for individual reinsurers (RI) ranked by size of payment (top 7)



The total retained claims of $0.9 billion on insurers after reinsurance from the main earthquake and aftershocks needed to be met from insurers' own capital. Insurers had capital at the start of the stress test in excess of these claims' costs.

3.3 Financial impacts

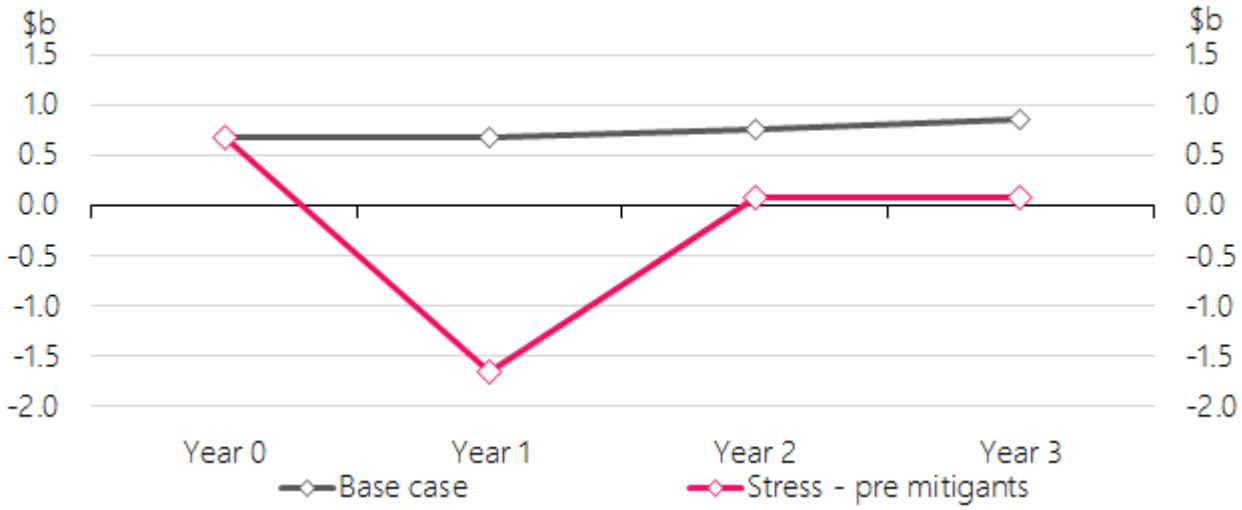
Profit results

The seismic event caused a significant decline in the aggregate profit of the five participating insurers in Year 1 of the stress test. Aggregate profits after tax fell from $0.6 billion in the base case to a loss of $1.6 billion in the stress test before any mitigants as shown in Figure 5.

The main driver of the drop in profits was higher reinsurance costs. The increase in reinsurance cost was due to both higher reinsurance premiums, consistent with the scenario assumptions, and the purchase of new or replacement catastrophe cover. The scenario assumed reinsurance would continue to be offered but at higher prices.

The main earthquake caused insurers to draw down on their catastrophe cover. Whilst the Interim Solvency standard requires insurers to have one pre-paid cover, insurers purchased additional cover in case of a further earthquake. This was paid for at the 50 percent higher rate assumed in the scenario. The aftershock, one month later, again drew on the catastrophe cover. This in turn led to insurers purchasing additional catastrophe cover at 100 percent higher rate than the base case. As a result, reinsurance costs in the stress scenario were double that of the base case in Year 1. Reinsurance costs continued to be more expensive in the later years, impacting profits for insurers renegotiating expired reinsurance contracts in Years 2 and 3.

Figure 5: Aggregate net profit after tax – pre mitigants



The other drivers of the fall in profit compared to the base case in Year 1 were the higher incurred claims expenses ($0.7 billion) and lower revenue ($0.5 billion). Lower revenue was driven by a reduction in policy income from a small reduction in the number of policies written and a lower level of investment income caused by the economic stress in Year 1.

