

Funding and reserving Canterbury earthquake insurance claims

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Key findings

- There are valuable lessons for insurers and the Reserve Bank (as the prudential regulator and supervisor of the insurance industry) to be drawn from a significant event such as the Canterbury earthquakes. This paper explores the funding of property insurance claims costs and the development over time of insurer estimates.
- The experience provides some lessons for dealing with future catastrophic events. While there are additional funding sources for catastrophic events besides reinsurance, these are generally constrained and not always effective. For large and unique catastrophic events it is difficult to accurately estimate expected claims costs and the uncertainty in those costs, and these difficulties can persist for several years.
- Reinsurance has funded 72% of the cost of insurance claims for the 2010-11 Canterbury earthquakes for 20 property insurers (excluding the Earthquake Commission and Lloyd's).
- Claim costs exceeded the limits of reinsurance cover for the 22 February 2011 earthquake for eight insurers. Four of these insurers also had claim costs that exceeded reinsurance limits for the 4 September 2010 earthquake.
- Ten insurers had insufficient existing reinsurance and capital to fully fund claim costs, and this was material for five insurers (with a pre-event funding shortfall of at least 30%). In aggregate for the 20 insurers, 81% of claim costs were funded pre-event and 19% post-event.
- Several insurers purchased after the event reinsurance, to mitigate increased claim costs in excess of existing reinsurance. This source of funding had mixed success.
- Several insurers required additional funding of their claim costs from capital injections by their parent, or in the case of Southern Response (formerly AMI) by the government. In aggregate, 14% of claim costs were funded by capital injections, which exceeds the 9% funded by existing capital. Western Pacific was unable to obtain additional capital and entered liquidation on 1 April 2011 with a significant funding shortfall.
- Insurers' best estimate claim cost has roughly doubled between June 2011 and December 2016. Since the best estimate is required to be an unbiased mean, the large size and persistency of increase indicates insurers struggled to accurately estimate claim costs.
- For valuations made before December 2016, the subsequent increase in claim cost has been more than 50% of the best estimate reserves for outstanding claims at the valuation date. This is more than double the risk margin component of outstanding claims reserves that insurers hold for uncertainty. With hindsight, reserves were not adequate and the quantified uncertainty was understated.

Introduction

The 2010-11 Canterbury earthquakes are by far the most costly disaster for insurance claims in New Zealand's history. The Reserve Bank's estimate of total estimated claim costs is around \$38 billion (including the Earthquake Commission), and by 30 June 2020, more than \$36 billion has been paid.

This paper reviews the funding and reserving of claim costs by 20 property insurers, which includes Southern Response (formerly AMI) but excludes the

Earthquake Commission and Lloyd's. Other costs from the earthquakes (such as additional reinsurance premiums) have not been included in the analysis.

Funding for insurance claims arising from large disasters is of interest to stakeholders because insurance is a promise to transfer risk from policyholders to insurers. Policyholders need to be confident that insurers are sufficiently well-funded to fulfil their obligations.

As the prudential regulator and supervisor of property insurers in New Zealand (excluding the Earthquake Commission and Southern Response), the Reserve Bank requires funding to be in place before a disaster occurs. Property insurers that are subject to New Zealand solvency standards are required to have reinsurance and capital sufficient for a 1-in-1000 year earthquake event. At the time of the Canterbury earthquakes, insurers were not yet licensed by the Reserve Bank and had no New Zealand solvency requirement other than through the Companies Act 1993.

If existing reinsurance and capital are insufficient, insurers typically have additional funding options to meet the cost of claims. The post-event funding includes reinsurance purchased after the event, capital injections, and future profits. However, the extent and availability of these options varies considerably by insurer, and if they are insufficient to meet obligations, the unfunded portion results in loss to policyholders.

Reserves for outstanding claims are the insurer's estimate of the unknown cost of future claim payments. In New Zealand, insurers are required to reserve for the best estimate cost (an unbiased mean) plus a risk margin for uncertainty. The risk margin increases the probability that total reserves are sufficient to meet the actual costs.

Reserving adequacy can be assessed with a hindsight comparison of reserves with subsequent payments. This paper includes a quantitative hindsight comparison of best estimates as well as movements relative to risk margins. This is not the same as an assessment of possible under-reserving (i.e. bias), because that requires a more in-depth analysis of information available at the time of reserving as well as an assessment of the reasonableness of allowances made for uncertainties.

