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Thoughts on large and unusual claims

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Table of Contents

1. Introduction

One of the principles that form the basis of insurance is that "in many cases a few very large losses represent a major proportion of the total cost" as described in Hart et al (2007).

Despite the clear prevalence of large losses in general insurance portfolios, and perhaps a common understanding of the broad principles of considering and analysing large claims, the authors observe that there is a wide variance in how these broad principles are applied, and a number of issues that emerge during application.

The authors have also observed that there exist a subgroup of claims that have been termed "unusual" in this paper. These claims might be claims that are atypical even within the large claim subgroup due to either cause, size or slow emergence as large claims, but can also be represented in groups of smaller claims (perhaps with a common causative factor).

This paper is of interest to readers who would like to understand current practice of how large and unusual claims are analysed and the "devil in the detail" issues that are observed to emerge during this analysis.

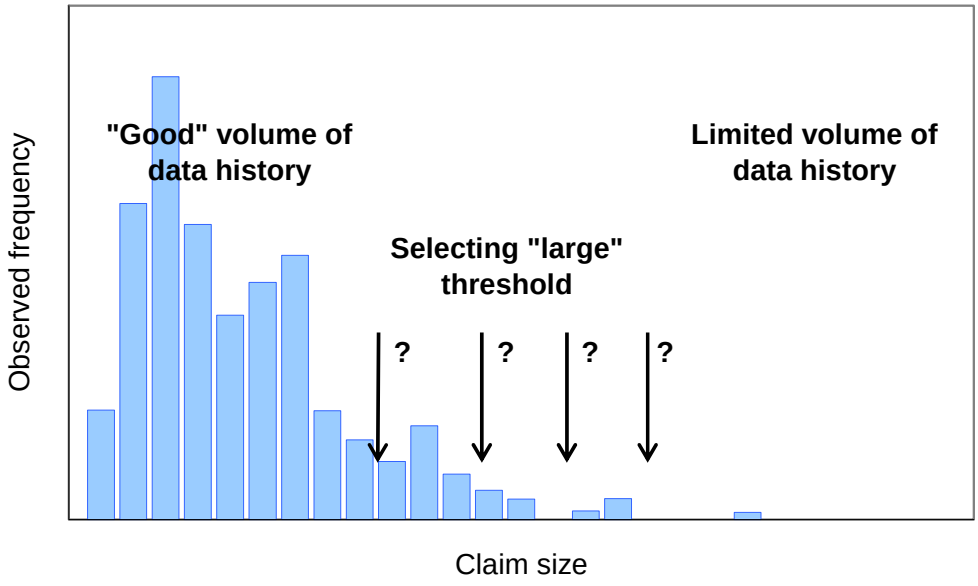
2. Approach to large claims – broad principles

2.1 Analysing "large" claims is a balancing act

Actuarial reserving methods rely on an assumption that there is sufficient and consistent data in the aggregate for relatively stable patterns of claim behaviour to emerge. While not every actuarial method is an aggregate approach to assessing claims liabilities, even those that attempt to individually estimate claims have a reliance on sufficient data to understand the relationship between claims characteristics and claims cost.

However, when examining any empirical, rather than theoretical, claim size or claim cost distribution, in practice there will always be a point beyond which there is limited information available which impacts our ability to make suitable assumptions, whether for reserving, pricing or other purposes. Figure 2-1 below illustrates this point schematically.

Figure 2-1: Illustrative claim size distribution



In traditional actuarial reserving, large claims are often separated from other claims (i.e. "non-large" or "attritional" claims) for analysis. Having a limited number of large claims might mean there is scant data on which to base a separate allowance for large claims, but on the other hand not excluding them can mean that an "all claims" analysis shows unstable experience due to distortion from those few large claims.

The actuary needs to exercise judgement in selecting the "cut off" claim size that represents the border between large and attritional claims. The fact that this decision also involves balancing an implicit trade-off in the volume of data should not be overlooked.

Claims that are large often require a tailored treatment by actuaries whether in the context of reserving or pricing (or both), rather than straightforward application of standard actuarial methods. Consideration of both qualitative and quantitative aspects of the claims may shape the view taken. As a result of the need for tailored treatment, actuarial practice varies widely in taking these claims into consideration.

Based on the above steps, some broad principles can be articulated that appear to be commonly accepted as necessary to analysing large claims. These are largely common sense based. They are:

- Determining whether large claims require separate consideration
- If so, defining the cut off point beyond which claims are considered large, or another definition to separate the two groups of claim.
- Understanding the qualitative and quantitative aspects of large claim data, such as through discussions with claims managers
- Selecting a methodology appropriate to the large claims analysed.

However, while the above would appear to be common elements across most portfolios, variance emerges in the application of these steps. In the following sections, this paper attempts to examine for each of these steps how these are being applied in practice and what issues need to be addressed during the analysis process. These observations are largely drawn from our work across a range of valuation and review roles.

The discussion of application primarily addresses analysis of large claims for the purpose of assessing outstanding claims. We note that historical analysis often forms the basis of or is the trigger for other investigation or pricing decisions and therefore can be seen as a predecessor function to other actuarial work that relies on an understanding of large claims.

This paper also focuses on costs gross of reinsurance, although reinsurance and the net position are considered. We note it is common practice to arrange excess of loss reinsurance, and indeed other reinsurance types, to limit the exposures to large claims/losses. The authors believe it is reasonable to assume that even in the case where appropriate reinsurances are in place, the "best practice" in the assessment of large claims by the actuary remains the same.

2.2 A trap within the "large" and "non-large" – the unusuals

While the discussion in the previous section centres around the potential isolation of "large" claims from "non-large", a trap remains for the unwary in assuming the claims that are not identified as "large" can therefore be regarded as "ordinary", "statistically stable", "homogeneous", and thus can be analysed as "one". Even within the large claims subgroup, one can expect there might be significant variation in the size and emergence across claims.

The authors have observed that within both "large" and "non-large", there can often be what we have termed "unusual" claims – those claims that have the potential to distort the analysis undertaken and that may require separation from the main body of data, whether small or large. Note that unusual claims may not always be individually large, but if considered as a collective "whole" in accordance with their likeness, they can easily become the dominant feature of a portfolio or induce distortions in some way. In some simple cases, a review of the identified large claims may well be all that is required to identify most of these cases, but this is not always the case. Some examples of characteristics that might make a claim unusual include:

- A large number of medium to small claims are in fact related to the same catastrophe or some common event or driver, therefore their outcomes are not independent.
- Asbestos and other latent claims – where individual claims may not be large but they collectively relate to the same sources or types of underlying exposure.
- Claims at their earliest days of development can have a high level of uncertainty around their attributes and parameters, so may have yet to present themselves unambiguously in the data as "large" claims. Claims that are particularly slow to emerge as large claims may require special attention.
- Claims that are relatively large even within the subgroup of large claims.

- The cause of the claim (or claims) was “out of the ordinary” relative to common causes of claim under the policy.