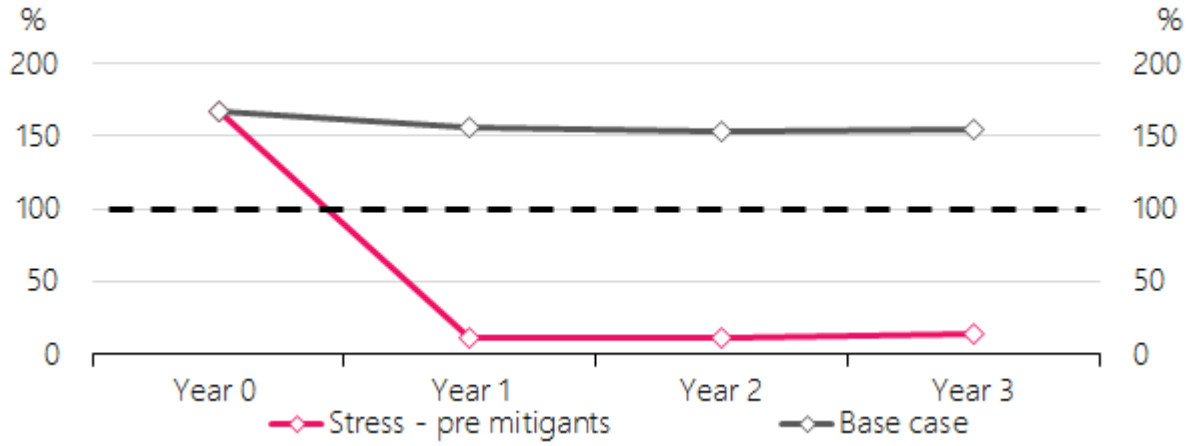
Solvency results

Locally incorporated insurers in the stress test are required to maintain their solvency ratio (actual solvency capital as a percentage of required solvency capital) greater than 100 percent to meet their licence condition. As expected, given the severity of the scenario, locally incorporated insurers modelled a significant fall in their solvency ratio. In response, participants were able to identify a range of actions including capital injections, repricing (especially in risk/affected areas), internal reinsurance and cost cutting to rebuild their capital levels.

The severity of the scenario, particularly around the reinsurance cost assumptions, caused the four locally incorporated insurers to breach their solvency requirements before implementing mitigating actions.[16] Figure 6 shows the aggregate solvency ratio of the four locally incorporated insurers over the three years of the stress test, compared to their base case. The ratio fell from 168 percent at the start of the scenario to 11 percent in Year 1 prior to any mitigating actions, where it remained for Years 2 and 3. This was lower than the base case at the end of Year 1 of 156 percent.

16 QBE Insurance (New Zealand) has been excluded from the solvency results as it holds a Section 59 exemption from compliance with New Zealand solvency standards.

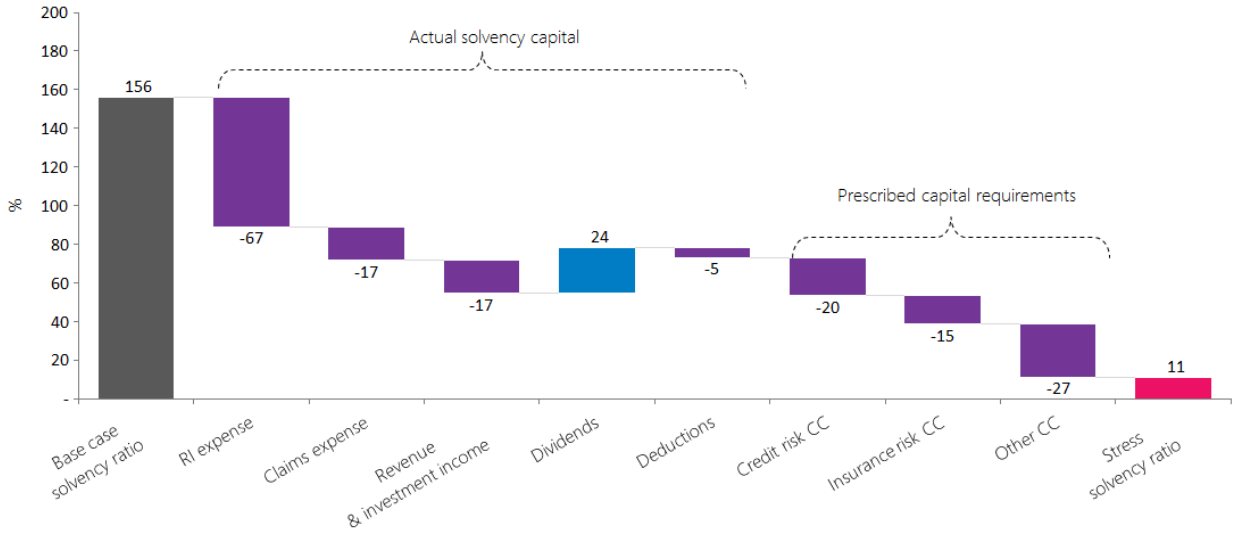
Figure 6: Aggregate solvency ratio



The drivers of the difference in the aggregate solvency ratio at the end of Year 1 for the base case compared to the stress test is shown in Figure 7. The difference is due to both lower solvency capital (81 percentage points [ppts]) and an increase in the capital requirements (64 ppts).