Reserving adequacy is important, because if an insurer is materially under-reserved it may not have sufficient resources to meet their obligations in full.

After the Canterbury earthquakes, residential property insurers changed the limit of their cover from replacement, to sum-insured. There have also been changes to cover provided by the Earthquake Commission (such as increase in cover for building damage and removal of cover for contents), with a corresponding change in cover for private insurers. Property insurers have also significantly increased their reinsurance cover. Therefore, if the Canterbury earthquakes were to recur today, the funding and development of claim estimates would be different to the actual experience.

Funding

There are several sources of funding claim costs, with some pre-event (in place before the disaster) and others post-event (obtained after the disaster).

Pre-event funding includes capital for the reinsurance excess and reinsurance, which are both expected sources, and capital for claims costs above reinsurance limits, which is not an expected source. If these are in aggregate insufficient then post-event funding is required.

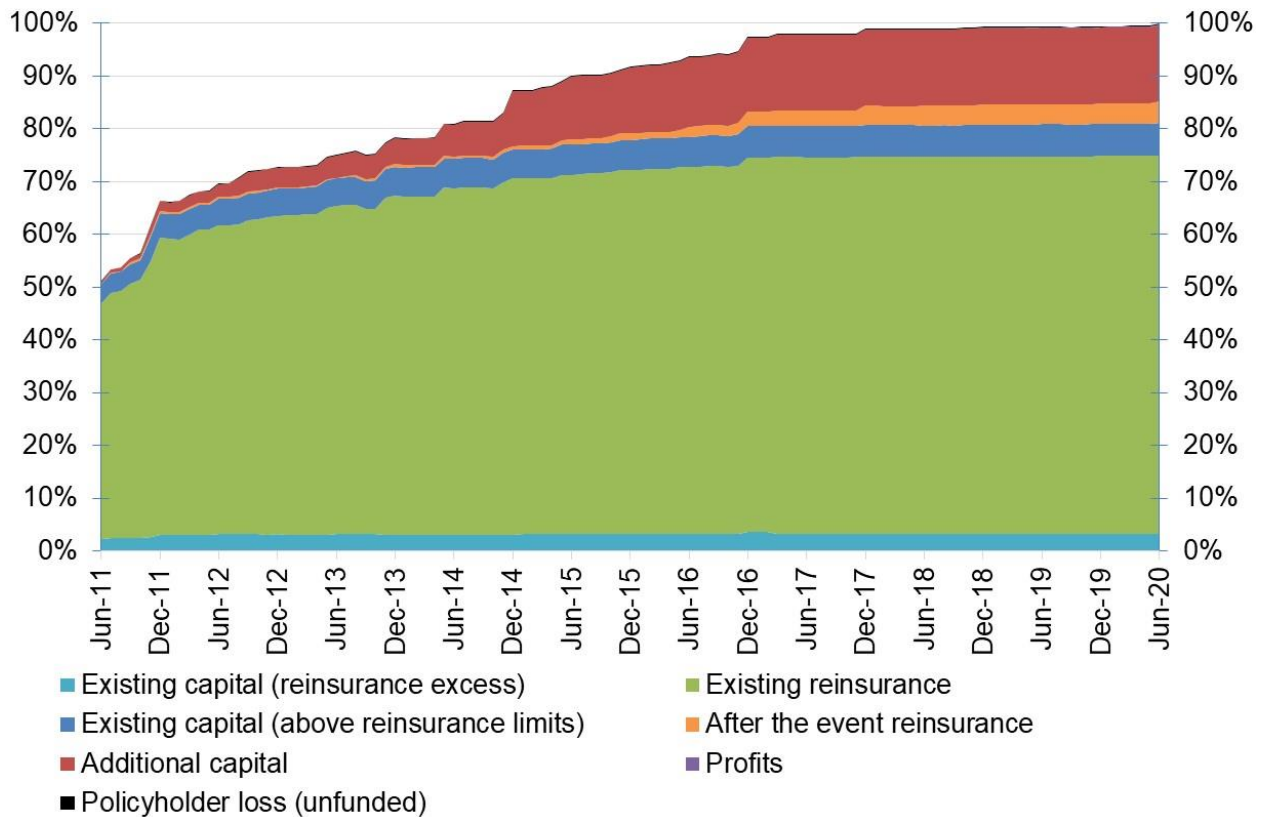
Post-event funding includes additional (retrospective) reinsurance, additional capital injected by the parent, and offset against future profits. If post-event funding is also insufficient, then policyholders suffer a loss by the amount of claims costs that are unfunded.