Not all of the claims described in the above examples, would be readily identified as “large”, but it is nevertheless arguable that it is still appropriate to identify (if possible) and consider them separately due to their “unusual” nature. These examples have the potential to behave in a manner different to the truly attritional claims. Some real life examples of these are provided in an Appendix to this paper.

However, it might be expected that the presence of such unusual claims in a given portfolio would be relatively rare. Unlike large claims, where it would be expected at least some consideration would be given for each portfolio, not every portfolio would be expected to contain unusual claims that require separate consideration.

The authors propose that the same basic principles are relevant to unusual claims as for large claims. Both unusual claims and large claims are often subject to limited data. Furthermore, both can commonly occur in the tail of development, where their relative importance becomes greater.

For the remainder of this paper, our consideration of the application of these basic principles is intended to include unusual claims. Therefore, unless stated otherwise, a reference to “large” generally considers both large and unusual, although a reference to “unusual” refers only to unusual claims.

3. Separating large and unusual claims

3.1 Identifying the need for separate analysis

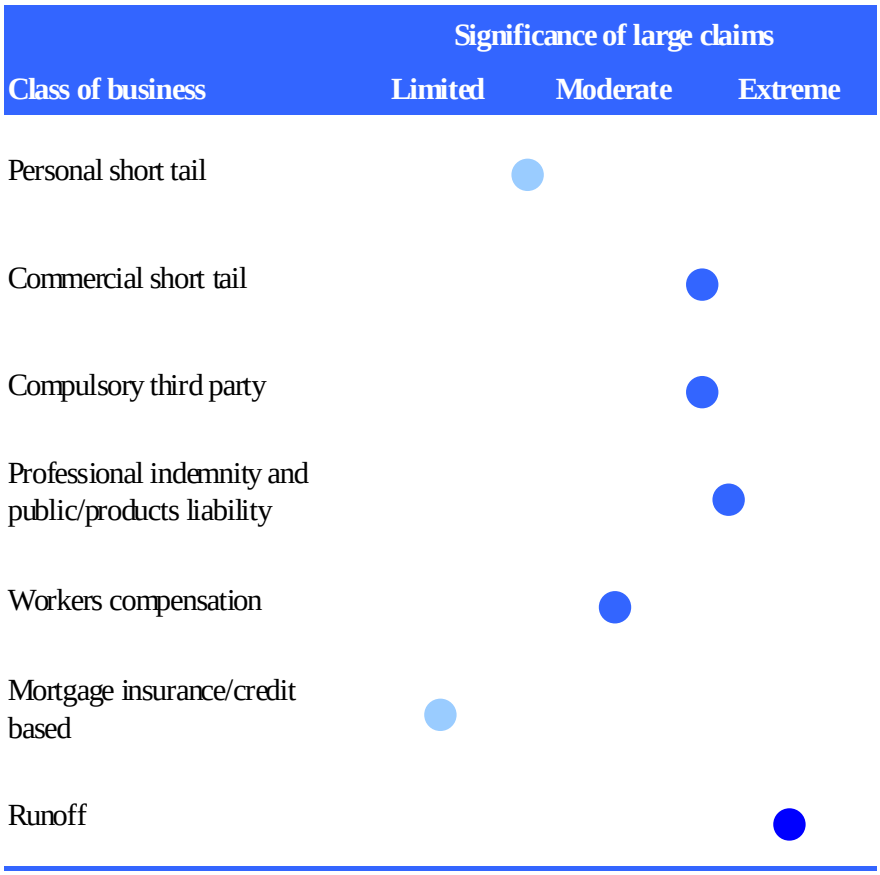
The decision to separately allow for, model or consider a claim or group of claims (whether large, unusual or both) is often guided by their relative significance to the overall reserves.

Figure 3-1 below sets out a view as to the importance of large claims (not events, and in this case not inclusive of unusual claims) by portfolio, in terms of whether the presence or absence of large claims are (a) a significant driver of cost and reserves and/or (b) a distorting factor influencing the choice of method. This sets the scene as to whether separate analysis of large claims is likely to be of value and hence would be considered "best practice" for that class of business. However, the authors acknowledge that in some cases large claims can be addressed without outright separation of data into large and non-large.

The ratings are not absolute – that is, a large claim might well occur for a personal short tail portfolio (e.g. a total loss on a fire claim for buildings), but for most valuations, the presence or absence of large claims and their size is not a significant driver of the overall cost and the size of reserves for short tail. We have not constructed a similar table for events, as it is relatively obvious that property classes are more generally affected by events such as natural catastrophes.

Note that the following table does not use a common definition of large claims, and has not sought to define a cut-off by class of business. It is simply a subjective view of whether significant claims cost or volatility is expected to be concentrated in the tail of the claim size distribution for that class, acknowledging that the distributions will differ.

Figure 3-1: Significance of large claims by class



We observe with respect to the summary that:

- Credit classes or personal short tail may well include larger risks and the potential for individual large claims. However, for most valuations, it would not be expected that a single large claim would influence the results so much as large volumes of claims.
- Commercial short tail and the statutory classes were felt to be of moderate importance. Commercial short tail can commonly include claims of larger value and potentially of several components (e.g. property damage and business interruption arising from the one incident). Large claims can account for a significant proportion of claims cost for statutory classes although this can be limited due to the presence of statutorily defined benefits or legislative response to larger claims. Furthermore, cost escalation on smaller claims can be an issue affecting the relative importance of large and small claims.
- Professional indemnity and public liability have coverage that is not necessarily standard with payouts that are relatively unregulated. Notwithstanding that legislative reforms can occur, and indeed have impacted the size and frequency of large claims as observed in Fuller & Marjoribanks (2009), these classes nevertheless have the potential for large claims to be significant.
- Many runoff portfolios will inevitably reach a point where the majority of the liability (e.g. 90% or more) can be dominated by the remaining open claims, which tend to be large and complex claims, while the non-large and straightforward claims tend to be settled sooner and can become relatively immaterial over the period of runoff. We have therefore indicated that large claims are of extreme importance in a runoff situation. It is of note that we found this observation to be generally true irrespective of the initial class of business of the portfolios in runoff.

It is not as simple to predict the importance of unusual claims by class of business, as by definition, these include claims that are quite unexpected. However, at the time of this paper, there are some sources of large and unusual claims that have received ongoing attention. We have attempted to list out the most notable ones for each major class of business:

- CTP – events that affect multiple vehicles and/or pedestrians, claims involving children
- Public/products liability – consequential losses and business interruption, in addition to the "foreseeable" property damage and bodily injury claims
- Workers compensation – work-related "illnesses" rather than injuries at work, asbestos is the classic example, with stress or psychological claims also an emerging issue
- Professional indemnity – professional association covers or other policies covering risks relatively larger than the majority of the portfolio
- Medical malpractice – birth related and "crazy doctors" claims
- Builders warranty – strata claims (for some states this is limited by "last resort" style cover)
- Mortgage insurance/credit based – accumulation of losses based on the economic environment
- Short tail – catastrophes, third party property damage

The presence of the above may indicate the need for separate analysis.

