

Section K

MISCELLANEOUS TOPICS

Preamble

The section's purpose is to catch those reserving topics which have fallen through the net of the main classification system used in the Manual. At present, three main items are dealt with, but the section has room for extension as other worthwhile topics come to light.

The first area taken is that of average cost reserving systems. Such systems are very useful for dealing with claims which are small but numerous, and with recently reported claims where not enough evidence is yet available to support a proper case estimate.

The second area is that of re-opened claims. For a variety of reasons, claims already settled may sometimes have to be re-evaluated, and further payments made to the insured. Depending on the reserving method used, and on the relative importance of the re-opens, it may be necessary to set up a separate reserve for such claims. There is an interesting question as to how the re-opens should be treated: as extensions of the original claims, or as new claims in their own right? In the latter case, re-opens have much in common with IBNR claims, and indeed can be evaluated as such for reserving purposes.

The third area is claims expense, of both the direct and indirect type. Indirect expense is not an area in which great precision can be achieved, and relatively crude methods will suffice. The problem is to find the overall reserve needed, i.e. for the business as a whole, and then to allocate it between the different classes. Coming to direct expense, this may often be treated simply as a component of claims themselves. If it is evaluated separately, then many of the methods already described for claims can be used. A good way of proceeding, however, is to look at the ratio which the expense bears to claims, and to project this ratio directly. It is commonly found that the ratio increases markedly with the development life of the claim.

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[K1]
AVERAGE COST RESERVING SYSTEMS

Average cost reserving systems are, in effect, used as an alternative to the setting of individual case reserves. They may be used either for replacing case reserves where insufficient information is available, or as a means for reducing paperwork and administrative cost.

Situations where such systems can be appropriate are as follows:

- a) For lines of business where claims tend to be small and quickly settled.
- b) For lines with large numbers of claims and a relatively stable pattern of claim sizes.
- c) Generally, for recently reported claims where the facts provided are insufficient for setting a proper case reserve.

General Principle

The general principle behind the average cost systems is to put the claims into a standard pool, but with time and value cut-off points beyond which the claims must be individually estimated. Thus, when first reported, all claims are reserved at an average value previously set for the line of business in hand. Then, for those claims settled by the cut-off date, no further estimating need be done. But for claims persisting beyond the cut-off, a case reserve will be established and used in preference to the average value.

The value limit, if set, works in a similar way to the time limit. Any claim exceeding the set value is immediately withdrawn from the pool and given an individual reserve.

This would apply where further facts may be obtained at an early date enabling a case reserve to be properly set. The claim can then immediately be estimated as such, rather than waiting for the time cut-off to operate.

Average cost reserving systems introduce some interesting problems for the reserver. These relate to the time and value cut-offs, and the average cost figure itself. The setting of the time cut-off will normally depend on how long is needed to gain the fuller facts about a given case. For most lines the period will be fairly short, say from one to six months at most following the date of report. The value cut-off needs to be selected for practical reasons, balancing cost savings against the need to give individual attention to the larger claims. It will be helpful if the reserver can obtain data on the general pattern of claim sizes which pertains to the line of business in question.

The Average Cost Figure

Coming to the average cost figure, one basis for it would be to estimate the ultimate average cost for claims in the given line of business. To this end, the methods of §H and §J could be used. The objection is that the ultimate average covers claims which are IBNR as well as reported claims. The IBNR claims are likely to differ in size from the generality — hence the ultimate average will show bias if used to estimate reported claims only. The distortion may not necessarily be serious, but if it is, one solution would be to make the average estimate using report year rather than accident year data.

The reserver should also monitor the data for other sources of distortion. For example, the most severe claims may be rapidly taken from the average cost pool and reserved on an individual basis. But the average used for valuing claims in the pool may be that for reported claims as a whole, i.e. including the severe cases. In this event the average will tend to be overstated.