Table 1 below sets out the contribution to funding of 30 June 2020 best estimate costs by each source.

Table 1: Sources of funding of claim costs

Pre-event		Post-event	
3%	Existing capital (reinsurance excess)	4%	After the event reinsurance
72%	Existing reinsurance	14%	Additional capital
6%	Existing capital (above reinsurance limits)	<1%	Profits
		<1%	Policyholder loss (unfunded)
81%	Total pre-event	19%	Total post-event

Figure 2: Funding over time as a percentage of 30 June 2020 best estimate claim costs



The funding mix changes over time as the estimates of the ultimate claim costs change. Figure 2 above shows the funding mix over time as a percentage of 30 June 2020 best estimate claim costs. The funding adds up to less than 100% prior to 30 June 2020 because the best estimate claim costs at each earlier date was less than the estimate as at 30 June 2020.

Reinsurance excesses are relatively minor

For most insurers, the reinsurance excess is between 3% and 5% of the 30 June 2020 best estimate claim cost. Two insurers have very low reinsurance excess (<1%) and three insurers have larger reinsurance excess (>10%).

Existing reinsurance is the biggest funding source ...

The biggest source of funding for 18 of the 20 insurers is existing reinsurance. In aggregate, 72% of claim costs are funded by existing reinsurance, with the proportion for each insurer between 36% and >99%. It was under 60% for five insurers.

At the time of the Canterbury earthquakes there was no regulatory requirement on the level of reinsurance. Insurers subject to the Reserve Bank's Solvency Standards are now required to have either reinsurance, or capital, to meet the costs of a 1-in-1000 year earthquake in New Zealand. Insurers exempted from the Reserve Bank's solvency standard are required to report on their reinsurance relative to the costs of a 1-in-1000 year earthquake in New Zealand.

... but was insufficient for several insurers

Claim costs exceeded the limits of reinsurance cover for the 22 February 2011 earthquake for eight insurers. For four insurers, claim costs for the 4 September 2010 earthquake also exceeded reinsurance limits. Most of these eight insurers initially estimated their claim costs to be less than the limits of reinsurance, but increases in estimates during 2012 to 2014 resulted in their reinsurance cover being exhausted.

In aggregate, 6% of claim costs are funded by existing capital (excluding reinsurance excess). There are 11 insurers with this funding source, and the funding is up to 12% of claim costs.

The insurers include seven of the eight with claims exceeding reinsurance limits - the eighth had no existing capital once reinsurance excesses were funded. There are two further insurers with claim costs less than the limit of reinsurance but with reinsurance coverage of less than 100%. There is also one insurer with material claims costs not covered by reinsurance (e.g. through ex-gratia claims).

Half of insurers needed post-event funding

For 10 of the 20 insurers, pre-event funding sources (existing capital and reinsurance) were insufficient to meet the full claim costs. In aggregate, existing reinsurance and capital funded 81% of best estimate claim costs.

The proportion of claims costs funded by pre-event funding sources is between 43% and 100%. For five insurers, 70% or less of best estimate claims are funded pre-event.

Some after-the-event reinsurance

It is possible to purchase reinsurance retrospectively, to meet some or all of the claim costs in excess of existing reinsurance. This 'after-the-event reinsurance' is typically expensive and may have restrictive terms, since it is purchased to mitigate the risk of material increases in estimated claim costs for a disaster that has already occurred.

Six insurers purchased after-the-event reinsurance for the Canterbury earthquakes. For some insurers, the after-the-event reinsurance was provided by their parent, as an alternative to capital injection, while for other insurers it was provided by the reinsurance market.

The success of after-the-event reinsurance has been mixed. One insurer failed to make a recovery due to not meeting the terms, despite claims exceeding both the excess and limit of their after the event reinsurance cover. Another insurer had a partial recovery due to a dispute with their reinsurer.

In aggregate, 4% of claim costs are funded by after the event reinsurance, with the proportion for each insurer between 0% and 18%.