3.2 Defining and detecting large claims

The authors believe the process of defining a cut off point for detecting large claims is well established within current actuarial practice. We do not intend to repeat this information here, but have nominated a few "obvious" yet sometimes overlooked points below.

- There are often two (or more) layers of subjectivity in identifying large claims for separate analysis. The first is familiar to actuaries when defining the "large" threshold for modelling purposes, which requires exercise of judgement. However there is also a need to recognise that the case estimate, thus also the reported incurred cost, of current claims

can contain (sometimes significant) elements of subjectivity and therefore may not identify all instances of large or potential large claims. The trap is to blindly assume these as "given facts".

- Monitoring claims close to but below the adopted threshold can give the actuary a sense of the "pipeline" of potential large claims that are yet to emerge. Clearly it is a matter of judgement as to how much lower a claim can be to still be included in the monitoring, and it needs to be understood that there will always remain the potential for even smaller claims to develop into large claims.
- Development observed across a group of large claims can be a mixture of movement of reported incurred cost across individual large claims, and changes in the group of claims considered large. In order to better separate these impacts, analysis can include claims that have been large (with threshold appropriately defined) at any point in time in the past, although they may or may not be currently large – this definition is often called "ever-large" claims. The key advantage of an "ever-large" definition over the "large as at now" definition is that observed trends and dynamics are more easily attributable to IBNER effects, rather than intertwined with the impact of a changing population of claims as individual claims move in and out of large. An alternative to "ever-large" is the use of "cap and excess" analysis, where rather than separate claims into small and large, all claims are analysed together with a large claims cap. Only the portion of a claim above the cap is excluded and analysed separately.
- A large claims threshold may be held constant or indexed over time (the latter option includes instances where the threshold appears constant but the individual historical claims are indexed in order to identify a constant "real value"). Where no indexation adjustment is applied, the actuary needs to be aware that in real terms the pool of large claims should be expected to change over time.
- Analysis of reinsurance recoveries and the net position can be simplified where the large threshold is chosen to mirror the reinsurance retention (or perhaps the reporting threshold of claims, to facilitate reporting obligations). A key advantage of this might be simplified modelling where the reinsurance has been stable. Similarly to the previous point, indexation should be considered where relevant.

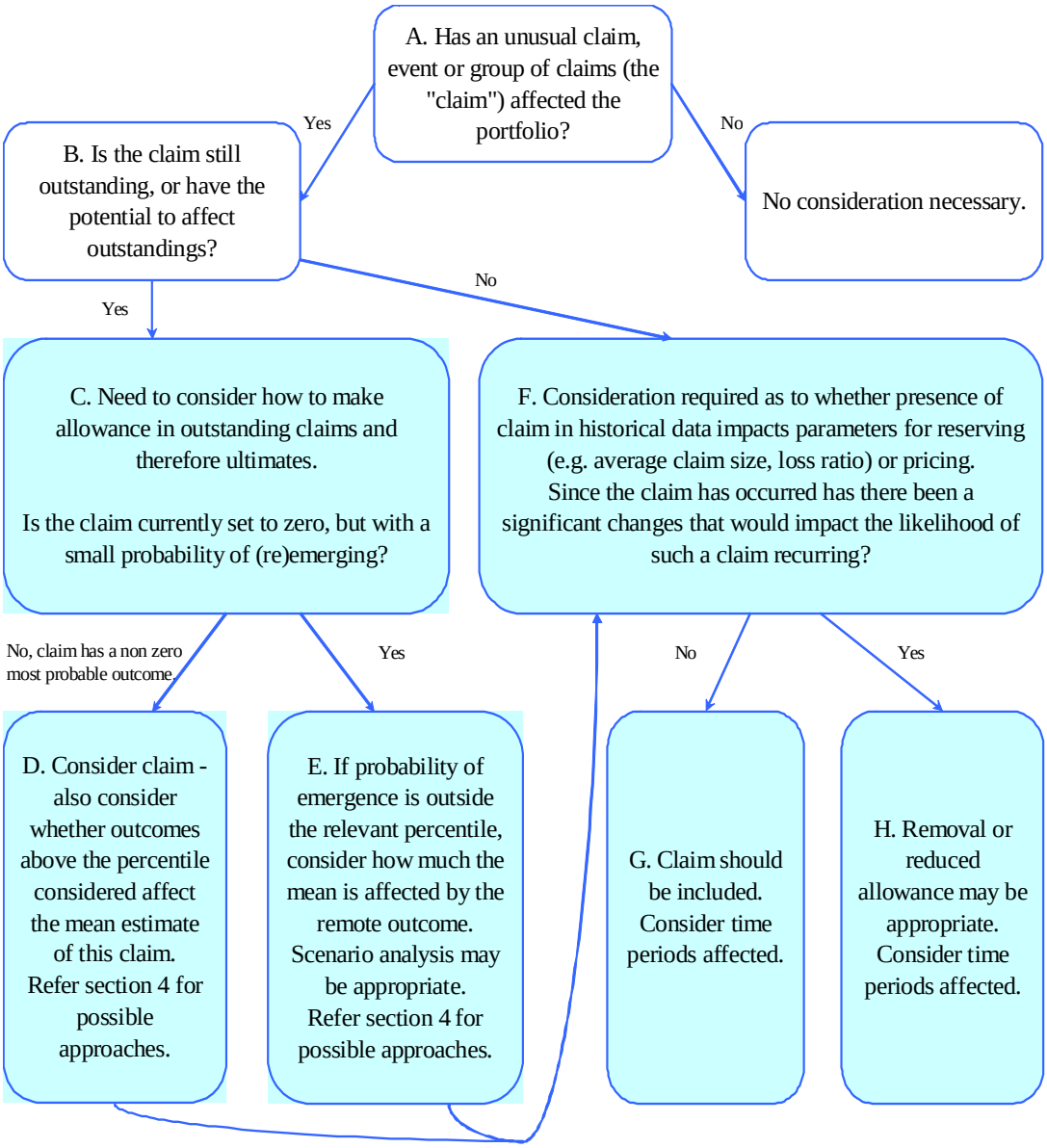
In practice, the point at which a claim is considered large might balance a "natural" cut off that might be observed in the data (say, where there is an apparent gap between the size of the bulk of claims and a handful of large claims) and a point that would allow meaningful analysis. In other words, even an analysis of large claims can be designed to involve an adequate volume of data. The same can also be true of large events, whether they be natural catastrophes affecting property classes or even incidents leading to an aggregation of claims.

3.3 Considering unusual claims

Sections 3.1and 3.2 address whether and how to separate claims into subgroups for the purpose of analysis. Implied in this discussion is the assumption that every claim will be accounted for within a subgroup in the analysis.

