

Estimating Unpaid Claims Using Basic Techniques

Chapter 12 – Case Outstanding Development Technique

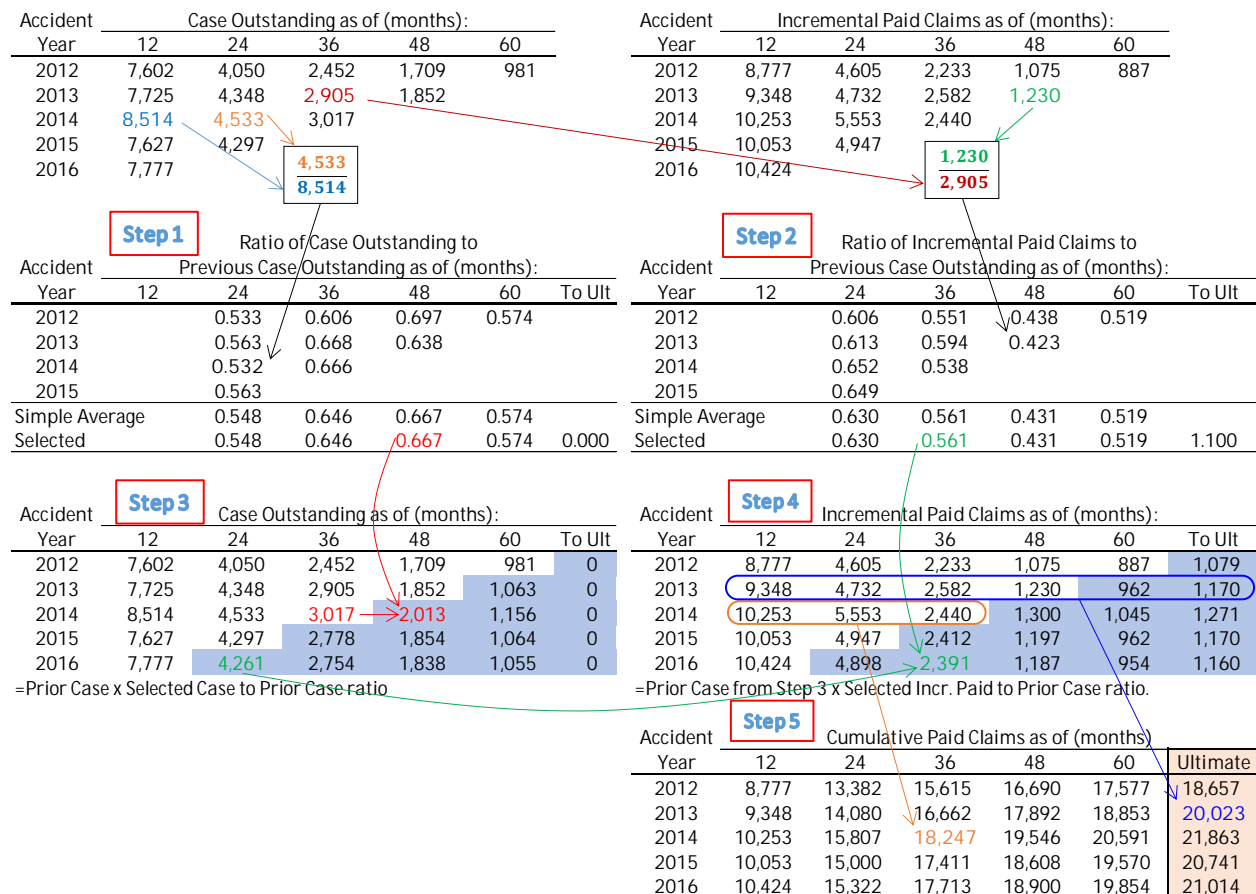
Introduction

This chapter presents two case outstanding development methods. The first incorporates the historical relationships between paid claims and case outstanding to estimate unpaid claims, while the second is useful in situations where the only data available is case outstanding reserves (a possibility for self-insurers).

Method #1 Mechanics

Method #1 uses the development of case to prior case reserves and incremental paid to prior case reserves to estimate ultimate claims. It is logical that future case reserves and incremental payments in a given period are related to the case reserves in the prior period. We use this fact to project future case reserves and incremental payments out to ultimate, then sum up the incremental payments to find the cumulative ultimate claims.

The first step is to calculate and select the ratio of case to prior case reserves by age— this is shown in Step 1 below. We also need to calculate and select the ratio of incremental payments to previous case reserves by age— this is shown in Step 2. We then use the ratios selected in Step 1 to develop the case outstanding amounts at each age in the bottom half of the case outstanding triangle, shown in Step 3. Next, we use the selected incremental payments to prior case ratios, along with the projected case amounts from Step 3 to develop the incremental future payments at each age—this is shown in Step 4. The cumulative paid claims, shown in Step 5, are simply the sum of incremental paid claims at each maturity from Step 4, with the cumulative paid claims at ultimate being this method's ultimate claim estimate (highlighted in peach below).



