BARNETT WADDINGHAM
beyond the expected

Climate change

How are (re)insurance actuaries facing the challenges ahead?

General Insurance actuarial report

March 2020

Have you heard children tell each other to turn the lights off? In the past, we might have expected this of the grumpy bill-paying parent. Now, more than ever, children are increasingly aware of the climate with statements such as wasted energy is 'killing polar bears'.

This emotive image could make us feel powerless for the future. However, insurance practitioners, and specifically actuaries, have a real opportunity to do something about climate change.

What can actuaries do about climate change?

Insurance practitioners, especially actuaries, have an opportunity to do something about climate change. Climate change is very real, yet it's riddled with uncertainty. Indeed, climate change is one of the most uncertain issues facing our world right now. This can affect us directly in our personal lives, or through our professional lives as actuaries.

Our risk management expertise equips us to begin to quantify and mitigate this uncertainty. To assume that all climate risk is implicitly reflected, or "lives in the data," is no longer enough. This is certainly true for actuaries, whether you are considering new product design or performing some model validation.

All areas of actuarial work (including the main areas of pricing, capital modelling and reserving) are affected by climate change in some way. That is because climate change is a multidimensional problem.

There is progress, but more work is needed

In order to understand what action is being taken by actuaries, we carried out research with 126 individuals across 60 firms. A promising key finding from the survey is that climate change appears to be on the agenda for actuaries when performing their day jobs. Insurers are seeing financial risk manifest in physical means, in the form of hydro-meteorological events such as droughts, floods and storms. Insurers are also seeing financial risks from the financial system, which is adjusting towards a lower carbon economy, including policy, consumer behaviour or technological.

However, further collaboration and work needs be done in the actuarial industry. This should cover the specifics of what is in fact being done and what could be done in each area of general insurance work. Discussions with practitioners highlighted that consideration to some secondary effects of climate change have not been fully thought through.

The specifics of what can be done will vary significantly, based on the risk profile of the business. For example, a motor insurer covering electric vehicles would need to consider different implications to a London Market construction liability specialist.

Next steps

We hope you find this report useful and informative. We plan to produce a further paper for each area of work. This will allow us to better understand the specifics of what is being done in each of the main areas, across different risk profiles.

Thank you to everyone who responded to our survey – the key findings could not have been identified without your valuable time. Please get in touch with any questions and comments you have.

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What actions are being taken now?

Our survey asked about the techniques or methods actuaries can use to take climate change risks into account. This covered practice areas across pricing, catastrophe modelling, reserving, capital modelling and model validation. The five key actions being taken now are highlighted in this paper and discussed below.

1. VOLUNTARY INCREASE IN CAPITAL: AT LEAST 50%* OF FIRMS INCREASED THEIR SCR

One of the key observations from our survey shows that at least one in two firms are mitigating the increased physical and financial risks by increasing the Solvency Capital Requirement (SCR).

Increase stakeholders' protection

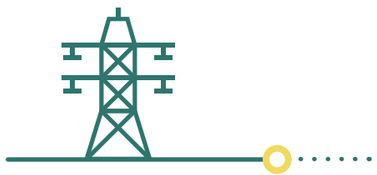
Increasing the SCR for climate change is not currently a blanket regulatory requirement. But increasing the required capital held should facilitate insurers in delivering on promises made to the insured, whether from the public or business. However, because increasing SCR means insurers need more capital, this makes doing business more expensive.

Whilst this survey result is perhaps surprising, it suggests that actuaries and companies are taking climate change seriously and 'putting their money where their mouth is.' This may imply that actuaries believe loadings on volatility calibrations are needed to reflect the additional uncertainty due to climate change. In turn, this may suggest that actuaries believe historical data is inadequate.

How much is the increase?

The survey did not measure the significance of the increase. However, our observations through our client work suggest that such increases do not appear significant. The increases have, however, been considered in the context of the risk profile and are believed to be appropriate.

Some insurers may look to recoup some of the cost of the increase in capital through increasing rates. In this case, insurers would need to ensure explanation is provided to their clients. This leaves the insurer with either competition or anti-selection risks.



* Due to uncertainty in the views of those not answering this question, there is a potential range of 50-71% for the actual number of firms increasing SCR. See 'About this study' for more details.