The decrease in solvency capital is primarily driven by the increase in reinsurance expenses, which contributed 67 ppts to the decline in the solvency ratio compared to the base case. The increase in claims expense caused a 17 ppts drop in the solvency ratio, resulting from high gross incurred claims (981 ppts), largely offset by reinsurer recoveries (964 ppts). An additional 17 ppts decline is attributed to lower revenue. Dividend were reduced or nil for most insurers, reflecting the decline in profitability in the stress scenario, which increased solvency compared to the base case.

Figure 7: Drivers of aggregate solvency ratio in Year 1



Insurers modelled higher capital requirements consistent with the Interim Solvency standard after the seismic event for:

- Credit risk capital charge (20 ppts) due to the large recoveries owed to the insurers by their reinsurers.

- Insurance risk capital charge (15 ppts) due to the risk that claim payments are higher than expected as well as additional capital required to cover loss making polices sold in the impacted regions.
- Other risks primarily due to disallowance of deferred tax assets generated by the seismic losses which are unlikely to be available in a wind-up scenario.

3.4 Actions to restore solvency ratio

Insurers identified a range of mitigating actions they could take in this scenario to restore their profitability and capital levels. Capital raisings, repricing and changes to reinsurance arrangements were the main actions lifting solvency above the minimum requirements as shown in Figure 8.

Call on dividends from subsidiaries, further reductions in dividends, reduction in expenses and cost reprioritisation were other mitigants modelled with a smaller effect. Additional actions were identified but not required included embargoes on new business, sale of part of the business, derisking of investments and placing the firm in 'run-off'.

Figure 8: Drivers of post solvency ratio in Year 1

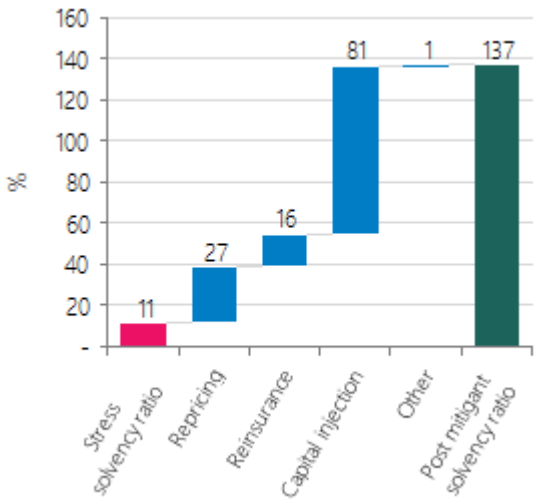
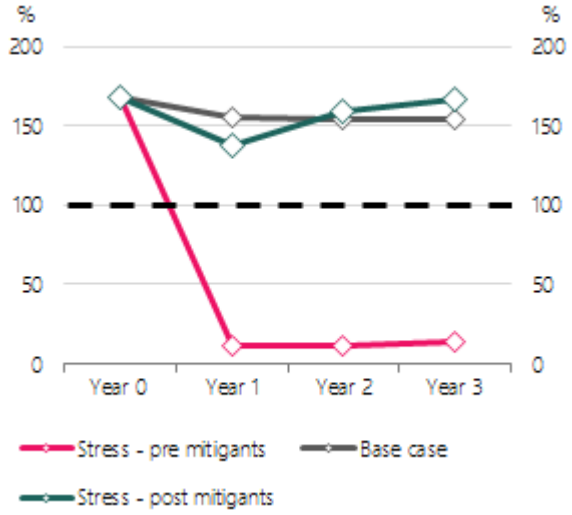


Figure 9: Aggregate solvency ratio post mitigants



Capital raisings were seen to be the most effective action to restore capital in a timely fashion. The three Australian-owned insurers received capital injections from their parent companies to strengthen their solvency positions. Capital raising increased the aggregate solvency ratio by 81 ppts.

Repricing was undertaken by all insurers as an immediate response to the increased costs of reinsurance. Premiums rose on average by 20 percent above the base case in Year 1 followed by further increases in Year 2 of 10 percent to 15 percent. The impact from repricing takes time as repricing applies on the renewal of policies typically every 12 months. This improves the solvency ratio beyond Year 1. Insurers highlighted that the price changes would not be applied uniformly but be technically driven to reflect the observed and anticipated changes in reinsurance risk appetite and costs, increased risk of aftershocks and construction and repair inflation. High-risk areas like Wellington and the east coast of the North Island would see a significantly higher pricing response compared to regions like Auckland i.e. an acceleration towards risk-based pricing would reduce cross-subsidisation across the country.