However, the authors have observed that when considering claims that are unusual, the decision is sometimes made to deem the claim an "outlier" or otherwise argue that it should be excluded from consideration altogether (or perhaps given reduced weighting). This can involve an entire claim or group of claims, or may simply be applied when refining the range of outcomes that are considered. The reasons behind such a decision can be quite variable, and we have therefore attempted to summarise a framework (Figure 3-2) encompassing the thought processes that underlie these judgements. This framework refers to unusual claims, events or groups of claims and considers both the impact on outstanding liabilities, as well as assumption setting across the portfolio. We have also provided more detailed comments on each stage of this framework.

Figure 3-2: Framework for considering inclusion of unusual claims



The above framework contains the following basic steps:

1. Identifying whether there is a claim, event or group of claims (referred to as "the claim") affecting the portfolio (the white shaded boxes);
2. Determining whether the claim impacts outstanding claims, and therefore whether special allowance needs to be made within the outstanding claims for that claim (the pale blue shaded boxes); and
3. Establishing to what extent the presence of this claim in the data should impact assumptions applied across the portfolio or to future periods of exposure (the darker blue shaded boxes).

Identifying presence of an unusual claim

If the presence of the claim is established at decision point A, the first step in deciding the breadth of impact of the claim is establishing whether the claim still has the potential to affect outstandings (decision point B). This may not be as simple as determining whether the claim is finalised or closed, as for classes such as professional indemnity, a long dormant notification may still contain potential to emerge as a claim. On the other hand, an apparent small claim remaining inactive and open for an extended period of time may also indicate some attention and clarification is needed. Where a group of claims is being considered, whether event based or emerging as a new source of claim, there may be potential for further claims that have been incurred to continue to be reported. That is, existing claims may not represent the full extent of the potential impact on outstanding claims.

Estimation of that specific claim

In the circumstance that the claim remains outstanding or may impact outstandings (step 2 above), thought needs to be given to how the claim might be valued (discussed further later in this paper), as a sufficiently unusual claim may not be well reflected in methods relying on a volume of historical data and an alternate approach may be required. Where this is the case, the claim may need to be considered in isolation from other claims.

It is at this stage of consideration (decision points C through E) that the actuary may well choose to limit the possible outcomes of the claim, either where the claim itself has a remote chance of occurrence, or where there is a potential outcome that is remote. This is frequently expressed as being due to the probability being outside the level of adequacy under consideration. As the 75th percentile is the relevant adequacy point for the purposes of regulatory reporting in Australia, this is often seen as the cut off point for considering an outcome. However, it is worth bearing in mind that:

- The central estimate is effectively representative of a "mean", or probability weighted average of all possible outcomes. IAAust (2010) defines the central estimate as "intended to be an unbiased estimate of the mean (statistical expectation)". Insurance cost and claim size distributions are skewed and the mean may be understated unless consideration is given to that outcome. The fact that the current reporting requirements in Australia are articulated in "percentile" terms does not remove this requirement. However, it may well be the case that the impact of a high cost but very low probability outcome can reasonably be deemed immaterial.
- In the circumstance that the mean is impacted, but still remains well within the relevant percentile, the impact of the outcome may not be overly material for financial reporting, as long as the risk margin is calibrated by reference to a specified percentile, these more extreme outcomes become ultimately a matter of the split between the central estimate and risk margin. (Even from a capital perspective, the split between central estimate and risk margin does not necessarily affect the risk charge applied.) However, where dealing with APRA reporting, the current requirement that the risk margin is at least half the coefficient of variation may have implications for particularly skewed outcomes, where the central estimate is close to the 75th percentile or exceeds it.

Implications for the remainder of the portfolio

Once the ultimate cost of the claim in question has been established (either at the final cost where the claim is not outstanding, or based on an estimate of the mean anticipated cost), the actuary then needs to work through step 3 above. The actuary will need to make a judgement as to whether the claim has implications for parameters used for valuations or pricing (decision points F through H). As many actuarial methods rely on examining past averages or fitting to past data, the presence of claims with a significant impact on those observed averages can cause concern with respect to the stability of parameters chosen. However, the actuary should be cautious before excluding an "outlier" altogether, as the "outlier" may well form a valid point on the distribution of potential claims. On the other hand, there may well be a valid reason why such claims will not recur or the frequency or cost would be reduced relative to the historical environment or why the claim is felt to be overrepresented in the data. Some potential reasons (although the list should not be considered exhaustive) include:

- There has been a response to the occurrence of the claim that affects the occurrence of future claims of that kind:
    - The claim or group of claims came from an unexpected interpretation or gap in the policy wording and the policy wording has subsequently been revised to exclude or limit these claims recurring. This might be the case for a liability policy, for example, where the breadth of potential claims can be difficult to anticipate. However this does not preclude additional unexpected interpretations or gaps in policy wordings.
    - There has been a legislative change impacting the potential claims. For example, tort reforms would have been expected to limit the potential size and therefore cost of future liability claims. Similarly, classes covering bodily injury type risks may be subject to additional claims or inflationary factors due to court precedents, but the risk of this impacting future claims can be removed or limited by a legislative response.
    - There has been an environmental change impacting the likelihood that such an incident could recur in the future. Using a simple example to illustrate this point, the withdrawal and discontinuation of use of a faulty product means that an assumption might be made that the exposure to products liability from its usage is removed or reduced after a certain point (there are exceptions to this simple case, such as asbestos, where the point of withdrawal and discontinuation of asbestos usage can be ambiguous). Similarly, a tightening in safety standards in response to a known incident can diminish, or eliminate, the occurrence of similar incidents in the future (e.g. Longford gas explosion sparked a Royal Commission which led to changes in safety procedures).
- The actuary only has limited years of data or for one reason or another is primarily relying on only a few years of data (e.g. averages based over the most recent experience, trying to use data only after a certain milestone). In these instances, "respreading" the impact of the claim, similarly to the way a catastrophe allowance might be made for a short tail class might be appropriate.
- The claim was notable enough that if a similar event had occurred for any past period (i.e. in relation to outstanding claims) it would already be known about given a reasonable length of time has elapsed. Therefore, it is possible that if no such claim is known by a specified time, then the need to include an allowance within outstanding claims, "just in case" it has in fact occurred, can become unsupported. The most obvious example of this relates to natural hazards, where in the absence of any significant event being reported, it is generally assumed that no general "catastrophe loading" would be required for

outstanding claims. A long tail example might include an assumption that all large claims are known after a given time period (perhaps 3-4 years).

Where the actuary feels that there is sufficient evidence to reduce the relevance of the historical experience, it may well be reasonable to not include the historical experience in full. However, we would suggest that even where such evidence does exist, consideration should be given to whether some residual risk remains, and partial allowance should be made. In each of points E and F, it is noted that the time periods affected requires thought. If there has been an event limiting the future implications of the claim, are these effective only from a certain point (perhaps for events that occurred thereafter, or for claims that are reported thereafter, or certain types of payments that are made thereafter, or for policies that are written thereafter) or are they expected to affect all periods? The impact may be different for premium liabilities relative to outstanding clams i.e. future periods relative to past periods.