2. CONSIDERING THE IMPACT ON RESERVES SET FROM CLIMATE CHANGE

The vast majority of the respondents said that explicit consideration is given to the reserves set due to climate change. It is encouraging that one of the most important items of an insurer's balance sheet is being given prominence in the context of climate change, at least from the actuarial perspective.

'Deterioration' over time

Reserve deterioration here may not necessarily be just 'prior year development' (PYD). Client discussions suggest that more volatility in initial reserve positions from natural catastrophe events is a worry. Also, in more recent years, this volatility is more severe.

Actuaries in this area are considering issues like hurricane clustering and the impact of El Niño and La Niña on their catastrophe reserves.

> The likely increase in the frequency of wildfires is another concern.

More than just natural catastrophes and reserves

The issue of reserve deterioration extends beyond direct catastrophe losses. In reality, climate change affects a wide range of losses. These losses could be due to business interruption from power loss in the summer owing to heavier demands on the electricity grid. Losses could also be due to non-performance of manufacturing or construction from increased temperature ranges. This could mean design specifications no longer fit.

Social inflation continues to impact reserves and reserve deteriorations. Actuaries should consider the potential compounding effects from the higher frequency of events on social claims inflation. For example, it is not inconceivable that more business interruption claims are made at higher severities.

> This extends into other areas. For example, in pricing, actuaries will have to factor in relatively obscure loss events to their technical price.

3. SETTING THE RIGHT TECHNICAL PRICE, ON THE RIGHT PRODUCT, UNDER THE RIGHT BUSINESS PLAN

Price adequacy

The majority of general insurance policies are annual contracts. Pricing actuaries might therefore assume that long-term trends in the climate have minimal impact on them. However, climate change affects many aspects of insurance and trends can be difficult to identify and isolate.

Our survey showed that pricing actuaries are most concerned with the extent to which the past data they use reflects the effects of climate change.

Consideration should be given to a breakout of trends on cohorts such as the prior 3 years, 5 years, 10, 20, 50 and so on. Actuaries should also consider the potential non-linearity of these trends and the possibility of climate tipping points. Where third party catastrophe models are used, pricing actuaries should consider the extent to which these models adequately capture climate change risks. Actuaries should challenge the providers of such models to provide more details.

Product design

This is a fundamental area that should receive more emphasis. In particular, public policies have been changing across the world. This includes, for example, policies on behavioural incentives such as tax credits or carbon pricing for businesses.

These policies encourage businesses to invest in renewable energy sources (within time permits) or for businesses to be more mindful of their emissions.

> This presents a significant opportunity for insurers to capitalise on. Insurers could provide cover to business investing in such projects, as well as encouraging a better equipped world.

Business planning

Taking pricing and product design a step further, a related role for actuaries is in the support of business planning. In the ideal scenario, a data driven basis for business planning will enable a business to hit the profitable 'promised land.' However, climate change has many dimensions and effects. Direct data driven analysis is harder than it sounds!

An actuary supporting business planning needs to be aware of the specifics of how climate change could affect their business. A motor insurer, for example, may now be seeking to insure electric vehicles. They have limited data on the potential risks and costs of the batteries of such vehicles. Therefore, business planning actuaries have a key role to play too.

A motor insurer, for example, may now be seeking to insure electric vehicles.

4. NATURAL CATASTROPHE MODELLING ACTUARIES

Recent years have seen an increase in catastrophe events, with some evidence suggesting that this is driven by climate change. The wildfires in much of Australia in 2019/2020 are one example.

It was encouraging to find that taking account of climate change risks in natural catastrophe modelling work has been on the radar for some time. This continues to be the case.

However, the challenge remaining is to better understand how much of the historical data represents climate change effects. Our survey highlighted that insurers continue to heavily rely on the external model providers. Some insurers are using additional uncertainty loadings on the models.

5. ASSET SIDE AND OTHER CLIMATE CHANGE DRIVEN WORK

Investment work

A lot has been said in the media about sustainable investment (Environmental, Social and Corporate governance - or ESG). As such, we might expect most firms to be considering the impact of climate change on investment. However, General Insurance actuaries may not always be involved in investment work. This could explain why only about two thirds* of firms said they were considering the impact on investment.