Additional capital was material

In aggregate, 14% of claim costs are funded by additional capital, which is more than the funding by existing capital. There are six insurers with best estimate claim costs funded by additional capital, and it is more than 25% of the total for three insurers. In the case of Southern Response (formerly AMI), the Government provided the additional capital, and without this there would have been a very substantial level of policyholder shortfall and unfunded claim costs.

Profits an immaterial source of funding

One insurer funded a small portion of best estimate claim costs from profits.

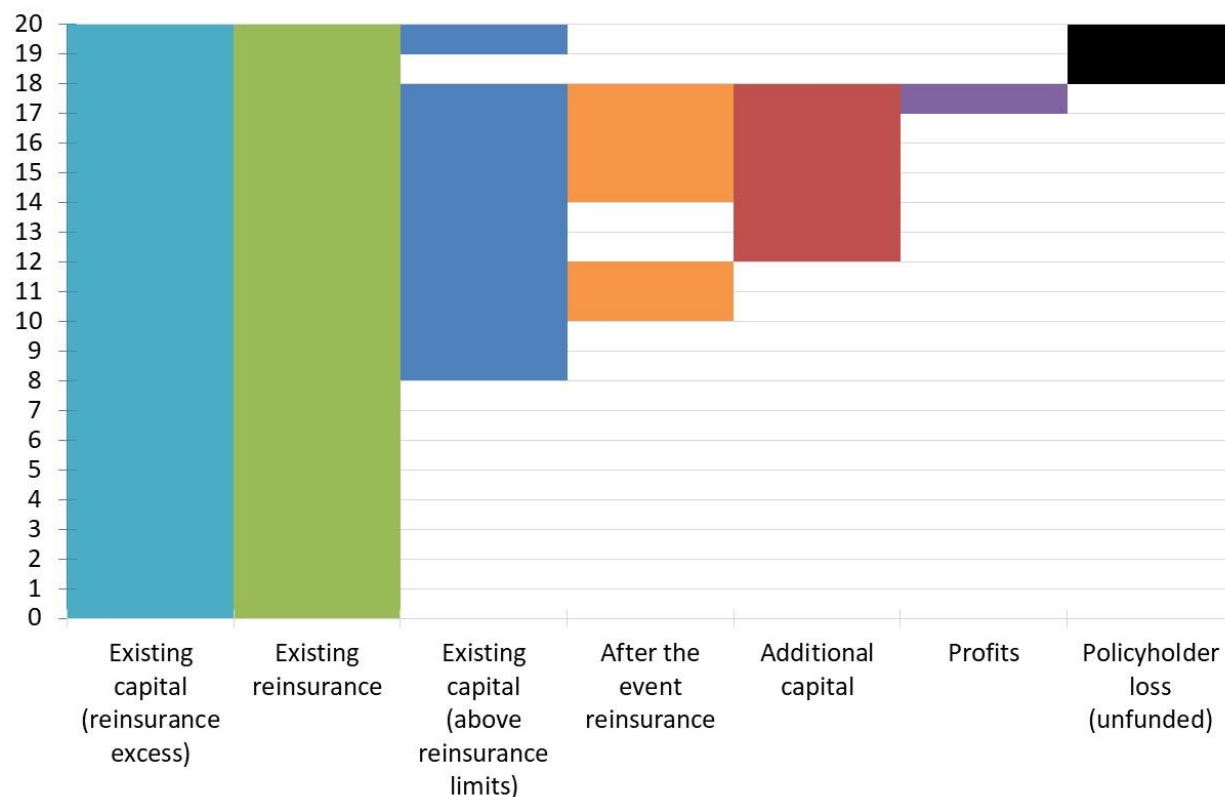
Some claims unfunded

Policyholder loss (i.e. the unfunded portion of claim costs) occurred for two insurers, and was <1% in aggregate. Western Pacific entered liquidation in April 2011 and had 42% of claim costs unfunded. The other instance of unfunded claim costs relates to policyholder funding of their (small mutually owned) insurer's reinsurance excess.

Funding sources

The various combinations of funding sources for the 20 insurers are shown in Figure 3 (on next page).

Figure 3: Funding sources by insurer



Reserving

Insurers establish reserves for outstanding claims, being the portion of claim costs that are not yet paid. Reserves have a best estimate component - an unbiased mean value, and a risk margin component - an additional amount to cater for uncertainty.