In cases where there has been no change or other reason to believe the claim will not recur, we would suggest that excluding such a claim as an “outlier” may not be appropriate. Even where the claim is considered a “freak event”, this is not to say that this or a different “freak event” could not impact the portfolio again.

4. Large claims methodology

4.1 Current practice - observations

As stated in earlier sections, we have drawn on our experience and a study of direct portfolios we have analysed or reviewed to gain a snapshot of current methodology when summarising large claims. The information we have set out to elicit includes:

- Class of business
- Other key features of the portfolio, like run-off
- Whether large claims are analysed separately
- Methodology for allowing for large claims (and unusual claims, where present)
- Any qualitative considerations given to large claims and unusual claims

It may or may not surprise some readers that in fact it was not at all a straightforward exercise to distil the above information from actuarial reports. The authors observed wide ranging forms of documentation on large or unusual claims in these reports, in terms of the level of detail and the quality of the documentation.

Some possible reasons for the diverse ways in which large and unusual claims are analysed across the industry are:

- The large and unusual claims are often considered unique in nature, and so justify unique treatment.
- Different methodologies are often warranted for different insurers and classes of business in any event, whether or not large and unusual claims are present.
- There is no recognised consensus on "best practice" in dealing with these claims, so consistency in practice is not generally expected.
- The concept of having a "best practice" in dealing with large and unusual claims can be seen as advocating a "one-size-fits-all" approach, and so is problematic and undesirable.

However, from our study it was interesting to see that some themes did emerge, usually within a particular class of business, as to how large and unusual claims are allowed for in a reserving context.

Some highlights from our study by selected classes of business are as follows (and a tabular format is shown on page 17). Note that the tabular format focuses primarily on large, rather than unusual, claims, as the latter were sufficiently rare to make generalisations difficult.

4.1.1 Liability, Professional Indemnity and Workers' Compensation

- Practices vary greatly across the industry as to how Liability, Professional Indemnity (including Medical Malpractice) and Workers' Compensation large claims are valued.
- Scenario analysis on outcomes of large claims does not appear to be common practice.
- Often a high level of credibility is given to case estimates, with little IBNER being added.
- The high reliance on case estimates is not necessarily clearly supported by well documented input from claims managers, although such discussions may often have occurred.
- Pure IBNR allowance is often based on the frequency x size approach.
- Separate analysis or reference to "unusual" claims is uncommon, however analysis of "incidents" (i.e. loosely defined as notifications of occurrence of possibly insured events

that precede submitting a formal claim) or other analysis of exposures are sometimes performed to understand an apparent clustering in the mix of claims.

4.1.2 CTP

- Practices appear to concur in the use of aggregate models to project large claims (e.g. triangle methods) given the volume of data for CTP portfolio is usually high
- Sometimes claims are analysed by severity or other characteristics, because based on the claims experience in the past these appear to be good predictors of future claim outcomes, i.e. claims of the same severity or with other similar attributes have exhibited similar average claims sizes and development patterns in the past, and this is expected to continue into the future – therefore severity may be a suitable proxy for size
- Often a high level of credibility is given to case estimates, with little IBNER being added.
- Sometimes the high reliance on case estimates is supplemented by input from the claims managers.
- Separate analysis or reference to "unusual" claims is uncommon unless they are already large.

4.1.3 Mortgage and credit

- Practices appear to concur - large claims tend to not be separately analysed. In many cases it is often noted that there have been no "large claims".
- In most cases there is clear acknowledgement by the actuary of potential unusual claims, in this case the risk of a large number of claims in the event of an economic downturn (often an unexpired risk consideration rather than outstanding claims), but the level of sophistication in quantifying these claims varies.

4.1.4 Short tail

- Practices appear to concur in the use of aggregate models to project large claims (i.e. triangle methods). For portfolios beyond a certain size or where the reinsurance retention is "low", large claims tend to not be separately analysed.
- The degree of credibility given to case estimates varies.
- Business estimates by the claims managers of the insurance company are sometimes used for events in their "early days" of development.
- Discussions with the claims managers and scenario analysis on outcomes of large claims do not appear to be standard practice, although this may occur more with large natural events.
- Separate analysis or reference to "unusual" claims is common, and tends to relate to known events such as catastrophes.

4.1.5 Runoff

- Practices appear to concur that large claims are often separately analysed and assessed individually, and the use of aggregate methods declines as the runoff progresses.
- There is often a clear intention by the actuary to assess unusual claims separately to other claims, mainly due to the perceived high potential for these claims to develop into large claims. In many cases there is a clear element of conservatism in the case estimates for the unusual claims, so identification of these within the large claims subgroup may be relatively easier (as opposed to identifying them within small claims). The process of identifying and assessing non-large unusual claims is subjective and variable.

- Discussions with the claims managers and scenario analysis on outcomes of large claims and unusual claims appear to be common practice.
- Pure IBNR allowance is often based on the frequency x size approach.
- The degree of credibility given to case estimates varies.
- For portfolios at an advanced stage of runoff, practices on the assessment of large claims and unusual claims seem to be similar regardless of the original class of business for those portfolios. The reason may be that the claims that are sufficiently "persistent" to remain in the advanced tail tend to be large and/or unusual, and in many cases these claims are the sole remaining liabilities of the run-off portfolio.

4.1.6 Other classes

- We have not shown classes where there was not sufficient number of portfolios to make generalisations.
- We have also not addressed asbestos – although this is often a subgroup of workers compensation or liability, the methods in this case are quite specialised and tailored.

Figure 4-1: Frequency of methodology

	Methodology						
	Not separated	Known and IBNR claims modelled in aggregate	Known claims modelled alone - no IBNER*	Known claims modelled alone - general development allowance	Known claims modelled individually	IBNR claims modelled separately	Comments
Personal short tail	●						- catastrophes generally separated out - liability component may be separated out
Commercial short tail	●	●					- catastrophes generally separated out
Compulsory third party	●	●	●	●	●	●	- where not separated, analysis by severity acts as a proxy
Professional indemnity and public/products liability		●	●			●	
Workers compensation		●		●	●	●	- separation by payment type common, note probably less exposure to large claims than other long tail
Mortgage insurance/credit based	●						
Runoff	●		●	●	●	●	

● Commonly ● Sometimes ● Rarely

* Note that "no IBNER" refers to an acceptance of case estimates at face value without further development

4.2 Additional information

In our overview of the basic principles of analysing large claims, it was observed that a "best practice" approach to large or unusual claims analysis should include a discussion of further qualitative and quantitative aspects of the claims, perhaps with claims management or other members of the management team.

The authors have observed that the extent of such additional enquiry is generally not clear within formal valuation reports. On the other hand, anecdotal evidence suggests that many actuaries are in regular contact with the management team responsible for the claims, or have other methods of gathering the information they need (e.g. regular surveys). It would generally be our expectation that a valuation actuary (whether statutory or not) would meet regularly with claims management to discuss general trends and changes in operational procedures.