Risk appetite setting

The risk appetite is a key way of determining the level of risk an organisation is willing to accept. As climate change risk has the potential to be very significant in future, we might expect the majority of firms to be considering the impact on their risk appetite.

> However, only about two thirds[1] of our respondents said they are considering the risk appetite.

As with investment work, this may suggest fewer surveyed actuaries actually work in this area.

* Due to uncertainty in the views of those not answering this question, there is a potential range of 68-82% for the actual number of firms considering the impact on investment. See 'About this study' for more details.

1 As per the footnote above, the actual number of firms considering the impact on risk appetite ranges from 63% to 82%.

Is regulation the driving force for climate change action?

Statement from the regulator

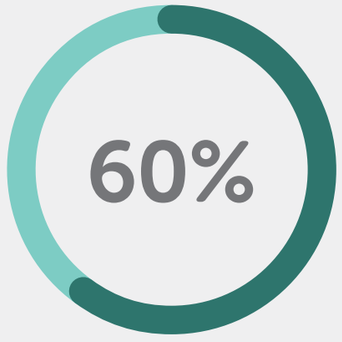
We asked about the impact of the April 2019 PRA supervisory statement (SS3/19)[2] on actuaries' work. This publication appears to have made a significant impression. Over a quarter of respondents to the survey said the impact was large.

Regulatory impact

Most actuaries are aware of the risks faced due to the impacts of climate change. However, some may feel frustrated that it took publication of the PRA's SS3/19 to move actuarial practitioners and insurers into action. On the other hand, it is a positive thing that regulator views are driving activity in this area

2 https://www.bankofengland.co.uk/prudential-regulation/publication/2019/enhancing-banks-and-insurers-approaches-to-managing-the-financial-risks-from-climate-change-ss

INDIVIDUALS AWARE OF THE PRA STATEMENT



More than just the UK

We have also seen regulatory impetus further afield, especially in other parts of Europe. Regulators in France, for example, have issued guidance and thought leadership on the matter. Given that climate change is not isolated by country, it makes sense that actuaries learn from regulatory reactions around the world. This can help us to craft a cohesive and inclusive response to climate change.

MAJORITY ARE AWARE OF PRA STATEMENT

The survey results show that climate change is on the radar for a significant number of actuaries. The majority of individuals confirmed their awareness of the April 2019 PRA supervisory statement on climate change: 'Enhancing banks' and insurers' approaches to managing the financial risks from climate change (SS3/19)'.

FEWER ARE AWARE OF THE DETAILS

However, only some were fully aware of the detailed suggestions underlying the statement. The PRA expects a firm's response to the financial risks from climate change to be proportionate to the nature, scale, and complexity of their business. Where appropriate, the PRA will expect to see evidence of how the firm monitors and manages such risks.

The requirements in such cases for the planning and management accountability are not necessarily trivial. We strongly recommend that actuarial practitioners read SS3/19 and consider what actions they can take now. This is true, whether or not they are directly responsible for areas dealing with climate change.

AWARENESS OF PRA STATEMENT AND REQUIREMENTS, INDIVIDUAL RESPONSES

1. The number of individuals aware of the PRA statement SS3/19
2. Those aware of the PRA requirement to have an initial plan to address the Policy Statement requirements
3. Those aware of the requirement to approve a Senior Management Function responsible for the PRA's climate change requirements

What are reserving actuaries doing?

Reserving actuaries are helping mitigate climate change impacts by ensuring that reserves are sufficient, even if climate change increases them.

PHYSICAL AND TRANSITION RISKS

As noted in SS3/19, financial risk as a result of climate change may materialise through two channels: physical or transitional.

Physical risk

An example of physical risk could be an increase in the frequency and severity of storms, leading to physical damage of property.

Transition risk

Transitional risks may crystallise through the process of the financial system adjusting towards a lower carbon economy. These risks can manifest in various ways. Examples include:

1. Emergence of disruptive technology
2. Emergence of disruptive business models
3. Amendments to climate change governmental policies.

New governmental policies may lead to climate related litigation events. These in turn can lead to higher liability losses for insurers. Incorporating these risks into actuarial reserving work is less straightforward. This is because, by their very definition, disruptive technology and business models would largely not be in historical data. Other methodologies may need to be explored. These include driver based reserving or scenario based loadings. Such methods try to adequately capture these different risks within the reserves, where permitted.

