Overview

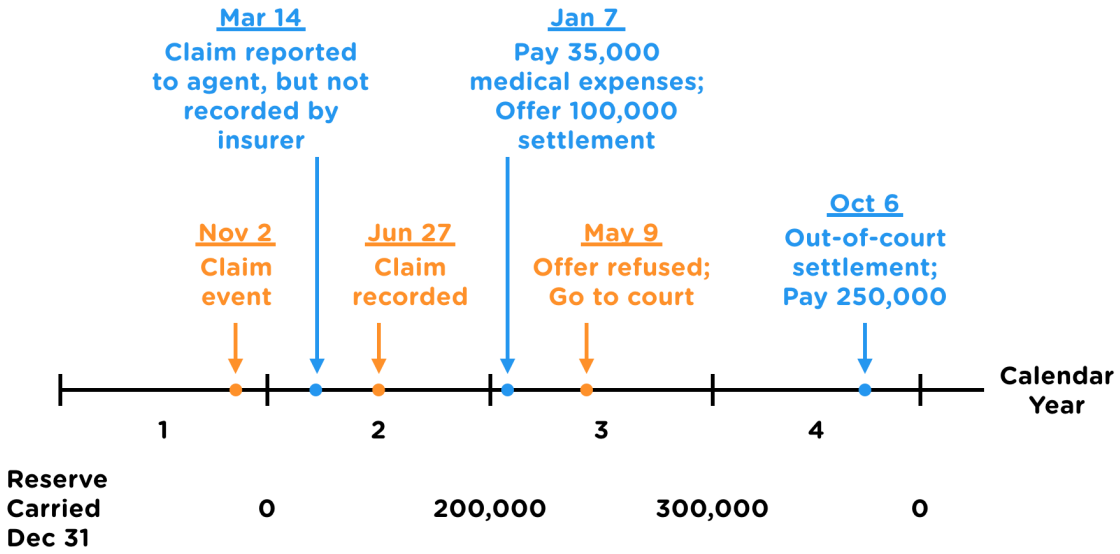
10M

The two most important functions that property/casualty (P&C) actuaries perform are **loss reserving** and **ratemaking**. In this section, we will discuss a number of techniques used to estimate loss reserves.

Before we can do that, we first need to understand the terminology used to describe claims:

- *Paid losses* are loss amounts that have already been paid to claimants.
- *Case reserve* is an estimate of the remaining amount of money needed to ultimately settle a claim.
- *Incurred loss* is the sum of paid losses and the current case reserve.

Consider the following example of one claim's loss development history:



The claim occurred on 11/2/CY1, but it was not reported to the agent until 3/14/CY2. In addition, the insurer didn't become aware of it until even later, almost 8 months after it occurred on 6/27/CY2. At the end of the same year, the insurer set up a reserve for 200,000 upon estimating the payment needed to settle the claim. Then, on 1/7/CY3, the insurer paid 35,000 in medical expenses and offered a settlement of 100,000 for the remaining expenses. The offer was declined and the claim went to court. So, the insurer raised the case reserve to 300,000. On

10/6/CY4, both parties agreed to settle out of court and the claim was closed after a final payment of 250,000. Thus, the final incurred loss of the claim is 285,000. The table below summarizes the claim activity at the end of each year.

Date	Loss Incurred-to-Date	Losses Paid-to-Date	Case Reserve
12/31/CY2	200,000	0	200,000
12/31/CY3	335,000	35,000	300,000
12/31/CY4	285,000	285,000	0

A simple approach to estimate the loss reserve for a block of business is to sum up the case reserves for all claims, then add the following items to account for uncertainties with the claims:

- Provision for future development in known claims, i.e. adjustments of case reserves.
- Provision for claim files that are closed but may reopen, e.g. workers compensation.
- Provision for claims incurred but not reported (pure IBNR).
- Provision for claims reported but not recorded (RBNR).

The total of these four components is called gross ***IBNR reserve***, or ***bulk reserve***. Then,

$$\text{Loss Reserve} = \text{Case Reserve} + \text{IBNR Reserve} \quad (\text{S5.1.0.1})$$

The approach to estimating reserves above was kept simple to illustrate the concept of loss reserves and what should go into them. In the rest of this section and the next section, we will look at three methods that can be used to estimate loss reserves. In general, these methods calculate reserves for claims still in development by projecting ***ultimate losses*** and then subtracting losses paid-to-date.

Note that the ultimate losses is the total amount the insurer eventually pays to close a claim. This was 285,000 in the previous example.

In other words, the loss reserve is set as the projected outstanding payments on the claims.

$$\text{Loss Reserve} = \text{Estimated Ultimate Losses} - \text{Losses Paid-to}$$

Coach's Remarks

We can calculate the IBNR reserve by subtracting the losses **incurred**-to-date from the estimated ultimate losses.

$$\text{IBNR Reserve} = \text{Estimated Ultimate Losses} - \text{Losses Incurred-to-Date}$$

The difference between the loss reserve and the IBNR reserve is the case reserve, which is the reserve set for claims that have been reported.

$$\begin{aligned}\text{Loss Reserve } - \text{IBNR Reserve} &= \text{Losses Incurred-to-Date} - \text{Losses Paic} \\ &= \text{Case Reserve}\end{aligned}$$

In this section, we will learn three basic methods of loss reserving:

- Expected loss ratio method
- Chain-ladder method
- Bornhuetter-Ferguson method