The opposite effect can occur where the majority of claims are small and quickly settled. In this event, the larger claims remaining longer in the pool can be underestimated by the reported claims average.

As a final point, care is needed whenever the time cut-off or the money limits for inclusion in the pool are changed. The group of claims that will qualify will be different, and hence the average cost figure is likely to need adjustment. It should be remembered that the statistical results (used, for example, for rating purposes) could be distorted.

By-passing the Main Claims System

For lines of business where claims tend to be small and quickly settled, i.e. situation a) above, special systems can be put into use. Various names are used for these: either a "first and final" payments system, or in the USA a "fast track" or a "one-shot" system.

The idea is that authority can be given for claims below a set limit to be settled directly at branch or agent level. The first report of any claim at head office will then be of the settlement itself and the amount paid. Such claims, although reported at branch level, are not coded into the main claims recording system and effectively by-pass it. But, as always, reserves must be established. It is most conveniently done by taking a periodic count of the number of claims in the category, and multiplying by an average cost figure.



[K2]
RESERVES FOR RE-OPENED CLAIMS

It is possible for claims which have been finalised, and on which the files have been closed, to be re-opened at a later stage. There is a number of reasons why this might happen. A good example would be in employers' liability, where an injury or disease sustained in course of employment may sometimes recur or produce fresh symptoms after a lapse of time. In such case it may be necessary to increase the amount paid out. Another example might be in property damage, where new evidence on the causal events comes to light, and an earlier settlement is challenged through a court action. Finally, an office's practice on old claims which have been inactive for an appreciable time may be to close them automatically. But such claims can still be re-opened by the insured at a later date.

How should such possibilities be treated by the reserver? For most lines of business, the reserve needed for re-opens will be small in comparison to the overall liability. Even where it is not, many of the standard methods for claims reserving will automatically cover the re-opens along with the first-time claims. Take for example the projection of paid claims on an accident year basis. For each accident year, running along the row in the development table, the amounts paid out on re-opens will be included as a matter of course. The accident date will be the same as that for the original claim, and so the paid amounts will be recorded as if the claim had never been closed in the first place.

Classification of Re-opened Claims

Although accident year projections of overall liability lead to few problems with re-opened claims, other methods may need more careful consideration. Again, where the liability has to be split into that for reported claims and for IBNR separately, problems can arise. The essential question is whether to count the re-opens as new claims, or as just further development on the existing ones. Either alternative can be used, so long as it is used consistently, though the choice may have to depend on the office's practice in the recording of such claims.

To give an example of the dilemmas which can arise, consider the case where reported claims are estimated from case reserves and the IBNR are found separately. There are two main possibilities:

- a) The case reserves are adjusted for future development, and combined with an estimate of true IBNR.
- b) Case reserves are not adjusted, but are combined with IBNR as the remainder term, or IBNER.

If a) holds, and case reserves are adjusted, the re-opens can be taken as part of the development on existing claims, and incorporated in the adjustment. They will then form a part of the reported claims estimate. But in case b), the re-opens

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cannot be put in with case reserves, and instead must be defined as new claims in their own right. As such they effectively take on IBNR status, and will be estimated as part of the remainder liability.

Where report year data are used for projections, the question of claim classification becomes an important one. Thus, if re-opens are counted as extensions of old claims, then the amounts paid out on them will appear at a later stage in the original row of the development table. Hence the projection will include the necessary allowance for the re-opens. But if the re-opens are treated as new claims in their own right, then the amounts paid on them will only appear in the table as new report year rows are added. The procedure is equivalent to that for emerging IBNR claims, and the re-opens effectively take on the IBNR status. They are thus no longer covered by the projection, and must either be brought in to the IBNR reserve or estimated as a third, independent category in their own right.

To sum up, re-opened claims can usually be treated as part of the reported or IBNR claim groups without further trouble. The problems mainly arise where re-opens form an appreciable element in the overall picture, or where there is a marked variation in their occurrence. In these cases, a separate analysis may be called for. The parallel between re-opens and IBNR claims is useful here, and many of the IBNR methods can be adapted for the purpose.