Some insurers **adjusted their reinsurance programs** strategically to control their risk exposure. This involved varied approaches, such as adjusting coverage levels, seeking extra protection and exploring alternative reinsurance structures including adjustment of their risk retention thresholds to provide a balance between cost-effectiveness and comprehensive risk mitigation.

3.5 Aftershock sensitivity

Given the uncertainty around the timing of the aftershock, we conducted a sensitivity analysis on the aftershock period. The sensitivity defined an aftershock occurring within 24 hours of the main earthquake (compared to one month in the stress scenario) with all other variables unchanged. In this sensitivity, the main earthquake and the aftershock (in the same proximity as the main earthquake) would likely be treated as a single loss event, impacting NHC and reinsurance cover:

- The NHC claims would be capped at $300,000 per dwelling, as the aftershock falls within their 48-hour window. This compares with a potential cap of $600,000 in the stress scenario.
- The main earthquake alone pushed claims close to the reinsurance limits of insurers. The additional damage from the aftershock within 24 hours of the main earthquake may be treated as a part of a single event for reinsurance purposes, pushing losses beyond the reinsurance limits in most cases.

These factors meant the impact on insurers was even more severe in the sensitivity. Insurers would retain more of the losses than the stress scenario, with an offsetting reduction in losses for reinsurers and the NHC. The result of this sensitivity highlights the significant impact the timing of an aftershock can have on insurers.

3.6 Estimated industry losses and cost to New Zealand

Extrapolation of the aggregate losses of $62 billion to cover the New Zealand insurance sector suggests total industry losses of between $80 billion to $100 billion.[17] However, these are only the losses for domestic and commercial property insured from the event. The total economic cost to New Zealand would be greater and include losses related to uninsured or self-insured assets, particularly public sector assets.[18] In addition, the government may wish to fund additional recovery costs, such as business support programmes.

The Kaikoura and Canterbury earthquakes suggest uninsured costs could increase the overall losses by 25 percent, with the total economic costs ranging from $100 billion to 125 billion.[19] Noting the uncertainty associated with these numbers, they are equivalent to approximately 25 to 30 percent of GDP.

Funding the recovery could therefore have significant impacts on the Crown balance sheet, through its indemnity of NHC, and coverage of uninsured assets and spending on additional recovery programmes. Again, using the examples of Canterbury and Kaikoura, estimates suggest the Crown has covered around 50 percent of costs to date. Retaining sufficient Crown fiscal buffers is therefore critical to managing the shocks of this magnitude. Particularly at a time where the insurance industry

17 We estimated industry gross losses by scaling up the results of the five participating insurers for their market share, including mix of commercial and domestic business. The range allows for the uncertainty of the estimates.

18 A 2012 report by the OAG, following a survey of over 400 of New Zealand largest public entities estimated around 57% of assets were uninsured, oag.parliament.nz/2013/insuring-public-assets/docs/insuring-public-assets.pdf

19 Refer to footnote 5, cite table 2.1 pg. 21

is also seeking capital to rebuild. This is a key consideration of the Treasury's current consultation on fiscal policy.[20]

While large, such an event is not an outlier for global reinsurers. The largest economic loss events (including both insured and uninsured losses) in 2024, was Hurricane Helene which caused major damage in the Southeastern United States in late September 2024 costing around US$78 billion.[21]

3.7 Insights from the seismic component of the stress test

Existing policyholders could be paid, even in an event more severe than our solvency standard.

The combination of NHC cover, reinsurance and the available capital (before the impact of the seismic scenario) was sufficient to cover the claims of policyholders for an event more severe than our solvency standard.

However, insurers need to deploy mitigating actions quickly to avoid breaching their licence conditions

This will allow them to continue operating as a going concern and avoid winding down their operations. The damage and recognition of claims in the scenario occurs in the first quarter so the mitigating actions need to be timely and effective. For insurers that face significant challenges despite implementing mitigating actions, the Reserve Bank would engage with them to understand their recovery plans, provide assistance where appropriate and apply its supervisory discretion as needed.

Raising capital and increases to policy rates were the most effective mitigating actions

Insurers considered a range of actions that could be taken in response to this event. Repricing and capital raisings had the most impact.

Australian owned locally incorporated insurers' plans for such a severe event are to request early capital support from their parent – the first quarter in this scenario. They provided historical evidence from previous stress periods to show the Group would have access to capital markets if required.

Insurers increased premiums to cover the cost of reinsurance and improve solvency. All participating insurers undertook repricing in Year 1 with further increases in Year 2. There was a general commitment to continuing to provide coverage to the most affected regions under the assumption of continuing reinsurance availability. Those regions most affected in the scenario faced higher premiums than other regions as insurers accelerated the move to risk-based pricing.