IMPACT ON RESERVE SETTING

Survey result

Unsurprisingly, surveyed firms were most concerned about the potential impact of climate change on reserves and claims costs. Nearly all actuaries we surveyed are considering the impact of climate change on reserves set (including deteriorations) by considering the claims costs.

The level of frequency and severity of natural catastrophe claims in recent years, and in the previous decade in particular, would put this front and centre of reserving actuary's minds.

We interpreted the results here in two ways: that reserving actuaries were seeing development on existing claims and that they were also concerned with the severity of claims with each new claims event.

> At least 82%* of our respondents are considering increasing the level of reserves set.

Both interpretations stem from the fact that historical data may not be capturing changes. These changes are in frequency and severity of climate related losses. There are more 'tail' losses being observed in recent times. We expect that the latter has a more significant impact on reserve setting. In particular, we expect that development of existing claims relates typically to the physical risks materialising, which tend to be short tailed.

However, even this progression is starting to become harder to predict. This is since the secondary effects of the potential increase in frequency of events is likely having a compounding effect on social (claims) inflation.

> Reserving actuaries should ask if their development patterns are still suitable for their projected losses. This is especially important when projecting unearned losses.

Uncertainty

The potential for reserve increases is compounded by increased uncertainty. This is due to a lack of historical data on climate related losses. To an extent, the link between climate change and reserves set is not sufficiently understood. For example, actuaries do not know how the prediction of winter sea temperatures may lead to better or worse weather later on.

* Due to uncertainty in the views of those not answering this question, the actual percentage is likely to be higher. See 'About this study' for more details.

How and why are reserving actuaries helping to mitigate climate change? What is the result?

HOW?

Increasing reserves

Reserving actuaries are increasing reserves for claims where climate change could have an impact. This can be thought of as a loading for uncertainty given the changes to frequency and severity of claims.

Alternative methods

Reserving actuaries are also using alternative projection methods to sensitivity test inbuilt assumptions. In addition, actuaries may need to use alternative or adjusted initial expected loss ratios.

Here, it would be highly recommended that the reserving actuary liaise with their pricing counterparts and underwriters. This is to encourage explicit consideration of climate change impacts.

Addressing increased uncertainty

Climate change increases uncertainty, particularly for large catastrophe claims. To address this, we can simulate more (uncertain) large claims by using distributions with fatter tails or by increasing the Coefficient of Variation in the insurance risk calibration.

Changes to reserve composition

Reserving actuaries are also thinking about the changes in business mix (and therefore reserve composition) as a consequence of consumers changing their behaviours.

For example, motor insurance portfolios may now contain more electric vehicles. While generally cheaper to fix due to less moving parts, this can present other challenges. These include the use of non-typical materials like aluminium or carbon fibre which make cars lighter.

WHY?

Importance to the balance sheet

The reserves are one of the most important items of the balance sheet for any insurer. Actuaries are likely considering increase in reserves set, because these can be affected both directly and indirectly by climate change.

Arguably, this is an 'easier' or more impactful way to ensure due consideration is given to climate change. It is, however, easier said than done as those considerations are relatively uncertain due to their recent emergence.

RESULT?

Potentially higher reserves

The impact on reserve deteriorations is that reserves are likely to be higher after considering climate change impacts. Practitioners should be aware that climate change can work both ways. For example, flight shaming may result in a lower propensity to claim on travel insurance policies, notwithstanding potential changes in the volume of policies. We did not consider the quantum of the increase as part of the survey. Further, the impact of any such changes depend significantly on the risk profile of the business and the actions taken need to be proportionate to the nature and complexity.

What are catastrophe modelling actuaries doing?

Catastrophe modelling actuaries are ensuring companies can withstand, and pay for, future catastrophes, even if climate change affects their nature.

INCREASE IN CAT EVENTS

Recent years have seen an uptick in catastrophe events, with some evidence suggesting that this is driven by climate change. The wildfires in much of Australia in 2019/2020 are an example. This makes catastrophe modelling a key area for reflecting climate change risks.