All analysis of reserves in this paper use figures gross of reinsurance.

Over time, the best estimate outstanding claims reserve decreases as claims are paid, and has step changes up or down to reflect the impact of updated estimates of the total costs (paid plus outstanding). Estimates of total costs are updated in liability valuations, typically performed at financial year-end and half-year dates.

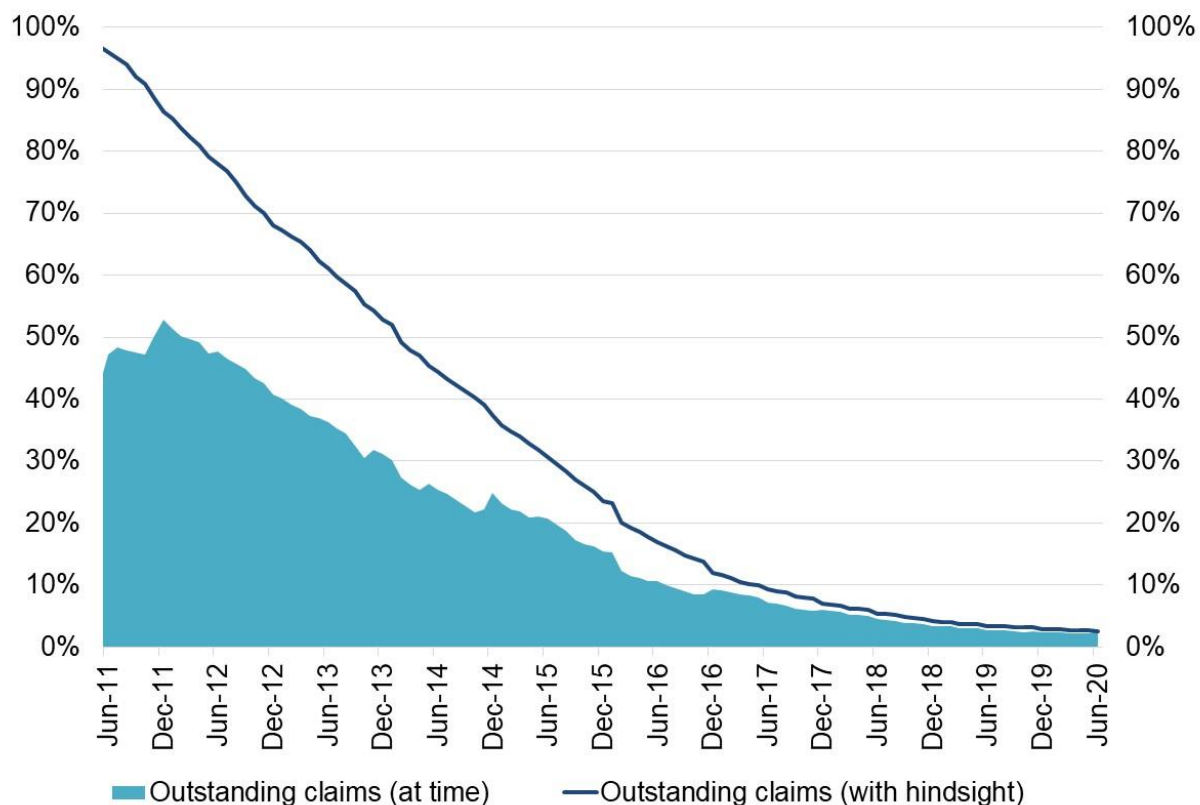
Best estimate costs have materially increased over time

The significance of increases in estimated claim costs can be seen from Figure 2. The best estimate ultimate claim costs in 2011 are around 50% of the 30 June 2020 best estimate ultimate claim costs, or alternatively, estimates have roughly doubled. Most of the increase occurred before December 2016.

Best estimate outstanding claim costs at each point in time can be reviewed in hindsight, by replacing the earlier best estimate total claim costs (paid plus outstanding) with the 30 June 2020 best estimate.

Figure 4 (on next page) shows best estimate outstanding claim costs as a percentage of 30 June 2020 best estimate claim costs (paid plus outstanding), for both each point in time and with hindsight. The levels generally reduce over time as claims are paid.