[K3]
RE-OPENED CLAIMS — BALCAREK'S METHOD

This is a method based on number and average cost for re-opened claims. The number of re-opens is estimated from the number of claims settled in recent years, using observed experience. The average cost for the re-opens is then found, again from experience, as a multiple of the average cost for settled claims. Multiplication of the two leads to a simple formula for the re-opened claims reserve.

Taking the number of re-opens first, function $r(t)$ is defined as the probability that a claim first settled t years previously re-opens during the current year. The probabilities are taken to be stable, and are derived from the past experience. (Balcarek fits an exponential function to his data for this purpose.)

Let nS_y be the number of claims settled in a given year y . Then, taking a stance at the end of year y , the claim numbers settled in recent years are:

$$nS_y, nS_{y-1}, \dots, nS_{y-k+1}$$

where k is some appropriate limit, i.e. the time-span beyond which re-opens are rarely encountered. The required number of re-opens from the end of year y , i.e. commencing in the year $y+1$, is then:

$$nS_y \cdot r(1) + nS_{y-1} \cdot r(2) \dots \dots + nS_{y-k+1} \cdot r(k)$$

or:
$$\sum nS_{y-t+1} \cdot r(t)$$

where summation is from $t = 1$ to k .

It remains to determine the average cost for a re-opened claim. Balcarek relates this to the average cost for a settled claim, where settlement is taken to occur in the original year to which the re-open relates. Denoting this average cost for year y by sA_y , the formula for the re-opened claims reserve becomes:

$$\begin{aligned} & r(1) \cdot nS_y \cdot z_1 \cdot sA_y + r(2) \cdot nS_{y-1} \cdot z_2 \cdot sA_{y-1} + \dots \\ & = \sum r(t) \cdot nS_{y-t+1} \cdot z_t \cdot sA_{y-t+1} \end{aligned}$$

where summation is again from $t=1$ to k , and z is the ratio between the average re-open and the average settled claim. Balcarek found, for his own data, that a constant ratio of 4.5 could be taken for the value of z . Using this property leads to the simplified formula:

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$$z \cdot \sum r(t) \cdot pS_{y-t+1}$$

where pS_y denotes the amount paid out on claims settled during the year y .

A point to note is that Balcarek's paper dates from 1961, and that he was using data from workmen's compensation business in the USA. The formula given above should therefore not be applied indiscriminately when a reserve for re-opened claims is required. The stability of the required assumptions on re-open probabilities and average cost ratios should be tested in the light of the data available.



[K4]
CLAIMS EXPENSE — INDIRECT TYPE

In dealing with the expenses related to the settling of claims, it is usual to recognize two main categories — direct and indirect expense.

Direct Expenses are those which can be related to the settlement of particular claims. Examples are lawyers' and loss adjusters' fees, medical and court expenses, costs of special investigations and so on.

Indirect Expenses are those which cannot be allocated to the settlement of particular claims. They are, typically, claim department salaries and national insurance, office costs, data processing costs, and so on.

Claims expenses are usually known in the USA as loss adjustment expenses (LAE), and the direct and indirect kind are known as allocated LAE and unallocated LAE respectively.

Reserving for Indirect Expenses

The simpler methods are available for indirect expense, so this type will be treated first. Since the expenses are of a general nature, as incurred in the overall running of the claim department, they must first be considered in relation to the business at large. The prime problem, then, is to determine the reserve as a whole — which may be sufficient in itself. But in some cases, it may also be desired to allocate the amount between the different classes of business.

The assumption needed for valuing the reserve is just that indirect claims expense will tend to vary over time very much as claims themselves do. The simplest method then is to find the paid expense/paid claims ratio for the year or period just past. Applying this ratio to the end-year claims reserve will then generate a first estimate for the expense reserve. The formula for year y will be:

$$^{\wedge}EV_y = (pE_y / pC_y) \times ^{\wedge}CV_y$$

where pE_y denotes the paid expense for year y , and $^{\wedge}EV_y$ is the required expense reserve.