Whilst these two mitigating actions were generally sufficient for this scenario, continued access to global reinsurance markets is critical post-event

Participating insurers ceded almost all their claims to their reinsurers in this stress test. Reinsurance markets are critical to providing cover in the event and allowing insurers to continue writing policies post-event. There was some consensus among participating insurers that an event of this type is understood by the market and reinsurance would continue to be available, albeit at higher pricing.

There are some considerations for our Solvency Standard

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20 Refer to footnote 5

21 ajg.com/gallagherre/-/media/files/gallagher/gallagherre/news-and-insights/2025/natural-catastrophe-and-climate-report-2025.pdf p.12

Insurers made some observations that we will feed into stage two of the solvency standard review:

- The seismic event highlights the potential benefit in diversification away from the insurance market's heavy reliance on traditional external reinsurance. Introducing alternative capital sources into our solvency standards could reduce this dependency, for example catastrophe bonds, already utilised by the NHC and permitted in some instances by regulators like Australian Prudential Regulation Authority (APRA).
- Participants in the stress test expressed concerns about the high cost associated with the current 1-in-1,000-year catastrophe capital requirement. This incentivises insurers to construct large reinsurance towers, which, although costly, do not adequately address vulnerabilities exposed by multiple-event scenarios such as aftershocks.
- The Interim Solvency Standard requires more capital (in the form of a higher reinsurance recovery, claims run-off and distressed wind-up charges) to be held following a catastrophe event (due to increased balance sheet risk) which amplifies the impact on solvency.

We need to continue to work with APRA on Trans-Tasman Recovery Planning

We have discussed the results with APRA's insurance supervision team. The stress test highlights the dependence of the Australian-owned insurers on their parents for capital support and/or shared reinsurance arrangements in times of stress. This shows the need for the Reserve Bank supervisors to continue working closely with APRA on recovery and resolution planning.

The exercise can help prepare us for such an event

We can make use of this exercise to continue to develop insurance sector recovery planning and preparedness to maximise our ability to respond to a systemic crisis. A simultaneous triggering of solvency concerns for numerous insurers will require the Reserve Bank to deploy distress management powers rapidly and at scale. Smaller insurers without parent support that did not participate in this stress test could be exposed to similar or more severe solvency concerns. Improvement in seismic modelling should assist the pre-event planning.

A system-wide response is required

The financial impact on New Zealand from this event is greater than the estimated insured losses of $80 billion to $100 billion. The total impact would also include the cost to government to fund the rebuilding effort, including repairs to uninsured or self-insured local council and central government owned assets and the underwriting of the NHC unfunded policy liabilities. Insurers need to manage claims payments including those of the NHC. Reserve Bank supervisors will need to be assessing the ongoing viability of insurers.

The seismic event requires wide collaboration across the private and public sectors in New Zealand. There will be a substantial proportion of New Zealand homeowners suffering property damage and in some cases injuries. Given the material impact on the New Zealand economy, we have shared results with NHC, the Treasury, Department of the Prime Minister and Cabinet and NEMA to inform preparation for a co-ordinated response to such an event. These organisations noted that the stress test results provide a useful input into consideration of wider policy issues such as NHC pre-funding and Treasury's balance sheet management.

4. Cyber risk scenarios

4.1 Background

While cyber-related insurance losses currently remain modest compared to other insurance classes, the financial risk to insurers from potential claims warrants our investigation – hence these stress tests. According to the International Monetary Fund, the average annual number of cyber-attacks doubled following the COVID-19 pandemic, resulting in increased financial losses for businesses worldwide. In New Zealand, 5,903 incidents were reported in 2024, with associated financial losses totalling $25.7 million.[22]

In the 2024 general insurance stress test, we aimed to investigate the risk to insurers' profitability and solvency from three distinct types of cyber risks: Major data security breach, cloud outage and systemic ransomware. The scenarios test insurers' ability to pay claims to policyholders who have suffered a significant cyber-attack.

The cyber scenarios were developed after discussions with Lloyd's of London[23] and the Bank of England Prudential Regulation Authority, which have conducted similar stress test exercises recently, and CERT NZ.[24] Our scenarios were refined through consultation with participating insurers.

Potential cyber exposures contained within traditional property and liability insurance policies as 'non affirmative' or 'silent cyber' were in scope of this exercise. Silent cyber (also known as non-affirmative or unintended cyber coverage) is a term used to describe an insurance policy that does not explicitly include or exclude cyber coverage. This exercise required insurers to test the validity of all contracts under each scenario. This approach sought to not only enhance insurers' resilience but ensures compliance with evolving regulatory requirements.