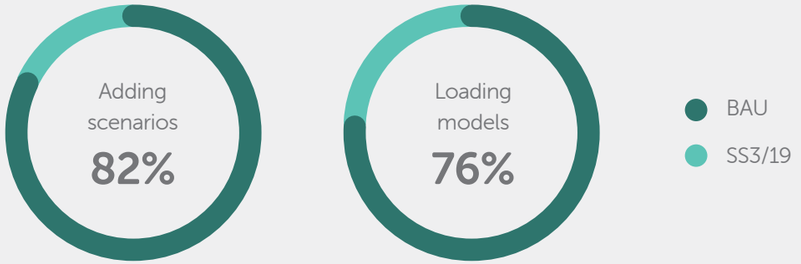
MORE BUSINESS-AS-USUAL WORK

Physical risks manifesting themselves are first-order and directly linked to natural catastrophes. Therefore, taking account of climate change risks in natural catastrophe modelling work should have been on the radar for some time and not so influenced by the recently published SS3/19. As expected, our survey showed that catastrophe modelling climate change methodologies are used more for business-as-usual than due to the supervisory statement SS3/19.

RELIANCE ON EXTERNAL MODELS

The challenge remains of seeking to understand how much of the historical data represents climate change effects. Our survey highlighted that insurers continue to rely heavily on the external model providers - and in a number of cases load those models with additional uncertainty loadings.

ADDRESSING CLIMATE CHANGE: THE DRIVERS OF ADDING SCENARIOS AND LOADING MODELS



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How and why are catastrophe modelling actuaries helping to mitigate climate change? What is the result?

HOW?

Short-term

How are catastrophe modelling actuaries considering climate change? The most common methods here are short-term 'fixes' to capital models to allow for climate change risks.

Loadings

Loading models to cover non-modelled climate change risk is an example of a short-term fix. Loadings may be justified using catastrophe scenarios. The scenarios could consider future catastrophes potentially being more expensive or more widespread than in the past.

WHY?

Key area

Catastrophes are an obvious area for considering climate change. Loadings to account for climate change are relatively easy to introduce, once the scenarios have been identified. The creation and identification of scenarios, however, is fairly difficult, particularly when considering secondary or indirect risks.

Due to a range of uncertainty in scenarios, actuaries need to work together to establish best practice.

RESULT?

Increased SCR

The result of considering climate change here is likely to be an increased SCR due to increase in catastrophe frequency and severity. The increased SCR reported by at least 50%* of firms supports this conclusion. This is interesting given that the Solvency II SCR represents a one-year view of risk, whereas climate change tends to be a longer-term consideration.

External models

Further loadings are added to external models at the same time as insurers relying on these external vendor models to provide detailed analysis and results by peril. This maybe due to a lack of understanding of what data or allowance has been factored into the external models. Or perhaps a 'prudent' view of covering any potential gaps. This highlights that further collaboration may be required between the in-house actuarial views and external model providers.

* Due to uncertainty in the views of those not answering this question, there is a potential range of 50-71% for the actual number of firms increasing SCR. See 'About this study' for more details.

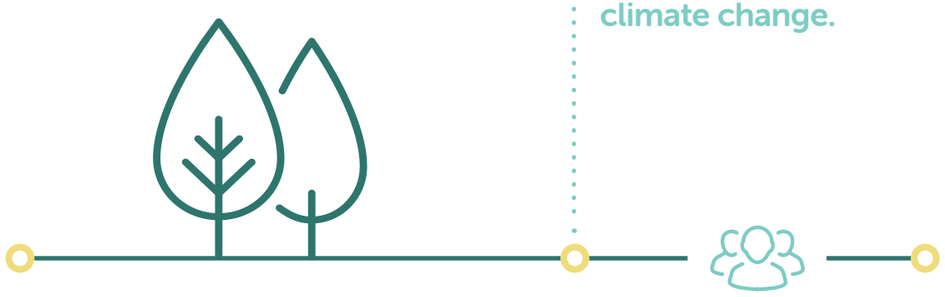
What are pricing actuaries doing?

Pricing actuaries are adjusting premiums to allow for potential future claim increases from climate change. By doing this, actuaries are ensuring firms are strong and will be around to pay claims in the future.

ANNUAL CONTRACTS VS LONG-TERM TRENDS

The majority of general insurance policies are annual contracts. Pricing actuaries may therefore assume that long-term trends in the climate have minimal impact on them. However, climate change affects many aspects of insurance, including large catastrophe events, where trends are difficult to identify.