This first estimate, however, is likely to be an overstatement of the actual need. The argument runs as follows: During the year, expense will be incurred as claims are opened, investigated, paid out on and closed. For any given claim, the expense will have some pattern of incidence while the claim is extant. But it would hardly be worthwhile to determine the pattern in full detail — a crude assumption will be enough. Perhaps the easiest to make is that 50% of the expense is incurred when the claim is first reported, and the other 50% when it is settled.

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With this assumption, consider the claims outstanding and IBNR at the end of the year y . For the first group, 50% of the expense will already have been incurred, during the year itself or earlier. But for the IBNR group, it is clear that no expense can yet have been incurred. Hence, in applying the formula above, it will be correct to reduce the overall claims reserve by 50% of the reported claims portion. The modified estimate is then:

$$\hat{EV}_y = (pE_y / pC_y) \times (.5 \times \hat{VR}_y + \hat{ibV}_y)$$

The estimate may, perhaps, be improved by looking at the paid expense to paid claims ratio in years prior to the current year. An average can then be taken for the ratio, or a trend followed through, to produce a more reliable figure. For years affected by one or more catastrophes, the paid expense to paid claims ratio may need to be adjusted to reflect the fact that claims resulting from a catastrophe receive less individual consideration than claims in normal circumstances and hence the expense may be a lower proportion of the claim cost.

Other methods for determining the indirect expense reserve will depend on a more detailed analysis of the incidence of expense. For example, claim payments might be identified as well as openings and closings as significant events in attracting costs. If such payments were more concentrated towards the closing date of a claim, then the 50% multiplier in the above formula would need to be increased by an apt amount.

On the question of allocating the indirect expense reserve among the different classes of business, this is a matter of finding a suitable weighting factor. Premium income might be suitable, but not necessarily. Reported and IBNR reserves could be used, as in the above formula. Alternatively, for private rather than commercial lines, a weighting based on numbers of claims reported and settled might be appropriate.

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[K5]
CLAIMS EXPENSE — DIRECT TYPE

The first question with direct expenses is as to whether they require separate recognition, or can be included along with the claims themselves. For most lines of business in the UK, the latter alternative is probably to be preferred, since it reduces the amount of work to be done. The principles are simply that all expense payments are counted as claim payments, and that an element for future expense is included when case reserves are set up.

Separate recognition of expenses is necessary only where the expenses are large in relation to claims, or where the expense pattern is changing in a markedly different way from the claims pattern. Such effects are more likely to occur in the long-tail lines, particularly liability business, where the legal costs of a long drawn out case can be heavy. This feature, of course, is exacerbated where North American business is concerned, and separate evaluation of claims expense may be vital.

General Methods

Given that data are available, it is possible to analyse expenses for their development by accident year, just as has been done for claims themselves. Thus completely separate projections can be made, using the normal claims methods already described. But a more favoured principle is to work on the relationship of expenses to claims, and to project the ratios found in past data. The ratios, of course, will not be constant, but provided they are reasonably stable for each development period the method will be valid.

One warning must be given. The expense/claims ratio will not be reliable in projections for direct expense if it is calculated on the calendar year basis only (i.e. as for indirect expenses, in §K4). The problem is that the characteristics of the group of claims settled during the year are very different from those of the group outstanding or IBNR at the end of the year. The settled group will contain a large proportion of early settling claims, and for these the direct expense/claims ratio is likely to be comparatively low. But the outstanding group at the year-end will have many more by proportion of late settling claims. For these the direct expense/claims ratio will be a good deal higher, thus completely invalidating the forecast.