Figure 4: Best estimate outstanding claim costs as a percentage of 30 June 2020 best estimate claim costs



The difference between the best estimate outstanding claim costs with hindsight and the best estimate outstanding claim costs at each point in time represents the cumulative increases in best estimate claim costs between each point in time and 30 June 2020.

Before December 2014, the best estimate outstanding claim costs with hindsight is materially higher than the best estimate outstanding claim costs at each point in time. The difference is at least 20% of the 30 June 2020 best estimate claim costs. Between December 2014 and December 2016 the difference was smaller, but still material.

The pattern of the best estimate outstanding claim costs with hindsight being in excess of the best estimate outstanding claim costs, but with the difference reducing over time, indicates a persistent increase in best estimate claim costs over time.

Another way of measuring the significance of increases in estimated claim costs is to express them as a percentage of the point in time best estimate outstanding claim costs. This strips out the effect of claims already paid at each point in time, given they cannot contribute to uncertainty (except in very limited special circumstances).

Figure 5 (on next page) shows the increase in best estimate claim costs between each point in time and 30 June 2020 as a percentage of the point in time best estimate outstanding claim costs.

Before December 2016, the increase in best estimate claim cost to 30 June 2020 was more than 50% of the point in time best estimate outstanding claim cost.

Since December 2016, the increase in best estimate claim cost to 30 June 2020 has been more than 20% of the point in time best estimate outstanding claim cost, except at 30 June 2020 when it is by definition 0%. This is significant, especially for the most recent dates, because there has been a relatively limited time for estimated claim costs to change.

Figure 5: Increase in best estimate claim costs as a percentage of best estimate outstanding claim cost



Before December 2016 risk margins were much smaller than the subsequent increase in best estimate

The risk margin component of outstanding claim reserves is an allowance for uncertainty, or alternatively, the difference between a conservative estimate and best estimate.

Risk margin figures are available for all insurers since December 2016, but only for some insurers before December 2016. This is due to a change in the template used for reporting Canterbury earthquake claim figures.

In New Zealand, the risk margin is typically set as a percentage of best estimate outstanding claim costs, and calculated to provide a total outstanding claim reserve (best estimate plus risk margin). It is set at a level that is sufficient to meet the cost of outstanding claims with a given probability. I.e. total outstanding claim reserves (best estimate plus risk margin) with a sufficiency level of x% should be at least as large as subsequent claim payments with x% probability.

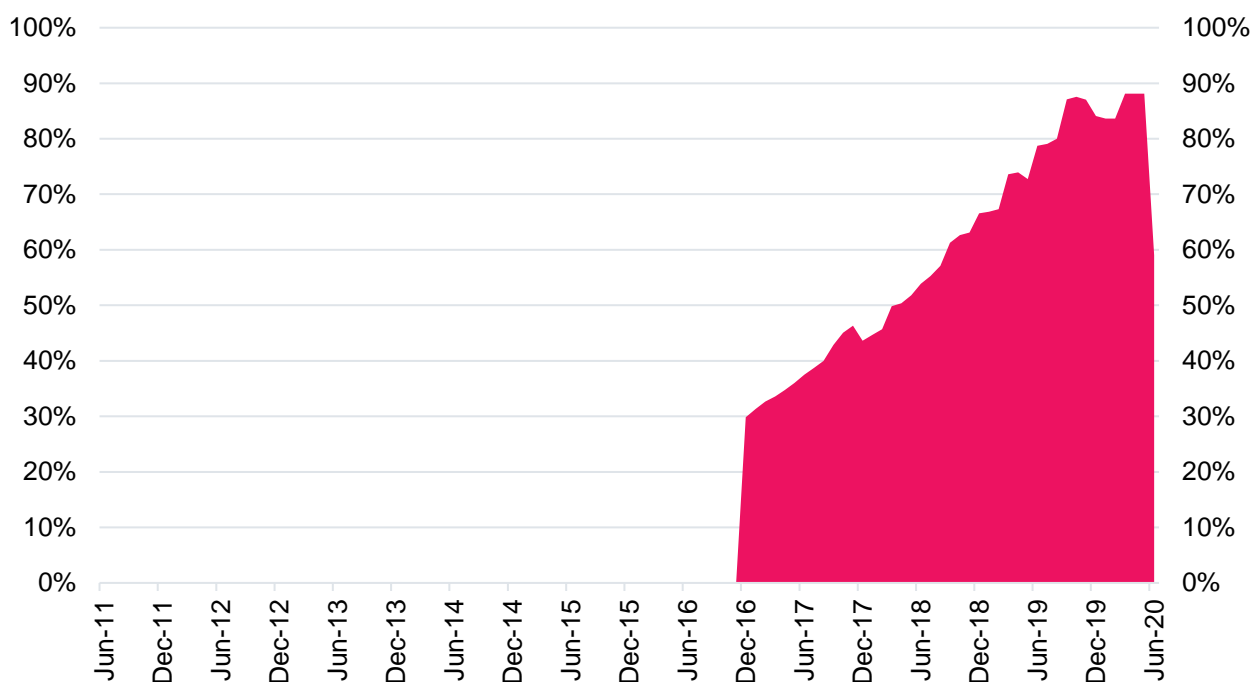
The sufficiency level varies by insurer, and sometimes over time, with 75% being the most common. Some insurers have much higher sufficiency level (e.g. 90%), which results in a higher risk margin.