Four insurers modelled the impact of the losses from the cyber scenario and three submitted detailed financial results. We assessed the impact of the cyber scenarios against Year 1 of the base case without the major cyber events.

4.2 Cyber scenario descriptions

Major data security breach

This scenario involved a series of coordinated cyber-attacks targeting large organisations across New Zealand. Despite the targeted entities having reasonable security measures in place, attackers successfully exfiltrate sensitive customer data. The attacks exploit vulnerabilities in operating systems, web applications, and software, affecting multiple systems and organisations. In this exercise, the ten largest customers within the sector with the greatest exposure are targeted.

Cloud outage

This scenario evaluates underwriting losses resulting from a two-day outage of a major Cloud Service Provider (CSP), such as Spark NZ, Amazon Web Services, Microsoft Azure, or Datacom. Policyholders experience prolonged disruption as they must verify their data and systems once the cloud services are restored.

22 cert.govt.nz/insights-and-research/quarterly-report/quarter-four-cyber-security-insights-2024
23 lloyds.com/conducting-business/underwriting/realistic-disaster-scenarios
24 bankofengland.co.uk/prudential-regulation/letter/2022/may/insurance-stress-test-2022

For this analysis, participants provided for outsourced CSP coverage as an optional extension within their policies. The CSP serves a broad customer base, including individual consumers, small-to-medium businesses, government agencies, and large enterprises.

Insurers noted that CSP policies typically include an exclusion for "Loss of Service," which would likely exclude losses resulting from an outage. However, for the purpose of this scenario, the model assumes no material exclusions apply and includes coverage for critical outsourced service provider security and system failures.

Systemic ransomware

This scenario assesses the underwriting losses from a widespread systemic ransomware event, with impacts differentiated by policyholder size. It is assumed that 5 percent of firms suffer ransomware attacks. Policyholders refuse to pay the ransom and instead rebuild their systems, experiencing varying degrees of downtime. Most must verify their data and systems to ensure they have not been corrupted. Some policyholders, particularly those with inadequate backup systems, face prolonged recovery times. The vulnerability is patched three days after the initial attack.

4.3 Aggregate cyber-related losses

The aggregate losses reported by the three participating insurers for each scenario are shown in Table 2. The maximum aggregate loss was $0.4 billion for the cloud outage scenario, with aggregate losses of the data breach and systemic ransomware scenarios at $0.2 billion each. In all scenarios, 80 to 85 percent of losses were ceded to reinsurers, with the remainder retained by insurers.

Table 2: Aggregate cyber-related losses per scenario ($m)

	Data breach	Cloud outage	Systemic ransomware
Aggregate loss	200	385	152
Reinsurance ceded loss	171	325	123
Losses retained by insurer	29	60	29
Reduction in profit relative to base case (%)	16	32	16

A significant portion of the losses stemmed from silent cyber exposures. These losses typically relate to directors' and officers' liability and professional indemnity coverages. Figure 10 shows the share attributed to these losses. Insurers noted the lack of historical claims for such events and applied conservative assumptions when estimating silent cyber claims as a result.

Based on the scenario assumptions, insurers' standalone cyber assessments, and product-specific assumptions, it was estimated that the majority of claim losses would arise from large organisations (those with annual gross revenue over $50 million), particularly in the technology, aviation, and professional services sectors. Table 3 provides more detail on the findings for each scenario.