However, in the circumstance where there are specific unusual claims affecting the portfolio, the discussion may need to be more targeted and specific, or the actuary may choose to review either claim summaries (e.g. major loss reports) or complete claim files in order to gather context and a grasp of the key issues. The actuary may also supplement their review with inputs from external claim estimation specialists or have reference to legal advice (either within or in addition to the claims file) to gain a more independent perspective.

There is an additional area where the actuary needs to exercise caution. Claim specific querying is in general more likely to occur at the larger end of the spectrum of claims. However, conclusions regarding the prudence of estimation should not be drawn based on this discussion alone. For example, the degree of prudence may well vary by size of claim, with as yet unidentified "large" claims currently classified as non large being underestimated, offsetting observed prudence in the known larger claims.

4.3 Issues when selecting a methodology

As noted in our review of current practice, there are a number of options currently in use for assessing large or unusual claims. The suitability of these methods will vary depending on the class of business and the circumstances of the claims being assessed. Section 4.1 considered common practice on a class of business basis, however this considers only one variable that should influence the choice of method.

We have therefore in this section tried to expand on some additional considerations when selecting a method, linked to four broad categories of approaches, including where the need for additional information fits within the applied methodology.

Potential approaches to assessing large or unusual claims can be broadly grouped in four categories. This grouping differs from that in Section 4.1 as it is focussed purely on method rather than subdivision of claims, and also considers methodology for unusual claims.

1. Traditional analysis methods that rely on aggregated claims data
2. Statistical case estimation methods that attach individual estimates to a claim, but rely on a large body of data
3. Exposure based methods that link the prevalence of claims to a more readily accessible exposure base
4. Allowance for individual claims based on information currently available, information from claims managers and judgement

4.3.1 Common considerations

There are a number of considerations that are observed to be common to all methods, rather than being method specific.

Thoughts on large and unusual claims

Which claims are included in the analysis?

- Will the method be applied to all claims, or only those that are known, or IBNR? Separating the analysis into known and IBNR claims can allow for a more structured consideration of the two groups of claims and the issues impacting them, although a combined approach may increase the available data and could be argued to be simpler.

How much data is available and how stable is the analysis in question?

- What data is available? Are key elements necessary for a given method unobtainable e.g. history of case estimates are needed for many methods.
- Where the number of claims being analysed is few, even an aggregated analysis may yield variability in the past data such that the potential range of assumptions may be unhelpfully large.
- The use of benchmarks may be considered, irrespective of the method chosen
- To what extent do the data fields typically collected for "ordinary" claims convey sufficient details about the special features of the large and unusual claim? In the event that system data is limited in some way, other supplementary data should be sought, such as a major loss report on those claims and discussions with the claims manager.

How well understood are the estimates on the claims?

- A common theme emerging across each of the options is the reliance on estimates set by claims managers. This is sometimes necessary due to the fact that larger claims, notably those covering bodily injuries with symptoms that have yet to fully stabilise, are often subject to a number of uncertainties and debatable issues within the specific context of the claims. If the outcomes of those uncertainties and issues have a significant impact on the ultimate outcome of the claims, an unbiased and informed actuarial assessment is unlikely to have been achieved if the actuary does not have the benefit of inputs from the relevant claims managers.
- The reliance on case estimates noted above makes investigations around the meaning and adequacy of case estimates particularly important. Even where a claim is not separated out for separate analysis, asking additional specific questions of claims management may provide a cross check on the resulting estimates and uncertainty.

What reasonableness checks or monitoring can be put in place?

- As with any actuarial methodology, the actuary will need to take a high level view of the reasonableness of the result. This might include steps such as:
  - Summarising the assumptions and results back to insurer management or the claims manager to ask for comments;
  - Comparison of the result back to the current case estimates, and understanding the drivers behind any observed differential;
  - Comparison of alternate methodologies;
  - Consideration of what scenarios could be adequately met by the resulting reserve.
- Experience may be difficult to monitor over time, with simplistic actual vs expected payments analysis unlikely to be of much use. Timing differences are common. Tailoring the monitoring to consider the key uncertainties identified is perhaps a more helpful approach. The monitoring (and sensitivity analysis) around large claims is an area we observe to be quite mixed in regard to it being addressed in actuarial reports.

4.3.2 Aggregate methods (category 1)

Aggregate methods are perhaps the most common approach observed for allowing for large claims. These include the following:

- Development analysis of large claims (e.g. Incurred Cost Development, Projected Case Estimates).
- Applying an IBNER allowance on known case estimates (perhaps informed by analysis as per the previous point).
- Frequency by size analysis, whether for IBNR claims only, or large claims as a group. Determination of an average claim size may have reference to observed sizes to date for large claims.

The above methods are frequently used and well established, and we have not sought to describe them here. Although this category is the most commonly used in assessing large claims, we would not expect these methods to work as well for the more unusual claims. In fact, while the conclusions of some of the above analysis (a fixed IBNER loading, for example) could readily be applied to unusual claims, caution is required before making any assumption that these results are applicable to unusual claims.

4.3.3 Statistical case estimation (category 2)

Statistical case estimation is not often used (whether for large or non-large claims), as it is reliant on having sufficient data to attach statistically credible parameters and can be time consuming to implement. Where this method is applied to large claims, it generally forms a part of an individual case estimate method fitted across all claims (small, large or unusual). Similarly to category 1, the theory behind these methods is fairly well set out in other literature, but we observe that due to the relatively technical nature of this method, there are implications of this method that may not be well understood by users of the results:

- Even an individual claim estimate is not a tailored estimate for that claim. Only a certain number of characteristics are taken into account in forming these estimates, and the end result relies on a fit that examines the “average” across the group of claims that share that combination of characteristics. As such, an unusual claim may not fit well within this method.
- This method may not reliably identify large claims. Even where certain claim characteristics are identified as being associated with larger claims, there will have been a range of outcomes for claims with a given combination of characteristics. Where historical claims with identical modelled claims characteristics have included actual claim sizes both above and below the cut off for identifying large claims, an actuarial estimate on future claims with those characteristics might either result in all those claims estimated below the cut off, although some will ultimately be larger, or all those claims estimated above the cut off, although some will ultimately be smaller.
- Identification of large claims will in some cases improve as the life of the claim progresses. For statutory portfolios where claims receive periodic benefits, an estimate can incorporate the duration of the claim to date. Alternatively, for a lump sum portfolio, time to finalisation might be a factor in assessing size. In simple terms, the longer the claim persists without completing or finalising, the greater the likelihood that the claim will become a long term or larger claim. Therefore, when a new cohort of claims is incurred, spread across all of those claims will be incorporated a small probability that each becomes a large claim. However, one year later, some claims will now have been finalised, with the remaining claims now each incorporating a greater probability of becoming a large claim. In this way, the estimates on an individual claim may not give an early warning that the claim will be serious. While some very severe claims (e.g. quadriplegic injuries) might be expected to be large claims from the date of first report based on a qualitative review, the

statistical estimate is reliant on appropriate variables being included in the model. Nevertheless, an imperfect flagging of large claims does not mean that the estimate aggregated across all claims is not adequate at each point of development.