> Practitioners should consider carefully whether it is the frequency, severity or both elements of claims that would be affected by climate change when pricing contracts.



RISKS REFLECTED IN DATA

Our survey shows that pricing actuaries are most concerned with the extent to which the past data they use reflects the effects of climate change. There is often little by means of internal or external data upon which pricing actuaries can call upon to help them in this area.

Where third party catastrophe models are used, pricing actuaries should consider the extent to which the third party models adequately capture climate change risks.

At least 53%* of actuaries are considering the extent to which past data reflects effects of climate change.

PRODUCT DESIGN

Our survey did not explicitly consider product design. However, this is an important area that should receive more emphasis. In particular, public policies have been changing across the world; for example, policies on behavioural incentives such as tax credits or carbon pricing for businesses. These encourage businesses to invest in renewable energy sources (within time permits), or for businesses to be more mindful of their emissions.

Opportunity

This presents a significant opportunity for insurers to capitalise on providing cover to business investing in such projects, as well as encouraging a better equipped world. We should also consider the notable risks. For example, a business may invest in a renewable energy project. Since the tax credits are available for a fixed time, this may lead to shortcuts in their design and implementation, and eventually a claim on their insurance.

> An actuary should work to support the design of products in a way that considers the exposure to such risk. Such opportunities encourage actuaries and insurers to embrace climate change risks.

Secondary impacts

Practitioners should also consider the secondary impacts of their products. For example, designing products that encourage 'smart home' technologies to mitigate against the cost of floods, wind and rain claims may itself result in a higher risk of cyber attacks, which may offset the cost savings achieved through the smart home framework.

BUSINESS PLANNING

Ideally data driven

Taking pricing and product design a step further, a related role that actuaries are playing is in support of business planning. In the ideal scenario, a data driven basis for business planning will enable a business to hit profitability. However, climate change has many dimensions and effects so direct data driven analysis becomes significantly harder.

Impact on business

An actuary supporting business planning needs to be aware of the specifics of how climate change could affect their business. A motor insurer, for example, may now be seeking to insure electric vehicles. They have limited data on the potential risks and costs of the batteries of such vehicles. In this regard there could be more collaboration with portfolio management to seek to ensure the mix of business sold is optimal, with the 'right' limits and T&Cs – in line with the changes to the business planning process. Therefore business planning actuaries have a key role to play too.

* Due to uncertainty in the views of those not answering this question, the actual percentage is likely to be higher. See 'About this study' for more details.

How and why are pricing actuaries adjusting premiums? What is the result of doing this?

HOW?

Data sources

Actuaries can look at alternative sources of data to adjust premiums to take account of climate change. Past data can be analysed and trended separately, depending on exposure to climate change. Using an increased number of years of data could assist with analysing and projecting trends. Actuaries should also consider the potential non-linearity of trends and the possibility of climate tipping points.

WHY?

Long-term trend

Why are pricing actuaries most concerned with the impact on past data? This is likely because climate change is a long-term and highly uncertain trend, which could make past data inappropriate for pricing future risks. The trend may or may not show up in the past data but, as the impact is possibly increasing, the extent of the impact will vary by year. Older years may have a smaller climate change impact. Alternatively, there may have been years where the climate change impact was unexpectedly high or low.

RESULT?

Adequate premiums

We expect considering climate change in pricing would improve the adequacy of premiums for risks exposed. Fundamentally, pricing actuaries are at the frontline alongside the underwriters in making sure that the risks being taken are well understood and that sufficient premium is being exchanged to cover potential costs

What are capital modelling and validation actuaries doing?

Capital modelling and validation actuaries are making sure internal models consider climate change. Hence, the SCR often increases which ensures future claims related to climate risk are paid.

VOLUNTARY INCREASE IN CAPITAL: AT LEAST 50%* OF FIRMS INCREASED THEIR SCR

Delivering on promises

Increasing the SCR for climate change is not currently a blanket regulatory requirement. However, increasing the required capital held should facilitate insurers in delivering on promises made to insureds, whether the public or businesses.

Increased capital

Increasing SCR also means insurers need more regulatory capital. This makes doing business more expensive. Whilst this result is perhaps surprising, it suggests that actuaries and companies are taking climate change seriously and 'putting their money where their mouth is'.