Figure 10: Aggregate losses per scenario by classes

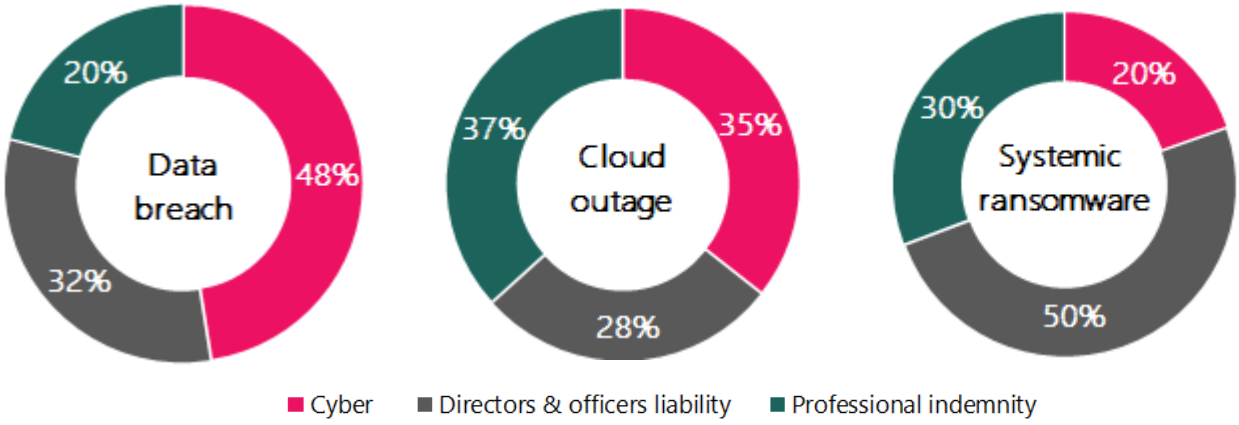

Table 3: Findings from insurers' submissions

Scenario	Findings from insurer's results
Data breach	Participants identified the technology, healthcare, and public administration sectors as having the highest exposure to data security breaches. This is due to the large volume of sensitive personal information managed by the policyholders in these sectors. Nearly half of the losses arose from the cyber class directly, with a large portion attributable to forensic investigations and remediation expenses following the breach.
Systemic ransomware	50 percent of the losses were due to directors and officers' claims. These costs would escalate with longer recovery periods—whether due to restoring access or rebuilding internal systems—and are also influenced by the size of the policyholder.
Cloud outage	The event would trigger losses across multiple liability coverages. One of the key losses would be from network/business interruption, calculated as the product of downtime (beyond any applicable waiting period) and daily revenue loss based on the business operations of policyholders. Additional losses were estimated using historical claims experience and prevailing market conditions in Australia and New Zealand.
Cloud outage - impact on insurers' operation	For this cyber risk scenario only, insurers were also asked to provide the effect on their own operations. A CSP outage could result in significant direct effects on insurers, including their ability to meet obligations to policyholders in a timely manner. To mitigate such risks, insurers reported relying on key control environments such as cyber resilience frameworks, periodic impact analyses, business continuity plans, and disaster recovery plans. Some also noted the possibility of leveraging brokers and/or their overseas parent companies or groups to redirect critical services, including claims handling.

4.4 Financial impact

Insurers could meet all claims could through their reinsurance arrangements and profits. The scenarios did not test the solvency ratios as expected given the relatively small size of the exposures. Mitigating actions were not required. However, the cloud outage scenario would have led to a one-third reduction in profits compared to baseline levels (Table 2). Insurers determined these scenarios were more severe than their solvency stress testing for cyber risk. These scenarios could be useful to monitor cyber risks if insurers continue to grow their cyber business in the future.

4.5 Insights

Insurers resilient to cyber risk

The results indicate that insurers are generally well protected against losses arising from cyber-related claims. This exercise highlighted the robustness of insurers' risk measures and control environment, with reinsurance protection standing out as particularly strong.[25] The global reinsurance market plays a critical role in mitigating the financial impact of not only large natural catastrophes but smaller and more frequent events such as cyber incidents, thereby supporting the ongoing viability of insurance businesses in New Zealand.

Participants claim that the risk from these scenarios remains within their underwriting appetite. Insurers also conduct regular business impact analyses to identify critical activities, establish recovery time objectives, and formulate contingencies. Most can redirect services, including claims handling, to international branches or parent companies if needed.

Emerging cyber insurance market

The cyber insurance market in New Zealand is relatively small but is expected to experience steady growth. According to participants' estimation, the number of affected cyber policies per scenario ranged from 10 to 250. Insurers have limited appetite to retain cyber risk locally and typically leverage their internal global expertise for underwriting. The stress test served as an opportunity to develop new models, prompting new analysis and discussion within their entities. Insurers are also conscious of potential cyber risk accumulations and use global cyber catastrophe models to assess and monitor their aggregate global exposures.

Silent cyber limited experience

The silent cyber exposure explicitly falls within the scope of this exercise. Participants emphasise that the "silent" nature of the exposure for these cover types increases the level of uncertainty for modelling these scenarios. Participants reported that it was hard to envisage silent cyber claims on the provided scenarios given their experience to date with professional indemnity, directors & officers liability and information technology portfolios with no recorded claims for these historical events.

Through this exercise, insurers were able to better identify portfolios with silent cyber exposures in certain policy wordings, reducing the risk of duplicate claims being paid under multiple policies for the same customer. This also enabled an insurer to refine their policies by introducing clearer exclusionary language where necessary.

25 Examples include evidence of Cyber Resilience Framework, Business Continuity Plans, and Disaster Recovery Plans.

Data development opportunities

The stress test exercise encourages insurers to engage in ongoing data quality improvement. Insurers pointed out that there was an inconsistency in the level of data collected across different lines of business for all policies. Insurers highlighted actions to address these issues including manual review and validation of policy data, as well as refining assumptions related to standardised industry codes, total sums insured, and business turnover.