- Across an entire cohort of claims, it is possible that the overall estimate is still found to be adequate even where individual large claims are not flagged. On the other hand, this could be a result of "chance" rather than "design" and potentially undermines the estimate as a reliable basis for making business decisions. As for any method relying on historical data, projections of claim estimates and numbers of large claims is reliant on adequate representation of larger claims in the data. If large claim numbers are increasing (beyond "normal" levels of inflation), then using a statistical estimation method might be reasonable to the extent that the increase is attributable to a change in the mix of claims characteristics currently modelled. However, where this is not the case, additional or separate allowance for large claims may be required.

4.3.4 Exposure based methods (category 3)

Exposure based methods can include:

- An examination of frequency where the rate of large claims is benchmarked as a relatively stable proportion of total claims (i.e. the latter acting as an "exposure" measure). A variant of this would be using notifications as the base, rather than total claims. (This could be argued to equally belong to category 1, as a component of a frequency by size model.)
- Bornhuetter-Ferguson style methods where large or other groups of claims are modelled based on an underlying loss ratio or even a frequency rate relative to an underlying exposure measure (which may be premium or some other measure)
- Identification of an exposure measure based on a causal relationship to the claims, with the frequency or reporting linked back to that exposure measure. An example of this would be the methods applied to the runoff of asbestos claims, which takes into consideration volumes of asbestos product usage.

While these methods can be and are applied in cases where there is a reasonable level of historical claims data, they are perhaps of most value relative to other methods in those cases where data is scarce. The third example given above is particularly useful for latent exposures, where the absence of claims history requires the referencing of an exposure base that is more readily available.

4.3.5 Qualitative input (category 4)

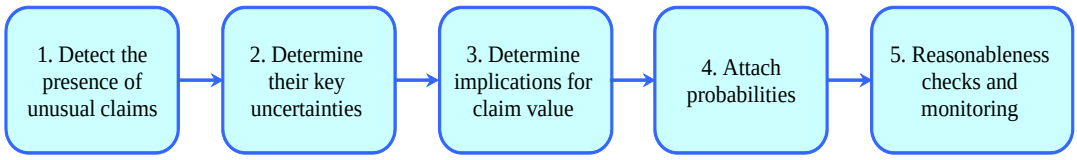
Qualitative input refers to the incorporation of further information supplementary to those captured in the standard data to assess claims. The key rationale for these approaches is that for large and unusual claims, the standard data fields may not fully describe the "special features" that made those claims large or unusual, which can contain a high degree of claims management judgement. Due to the claim-specific focus, these approaches are often applied on an individual basis. This can include annuity style methods where individualised assumptions are made for each claim, but also includes instances where a subjective estimate is adopted having had discussions with claims management regarding the potential outcomes. These approaches are most common when dealing with tail claims, where there are generally only a few open claims remaining after a certain point of development.

This category of approaches, compared to the other categories of approaches, relies less on having a body of aggregate claims data to rely upon, although information regarding the claim in question will always be needed. Using the same example above of dealing with the few claims remaining in the tail of a portfolio, it has considerable similarity with scenario analysis, which is more commonly used in assessing investments risk and risk management. An assessment of outstanding claims is generally dealing with past events, rather than the

broader possibilities of events that are yet to occur, so in terms of considering the list of "all possible outcomes" for scenario analysis, the application to a known outstanding claim should be a relatively simpler exercise.

Even where these approaches are not used, given the heavy reliance of the most common group of methods on case estimates, working through the potential outcomes of a handful of the largest or most uncertain claims can be useful in understanding the basis of underlying estimates.

As this category is perhaps the least well defined of the approaches, we have set out below a simplified path for applying a "scenario analysis" based approach to an unusual claim.



Step 1: Detect the presence of unusual claims

The first step is to identify unusual claims (especially in the case where they may not be currently large). In practice this is easier said than done, and can often be dependent on the timeliness, accuracy and quality of the data. Monitoring tools can be developed to assist in detecting changes in mix, hidden dependencies, an increased use of "default system values" or "dummy case estimates" in the data, and other unexpected trends in the emerging claims, which may indicate an apparent or possible presence of unusual claims. However it should be acknowledged that detection is necessarily subjective and involves exercise of judgement, as well as some efforts in "searching for clues" and putting the controls in place.

In some cases, the claims department may have produced a major loss report or similar summary setting out issues around the claim and the basis of the estimate on the claim. These are usually produced for claims requiring more attention by claims management and in some cases also prepared as part of the regular reporting to reinsurers, but they can also be useful to actuaries in giving an additional perspective of the claim that may not necessarily be captured by the standard system data. Where such a report is not available, a review of the claims file may be of similar assistance in contextualising and forming a preliminary view of the issues. While such views should be confirmed with claims management, it allows for more targeted enquiry regarding areas of uncertainty.

Step 2. Determine the key uncertainties

The simplest of claims might only have one key uncertainty – for example, the outcome of a court decision. This might then lead to a relatively simple two outcome assessment (i.e. a better or more favourable case and a worse or unfavourable case.

However, some of the more complex claims could have several uncertainties affecting the outcome, and we have set out some areas where in our experience we have observed uncertainty.

Coverage issues. The inclusion of the claim under the policy may be under dispute, which may limit the gross cost of the claim to defence costs. Alternatively, there could be a dispute with the reinsurers as to inclusions. More complex issues may have arisen regarding how the cover is applied, with respect to deductibles, limits or gaps, and the indexation of each of these. There is also the possibility that the coverage under the direct and reinsurance policies is not aligned, leading to different issues at the direct and reinsurance levels. There may also be several layers of cover that will be impacted or utilised differently depending on how the covers are applied.

Inclusion or exclusion of costs. Have costs been included (whether own or other party)? Is there uncertainty regarding these costs (for example, the other party has not yet quantified their claim for costs)? It is possible (or even likely) that the insurers view and the claimants view of the claimants costs will vary – and this can be a potential area for further claim cost development.

Exchange rate issues. Is the original currency of policy or claim in another currency? Is the rate of exchange fixed or will the value of the claim move with any subsequent currency movements?

Definition of a claim. Is the claim actually an aggregation of a group of smaller claims or a few larger claims? Does this impact the number of claims impacting the policy and the action of deductibles or limits? Is there doubt as to how many individual claims under the policy will occur? Is there a dispute regarding the aggregation of claims?

Where there are a number of uncertain factors affecting the outcome, a more complex model than a two state scenario may be required that allows for the interaction of these factors.

Step 3. Implications for claim value

Once the scenarios or outcomes are determined, the actuary will need to work closely with the claims manager in attaching a value or claims cost to each outcome.