This may imply that actuaries believe loadings on volatility calibrations are needed to reflect the additional uncertainty due to climate change. In turn, this may suggest that actuaries believe historical data is inadequate. For example, a property insurer may find that their class level coefficient of variation assumptions for attritional losses may be inadequate. They are based on historical data and therefore may require expert judgement loadings. Alternatively, as described above, the insurer's risk profile may be changing. This could be due to knock-on effects of transition risks manifesting. This may also warrant additional volatility loadings.

ADDING AND AMENDING VALIDATION TESTS

Improve understanding

Identifying key new tests is important to improve understanding of the capital requirements for firms. According to our survey, adding new tests and amending existing tests are the most common methods in use by validation actuaries.

* Due to uncertainty in the views of those not answering this question, there is a potential range of 50-71% for the actual number of firms increasing SCR. See 'About this study' for more details.

How and why are capital actuaries increasing SCR?

How much is the SCR increase?

Our research did not measure the significance in the increase. Our observations, through our client work, suggest that such increases do not appear significant. The increases have, however, been considered in the context of the risk profile and are believed to be appropriate. In particular, we believe the impact of the long term and to-ultimate time horizon shift are higher than the one year view of risk.

Increasing rates?

Some insurers could look to recoup the cost of this capital through increasing rates. In this case, insurers would need to ensure explanation is provided to their clients. Increasing rates is likely to increase competition and/or anti-selection risks.

How and why are validation actuaries adding and amending tests? What is the result?

HOW?

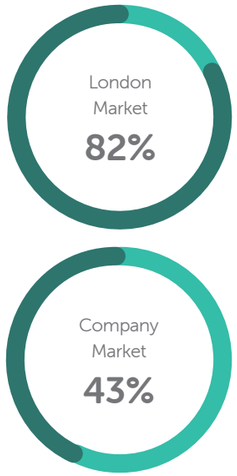
Reflect other areas

How are validation actuaries introducing new tests? We expect the new tests will reflect the work done elsewhere on climate change. For example, if the validator knows the firm is introducing new scenarios, they may add tests to check that modelling appropriately reflects the new scenarios. It would be enlightening to conduct a more in-depth survey on the tests used. However this is unlikely to be possible due to the range of potential tests available, and for confidentiality reasons.

London Market vs company market

Most London Market firms are introducing and/or amending tests. This is much higher than the company market where only about half of firms are[3]. This could be due to the impact of the Lloyd's[4] guidance on climate change activities. Alternatively, it could be that climate change is more likely to affect London Market firms' business, due to catastrophe exposures.

FIRMS AMENDING AND/OR ADDING TESTS, BY FIRM TYPE[5]



3 Both the London Market and company market figures are on basis 1. This means that the percentage of actuaries adding and amending tests is probably underestimated. See 'About the survey' for more details.

4 https://www.lloyds.com/news-and-risk-insight/risk-reports/library/natural-environment/catastrophe-modelling-and-climate-change

WHY?

Why add and amend tests?

The new or amended tests can demonstrate how well the firm is taking climate change risks into account. Practitioners who are able to devote more time to thinking about and understanding the impact of climate change on their internal models are perhaps more likely to derive new specific tests. These would tease out whether the internal model has given sufficient consideration to climate change risks.

However, at a minimum, adapting existing tests to focus on climate change risks is probably sufficient at this early stage. To an extent, insurers, particularly those in the Lloyd's market, would already be familiar with the use of Realistic Disaster Scenarios to assess catastrophic climate related events. Therefore, they may already be considering the resilience of their models to climate related events.

Business-as-usual

The majority of firms are adding or amending tests as BAU, rather than due to the supervisory statement (SS3/19). This is encouraging as it shows most firms are already embedding climate change risks in their business.

5 Due to uncertainty in the views of those not answering this question, the actual percentage is likely to be higher. See 'About this study' for more details.

RESULT?

What is the result of adding and amending tests?

The result of adding and amending tests is that models are more robust and the SCR is more likely to reflect the risk profile. The result implies that climate change risk is being deliberated, and acted upon, at the highest levels in some companies in the General Insurance industry.

What else are actuaries doing?

