## **Overview**

**◯** 5M

Now that we have discussed several loss reserving methods, let's move on to ratemaking. *Ratemaking* is the determination of rates or premiums to be charged for insurance.

Unlike tangible products whose costs are known, the cost of an insurance policy is not known at the time the policy is sold. Thus, when determining rates, actuaries have to ensure that the premium charged is enough to cover future losses and expenses and to generate profit. From this, we get the following fundamental insurance equation:

$$Premium = Losses + Expenses + Profit$$
 (S5.2.0.1)

This equation will be the basis for the ratemaking process. Ratemaking is important to insurance companies and to society in general for various reasons. First, if rates are set appropriately, they will cover unexpected events, such as large losses and natural disasters. In addition, ratemaking can encourage loss control, as insurers can incentivize policyholders with different types of discounts for loss prevention. Furthermore, ratemaking is regulated, which ensures that rates are adequate, affordable, and not unfairly discriminating.

Ratemaking actuaries must select an appropriate *exposure base*. Rates are then listed as per *unit of exposure*. To illustrate this, consider the following example.

A home is worth \$250,000. An annual homeowner's insurance policy sets rates at \$4.80 per \$1,000 of home value.

Determine the exposure base, unit of exposure, and the annual premium charged to the policyholder for \$250,000 of insurance.

In this setup, the exposure base is "home value," and the unit of exposure is "\$1,000 of home value." In other words, every \$1,000 of the home value increases the premium by \$4.80. Thus, the premium charged to the policyholder is:

$$\frac{\$4.80}{\$1,000} \times \$250,000 = \$1,200$$

What makes a good exposure base? In general, a good exposure base should:

- Accurately measure the quantitative exposure to loss.
- Be easy to determine when premiums are calculated.
- Not be easily manipulated by the insured.
- Be simple to record and administer.
- Be easily understood by the policyholder.

Ideally, a good exposure base should also automatically adjust to inflation. Thus, based on all of the previous criteria, "home value" serves as a good exposure base for homeowner's insurance while "cubic millimeters of available closet space" does not.

Note that we only aim to provide an introduction to ratemaking. Even though we will cover essential ratemaking concepts that are inherent to most, if not all, property and casualty insurance products, in reality, insurance companies have more complex approaches to ratemaking.

In this section, we will look into preparing data to perform ratemaking.