Accident Year Projection

The safe method is therefore to use an accident year projection, and this is now illustrated by a worked example. To begin with, we give on the next page the usual paid claims data, together with a ready-worked out projection to the ultimate values. (The projection is taken from the result of the link-ratio method, as applied in §E6.)

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		<i>d</i>						
		0	1	2	3	4	5	<i>ult</i>
<i>a</i>	1	1001	1855	2423	2988	3335	3483	3705
	2	1113	2103	2774	3422	3844		4271
	3	1265	2433	3233	3977			4947
	4	1490	2873	3880				5948
	5	1725	3261			[<i>pC</i>]		6626
	6	1889						7284

Next we require the expense data, in the same accident/development year format. The symbol *pE* denotes that the figures are for *paid* expense, while the value 320 in the *ult* column is an estimate, based if possible on data from earlier years.

		<i>d</i>						
		0	1	2	3	4	5	<i>ult</i>
<i>a</i>	1	30	74	144	210	260	294	320
	2	36	88	165	250	309		
	3	42	100	201	289			
	4	51	124	250				
	5	54	136			[<i>pE</i>]		
	6	63						

From the two tables, it is easy to calculate the expense/claims ratio at each point in the development. Thus, in the following table, 3.00 is 30/1001, 3.99 is 74/1855, each ratio being given as a percentage.

		<i>d</i>						
		0	1	2	3	4	5	<i>ult</i>
<i>a</i>	1	3.00	3.99	5.94	7.03	7.80	8.44	8.64
	2	3.23	4.18	5.95	7.31	8.04		
	3	3.32	4.11	6.22	7.27			
	4	3.42	4.32	6.44				
	5	3.13	4.17			[<i>pE/pC</i>]		
	6	3.34						

CLAIMS EXPENSE — DIRECT TYPE

The ratios show reasonable stability down the columns, and the table can be projected by the link ratio method of §E. This is done below.

	<i>d</i>						<i>ult</i>
	0	1	2	3	4	5	
<i>a</i>	1.330	1.489	1.184	1.110	1.082	1.024	
	3.00	3.99	5.94	7.03	7.80	8.44	8.64
	1.294	1.423	1.229	1.100			
	3.23	4.18	5.95	7.31	8.04		8.91
	1.238	1.513	1.169				
	3.32	4.11	6.22	7.27			8.90
	1.263	1.491					
	3.42	4.32	6.44				9.41
	1.332						
	3.13	4.17				$\frac{[r]}{[pE/pC]}$	9.01
	3.34						9.32
<i>r</i>	1.291	1.479	1.194	1.105	1.082	1.024	
<i>f</i>	2.790	2.161	1.461	1.224	1.108	1.024	

The result of the projection is to give an ultimate value for the expense/claims ratio for each succeeding accident year. It remains to apply these ratios to the projected claims figures, given in the first table above. The calculations are:

	<i>a</i>					
	6	5	4	3	2	1
\hat{C}_{-ult}	7284	6626	5948	4947	4271	3705
$\hat{pE/pC}$	9.32	9.01	9.41	8.90	8.91	8.64
\hat{E}_{-ult}	679	597	560	440	381	320

Here, 679 is 9.32% of 7284 and so on. The final result for the expense projection is now given, by addition of the accident year figures. Symbol pE^* refers to the current values for paid expense, i.e. the data in the main diagonal of the pE triangle above.

Overall Values:	$\sum \hat{E}_{-ult}$	2,977	
	$\sum pE^*$	1,341	
	Reserve	1,636	(55.0% of \hat{E}_{-ult})

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Comparison:	$\sum C_{-ult}$	32,781	
	$\sum pC^*$	20,334	
		<hr/>	
	Reserve	12,447	(38.0% of C_{-ult})
		<hr/>	

Comparison of the overall expense and claims figures is instructive. The proportion of the ultimate amount which needs to be held as a reserve is markedly higher in this example for expenses than for claims. This results simply from the fact that the expenses escalate more rapidly than the claims as development time increases.