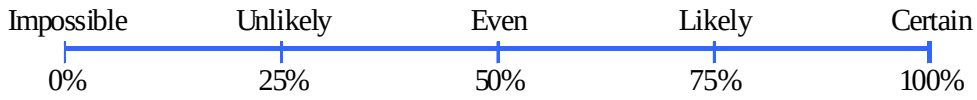
As a starting point for this step, it may be useful to understand the existing estimate on the claim. Is the estimate representative of a most likely outcome or is it a blend of an unfavourable and favourable outcome? (Note, depending on the approach to estimation, an estimate may tend towards allowing for an unfavourable outcome.)

Is there any limit to how large the claim could be? For example, is there a policy limit or sum insured in place? What is the amount being asked for by the claimant?

Step 4. Attaching probabilities

Attaching a numeric probability can be difficult, and it may be worth framing this question in a qualitative way, then transparently mapping the responses to a numeric scale. Figure 4-2 illustrates an example of how a simple probability scale may assist with mapping qualitative assessments to probability assumptions. A probability scale may also clarify relative probabilities e.g. if three possible outcomes were described as unlikely for A, likely for B and likely again for C, with probabilities totalling 100% as required, then if we were to mirror the approximate relativity of the scale that a likely outcome is about three times more probable than an unlikely outcome, this might suggest selecting probabilities in the range of 10-20% for A, 40-45% for B and 40-45% for C respectively.

Figure 4-2: Simple probability scale



Alternatively, or as well, ranking the outcomes from most to least probable may assist in assigning likelihoods.

It is important when translating a qualitative scale to a quantitative scale that the sensitivity of the assigned probabilities be understood, to ensure that the judgemental nature of the translation is not causing significant distortion to the results. Small movements in the allocation of probabilities should be tested.

Step 5.Reasonableness checks and monitoring

As for any other method, reasonableness checks and monitoring are a requirement.

5. Summary

Large and unusual claims are a significant driver of cost for many portfolios, and yet while certain themes do emerge when reviewing how these claims are separated and analysed, what is considered best practice is not clearly articulated or set out. As described in Hart et al (2007), "in many cases a few very large losses represent a major proportion of the total cost".

Themes (and possible gaps) in current practice regarding the treatment of large or unusual claims include:

- The presence of large claims is generally acknowledged by actuaries in their assessment of portfolio liabilities but the importance of large claims to a portfolio is likely to vary, with class of business a key consideration – the decision to separately analyse a group of claims will depend on this importance. We have not observed any evidence that large claims are not being separated where it would have been appropriate to do so;
- Unusual claims, i.e. claims that might cause distortion to the analysis, are not always contained within large claims and although rare, actuaries should be wary of their presence. Furthermore, the decision to exclude or reduce the impact of an unusual claim from the analysis should be supported by a conclusion of immateriality (i.e. for a remote outcome) or sufficient evidence of changed circumstances. From our review, we conclude that actuaries are quite good at identifying individual or groups of unusual claims, but the reasoning behind including or excluding such claims is not always well articulated;
- Where large or unusual claims are separately considered, there are a range of methods in use. This is quite reasonable given that large and unusual claims by definition tend to require tailored treatment;
- Many methods have a heavy reliance on case estimates, sometimes with no or limited IBNER allowance, and this underscores the importance of the actuary having sufficiently investigated the adequacy, uncertainties and qualitative information for key claims. This is particularly true of unusual claims, where there is unlikely to be sufficient historical data to estimate the claim based on traditional methods. The actuary should ensure they have sufficiently supported their reliance on case estimates;
- It is difficult to confirm the degree to which actuaries are interacting with management, particularly claims management, but few would disagree that all actuaries should ask themselves whether they feel there has been sufficient interaction and inquiry;
- Large claim monitoring and inclusion in sensitivities is an area that could be further developed.

References

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Hart D, Buchanan R & Howe B, 2007, *Actuarial Practice of General Insurance 7th Edition*, The Institute of Actuaries of Australia.

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Appendix: Examples of unusual claims

- Longford gas explosion – On 25 September 1998, there was a gas explosion at the Esso natural gas plant in Longford (Victoria) causing a fire that was not extinguished until two days later. As the plant was the primary provider of natural gas to Victoria, this industrial accident halted the supply of natural gas for more than two weeks. The subsequent Royal Commission found that Esso was responsible for the accident and had breached the Occupation Health and Safety Act by failing to provide a safe work environment and identified numerous deficiencies with Esso's operations.

  In December 2004, Esso settled a class action launched by businesses, workers and domestic users for $32.5 million. However when the class action was first brought against Esso, it was reported that the claimants were seeking up to $1.3 billion, a large element of which relate to "business interruptions" claims from the 2-week suspension in the supply of natural gas – which both the extent of impact and the magnitude of these claims could not have been predicted by the original gas explosion. At the time, noting the complexity of the issues involved and the sheer magnitude of the alleged losses, this would have presented significant challenges for claim managers who were setting case estimates, and actuaries who were estimating reserves.

- Leaky buildings – In New Zealand, there were changes to the designs and materials allowed in the construction of buildings (including homes) during the 1990s. These changes weakened the resistance of buildings (that were built in the 1990s/early 2000s) to wet weather. New Zealand's predominantly wet environment has subsequently rendered many of these buildings hazardous. In response, building standards have been strengthened. It has also emerged that numerous developers, architects and builders were producing substandard work, and local councils had failed in their inspection of buildings. This is a recent example of latent claims, where (a) the changes in the 1990s to building requirements were not expected to severely shorten the lifespan of buildings, (b) the extent and cost of leaky buildings did not become apparent until the late 2000s, and (c) the insurance premiums charged to homeowners for home warranty type covers during the construction of these buildings made immaterial allowance, if any, for leaky buildings. Some quoted estimates of the financial cost vary from NZ$11.3 – 23 million.

- Black Saturday bushfires – Around 7 February 2009, a series of bushfires raged across Victoria causing 173 deaths, 414 injuries and widespread carnage. Apart from the usual insurance claims, class actions were launched against electric utilities. The thrust of the class actions centred around claims of alleged negligence in their maintenance of electricity infrastructure, lack of protective devices fitted to power lines or simply fallen power lines which sparked or contributed to certain bushfires. Prior to these bushfires, it would have been rare to associate bushfires with class actions against electric utilities.

- Chelmsford deep sleep therapy – From early 1960s to late 1970s, Harry Bailey practised Deep Sleep Therapy at Chelmsford Private Hospital, Sydney. His practice involved drug-induced comas and electroconvulsive therapy, and caused over twenty deaths as well as numerous physical and psychological issues for his surviving patients. It was not until the 1980s that investigations led to Bailey's suicide and a Royal Commission. A medical indemnity insurer would not have anticipated the long duration of a practice that might be considered unacceptable by the broader medical community, especially after coroner reports.

Some common threads tying these examples of large and unusual claims are: professional indemnity and public/products liability style claims; and lack of precedents and successful legal proceedings eg class actions. It is possible that this sample is biased, as other large and unusual claims may not have the same level of publicity seen in these examples or may be settled privately.