The insurers that provided a risk margin before December 2016 generally had a risk margin dollar figure of between 10% and 25% of best estimate outstanding claim costs. The increase in best estimate claim costs from before December 2016 to 30 June 2020 has been much larger than the risk margin for most insurers.

For each date between 2011 and 2019 there have been some insurers that have had an increase in best estimate claims costs to 30 June 2020 that exceeded ten times the risk margin at the respective earlier date. The specific insurers with such a large hindsight increase relative to risk margins has differed for each period. The percentage risk margin is now material for some insurers

Figure 6 (on next page) shows the risk margin as a percentage of best estimate outstanding claims since December 2016. Figures for earlier dates are not shown due to the data being incomplete.

Figure 6: Risk margin as a percentage of best estimate outstanding claim costs



Risk margin as a percentage of outstanding claims generally increases over time. This is because diversification effects on uncertainty reduces with a smaller number of outstanding claims yet to be settled, and the last claims to be settled tend to be more complex than average and are also more likely to be subject to litigation. In contrast, risk margins in dollar amounts generally reduced over time.

Since December 2016, risk margins as a percentage of best estimate outstanding claims have materially increased for several insurers. However, some insurers continue to have a risk margin of between 10% and 25% of best estimate outstanding claims.

Conclusion

This paper shows that a mix of sources have been used to fund Canterbury earthquake insurance claims, with existing reinsurance funding the largest proportion at 72% of best estimate claim costs.

Claim costs exceeded the limit of existing reinsurance for eight insurers. Insurers were not subject to solvency requirements at the time of the Canterbury earthquakes.

Ten insurers required post-event funding, which was provided through a combination of after the event reinsurance and additional capital. For five insurers, the post-event funding was at least 30% of claim costs.

While post-event funding was generally sufficient, it was not universally successful. Some insurers failed to recover expected amounts from after-the-event reinsurance, and one insurer was placed into liquidation with a significant funding shortfall. Another insurer has fully funded their claim costs by substantial additional capital from the Government.

Since the Reserve Bank requires insurers to have reinsurance and capital to cover the claim cost of a 1-in-1000 year earthquake, there is greater assurance for funding of future disasters.

Insurers' best estimate (i.e. unbiased mean) claim costs have doubled since 2011, with most of the increase occurring by December 2016. The size and persistency of increases in estimates for almost all insurers indicates they have, with hindsight, struggled to accurately estimate claim costs.

Increases in best estimate total (paid plus outstanding) claim costs have been large relative to best estimate outstanding claim costs and also relative to risk margin component of reserves for uncertainty, for almost all insurers. This indicates insurers have also, with hindsight, struggled to quantify uncertainty.

The paper does not analyse whether the claim cost estimates were reasonable at the time they were made. This would require a more detailed investigation of the information available at the time, rather than with hindsight, and allowances for uncertainties.

There are other funding options besides reinsurance, but these are generally constrained and may not be reliable. Estimates of expected claims costs and the uncertainty in costs could be significantly understated for long periods of time. Consideration by insurers and the Reserve Bank of the funding and reserving experiences of the 2010-11 Canterbury earthquakes may assist dealing with any future catastrophic events.