In Step 1 we selected a tail factor of 0.00, implying there are no case reserves after the latest age in the triangle. That will be the default selection in this method, so ensure your triangle is large enough that this is a valid assumption. If we had selected a tail factor greater than 0.00, there would be case reserves in the “To Ult” column of Step 3, but that does not lead anywhere since it never becomes the prior case reserves in the next step (the Step 2 tail is applied to the case outstanding at the latest age, not ultimate). In Step 2 the selected tail factor represents the percentage of case outstanding at the latest age that is ultimately paid out. If we expect more than the case outstanding at the last age to ultimately be paid out, we would select a factor greater than 1.0, as we do here (a selection less than one implies claims settle for less than the case reserves at the latest age).

The key assumption of this method is similar to other development techniques—that future claims are related consistently to claims already reported. This method is most stable/appropriate when most claims are reported in the first year, so that it can more accurately measure the incremental paid to prior case ratio. If there are significant new reports in future periods, this ratio will not be as steady due to more moving pieces. This is because future payments include those included in prior case, but also payments on newly reported claims. This is a weakness if we are evaluating most lines of business on an AY basis, but is a strength when analyzing claims made policies grouped into report year triangles. An additional weakness is there are no industry benchmarks to compare to our selected ratios by age, and these selections are not necessarily intuitive or something the actuary would have gained knowledge of through general experience. As a result, this method is not commonly used by actuaries.

Method #2 Mechanics

The text presents a method to develop an unpaid claims estimate if the only pieces of information we have available is current case reserves and industry paid and reported CDFs (i.e., we don’t know total paid, total reported, or have historical valuations). This situation is possible, though not necessarily common, for self-insurers, particularly in older years following mergers and acquisitions. Unlike other methods that first develop an estimate of ultimate claims (before subtracting reported and paid claims to get IBNR and unpaid claims, respectively), this method results in an estimate of unpaid claims directly.

The CDFs referenced in the equation below are cumulative, and the formula inside the parenthesis is called the case outstanding development factor. This equation is applied separately to each accident year.

$$\text{Unpaid Claims} = \text{Case Reserves} \left(\frac{(\text{Reported CDF} - 1.00) \times \text{Paid CDF}}{\text{Paid CDF} - \text{Reported CDF}} + 1.0 \right)$$

The algebra needed to understand this formula intuitively is messy. Instead I would recommend you learn the following more intuitive and mathematically equivalent formula which is also more commonly used in practice and is also accepted by the CAS (see Fall 2016, Q19 Part a, Sample Answer 2).

$$\text{Unpaid Claims} = \text{Case Reserves} \left(\frac{1 - 1/\text{Paid CDF}}{1/\text{Rep. CDF} - 1/\text{Paid CDF}} \right)$$

Which is more intuitive to me since it is equal to:

$$\text{Unpaid Claims} = \text{Case Reserves} \left(\frac{\% \text{ Unpaid}}{\% \text{ Reported} - \% \text{ Paid}} \right)$$

Where case reserves divided by % Case is a “pseudo” ultimate estimate, which is then multiplied by % Unpaid to estimate unpaid claims.

The advantage of this method is we are able to develop an estimate of unpaid claims when the only piece of information we have is case outstanding (and industry CDFs).

There are many weaknesses to this second method. Since this method is used when historical data and company CDFs are not available, we must use industry benchmarks which may prove to be inaccurate for the

specific company. It may also not be a good estimate for more recent years, if CDFs are highly leveraged. Additionally, any individual large losses contained in the case reserves may distort the projection.

The following example applies this method across several accident years.

Accident Year	Case Outstanding	Industry Reported CDF to Ult.	Industry Paid CDF to Ult.	Case O/S Development Factor	Unpaid Claim Estimate
(1)	(2)	(3)	(4)	(5)	(6)
2011	715,000	1.015	1.046	1.506	1,076,790
2012	775,000	1.020	1.067	1.454	1,126,850
2013	850,000	1.030	1.109	1.421	1,207,850
2014	915,000	1.051	1.187	1.445	1,322,175
2015	975,000	1.077	1.306	1.439	1,403,025
<u>2016</u>	<u>995,000</u>	1.131	1.489	1.545	<u>1,537,275</u>
Total	4,775,000				7,011,175

Column Notes:

$$(5) = [1 - 1/(4)] / (1/(3) - 1/(4))$$

$$(6) = (2) \times (5)$$