5. Conclusion

The 2024 general insurance industry stress test has enabled the Reserve Bank to better understand the risks posed by a major earthquake and cyber events to New Zealand's largest general insurers.

The results from the seismic scenario underscored the crucial role of the NHC and reinsurance in the settlement of claims as well as disaster response and recovery efforts. Additionally, the move towards risk-based pricing, balanced with ensuring insurance affordability, will be vital in fostering a sustainable and resilient insurance market for all New Zealanders.

Solvency shocks for insurers from a seismic event play out very differently to our bank stress test. The main impact from banks in an economic shock generally takes two years to have the largest effect on capital providing time for response. However, the seismic event in the insurance stress test caused the major impact in the first quarter. This requires a rapid response and state of preparedness from both the industry and the entire government. Looking ahead, a coordinated, New Zealand-wide response will be essential to effectively manage and recover from such severe and systemic events. This stress test scenario is one among many that can be considered for this purpose.

Appendix – Glossary

Term	Description
Catastrophe Risk Capital Charge	A charge intended to protect the licensed insurer's solvency position from its potential exposure to extreme events (e.g. earthquakes, floods or storms, that results in unexpected large or extreme losses).
Claims expenses	Claim expenses net of reinsurance, including any increase in policy liability net of reinsurance, any increase in policyholder unvested benefit liability, and any increase in deferred & future tax on policy liabilities.
Directors and officers' liability	Covers individual directors and officers against liability for claims arising out of wrongful acts, as well as the cost of defending those claims.
Hikurangi subduction zone	The Hikurangi plate boundary, located off the east coast of the North Island, is where the Pacific tectonic plate subducts (or dives underneath) the Australian tectonic plate. The subduction zone is potentially the source of the largest earthquake and tsunami hazard in New Zealand.
Insurance policy deductibles	The amount that a policyholder must pay before their insurance coverage begins to pay for a covered loss.
Insurance policy limits	The maximum amounts an insurance company will pay for covered losses during the policy period. Costs exceeding limits are policyholder's responsibility.
Insurance revenue	The consideration to which the entity expects to be entitled in exchange for providing insurance services
Liquefaction	The process which causes soil to behave more like a liquid than a solid during an earthquake.
Magnitude	Magnitude as measured by the Moment Magnitude scale.[26]
Natural Hazard Commission/ previously known as Earthquake Commission	A Crown Entity, created through the Earthquake Commission Act 1993 (EQC Act). The organisation provides insurance coverage for residential property damage caused by natural disasters like earthquakes, volcanic eruptions, tsunamis, landslides, and severe storms for residential property, administers the Natural Disaster Fund. Most homeowners automatically have NHC coverage through their home insurance policy if it includes fire cover.
NHC recoveries	NHC covers provides the first layer of insurance cover for natural disasters damage to • **Homes**: Damage from earthquakes, volcanic activity, tsunamis, landslides, geothermal activity, and fire • **Land**: Damage from natural hazards, storms, and floods The maximum payout for a residential building is $300,000 (plus 15% GST). There is no maximum payout for land damage.
NZ IFRS 17	New Zealand Equivalent to International Financial Reporting Standard 17. Reporting in this stress test was on an IFRS 17 basis.

26 usgs.gov/faqs/moment-magnitude-richter-scale-what-are-different-magnitude-scales-and-why-are-there-so-many

Term	Description
Premium	The consideration an individual or business pays for an insurance policy.
Prescribed Capital Requirement	Is the minimum amount of capital insurers need to hold, worked out based on the stressed balance sheet (it is the sum of the 'capital charges' assessed for each risk).
Professional indemnity insurance	Covers claims relating to a breach of professional service or duty.
Reinsurance	Reinsurance is a form of insurance for insurance companies, where in return for paying a premium the reinsurance company will take on an agreed portion of the insurance company's claims.
Reinsurance Recovery Risk Capital Charge	This charge reflects the exposure of a licensed insurer to losses arising from failure to fully recover on reinsurance contracts, including losses due to reinsurer failure and contract dispute.
Risk Capital Charge	This charge set out the amounts of capital licensed insurers are required to hold against certain risks they are exposed to. These risks are set out in the solvency standards.
Solvency Capital	Is the amount of capital on the standardised balance sheet required in the Interim Solvency Standard.
Solvency Standard	Refers to the Interim Solvency Standard
Solvency Ratio (%)	Puts the size of solvency capital an insurer holds in the context of the minimum amount of capital they should hold (the Prescribed Capital Requirement). The licence condition requires insurers to have their solvency ratio above 100 percent. $Solvency\ ratio = Solvency\ capital\ /\ Prescribed\ capital\ requirement$