Beyond traditional areas, actuaries are involved with investment decisions and determining risk appetite. Investment choices could fund climate mitigation. Risk appetite setting ensures that firms are around to pay claims in the future.

The responses to the survey represent the knowledge that actuaries were willing and able to share at the survey date. As such, the responses do not necessarily represent the full picture of how firms are dealing with climate change. This is because actuaries may not be involved in all areas. The figures in this section could therefore be underestimated.

INVESTMENT

Assessment of the impact of climate change on investment is an industry in itself[6]. We would expect most firms to be considering the impact of climate change on investment.

However, General Insurance actuaries may not always be involved in investment work. This could explain why only about two thirds[7] of firms said they were considering the impact on investment.

The impact of climate change in recent times has been to encourage fund managers to consider ethical or green investing. This has, in turn, encouraged companies who traditionally operate in carbon polluting industries to pivot towards greener solutions. Changes in investment behaviour can therefore clearly have a direct impact on climate change.

6 Financial Times, AI and climate change transform investment sector: https://www.ft.com/content/fa8885f6-ad69-3dd0-a437-6aeb23c753ad

7 Due to uncertainty in the views of those not answering this question, there is a potential range of 68-82% for the actual number of firms considering the impact on investment. See 'About this study' for more details.

8 As per footnote 7, the actual number of firms considering the impact on risk appetite ranges from 63% to 76%.

RISK APPETITE

The risk appetite is a key way of determining the level of risk that an organisation is willing to accept. As climate change risk has the potential to be very significant in future, we might expect the majority of firms to be considering the impact of climate change on their risk appetite.

For the same reasons as for investment, the result of about two-thirds[8] considering risk appetite might be underestimated.

About this insights paper

Purpose of this report

We created this insight report on the basis of our research to understand the impact of climate change on General Insurance actuaries' work specifically.

Coverage

This paper presents our findings to give practitioners insight into the types of work being carried out and to encourage actuaries to learn from others in the market.

Bases of the research

Our research did not distinguish between actuaries not working in an area and actuaries not using the methodology in the question. We have therefore produced some of the results on two bases. The true level of use for each methodology lies somewhere in between the two bases.

The first basis assumes that respondents not indicating they are using a particular methodology are not using it. This likely underestimates the percentage of actuaries using each one.

The second basis assumes that respondents not indicating they are using any methodologies in a particular area do not work in that area. This likely overestimates the percentage of actuaries using each methodology.

Therefore, in this document, we present some results with terminology of "at least". This represents result of the lower of the two bases.

Limitations

The responses represent the knowledge and awareness that respondents had, and were willing and able to share, at the time of the survey in September 2019.

When multiple individuals from the same company indicate different responses, the positive response is taken. There were a number of consultant respondents; we asked them to consider their largest or most recent client. This could lead to some double counting in the results.

The results are not a full reflection of the General Insurance actuarial market. Some respondents may not have understood the questions in the way we intended.

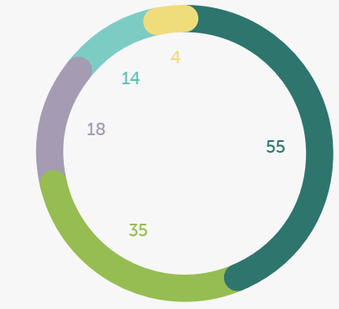
Who responded to our survey?

A high proportion of senior figures

We received responses from 126 individuals, representing 60 firms. We aimed our research at General Insurance actuaries - those employed by insurance companies and Lloyd's syndicates, consultants and some self-employed practitioners.

A high proportion of the respondents (58%) were senior industry figures.

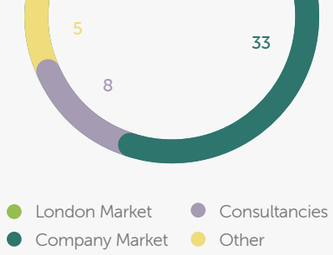
RESPONDENTS SPLIT BY TITLE



A range of companies

Representatives of a range of companies, including Lloyd's syndicates, completed our survey.

RESPONDENTS SPLIT BY COMPANY TYPE



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Please contact your Barnett Waddingham consultant if you would like to discuss any of the above topics in more detail. Alternatively contact us via the following:

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March 2020