INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Class: MSc Sem 1

Subject : Insurance

Chapter: Unit 4 Chapter 3

Chapter Name: Risk and Actuarial Valuation

Today's Agenda

1. Introduction to Financial Market
    1. What is Financial Market?
    2. About the Financial Market
    3. Why do we need Financial Market?
    4. Functions

2. Market Crisis
    1. Case Study
        A. Learnings from the Case study
        B. Next Steps
    2. Importance in Financial Market

3. Market….

1.1 Introduction

- We know that during the early years of a policy the premium received by an insurance company surpasses the required amount due to the Level Annual Premium system. Thus there is excess collection, corresponding to the premiums of all the policies. This excess then constitutes a funds pool, which enables the company to, settle claims and meet deficit during years when the premium is not sufficient. It now becomes essential to determine whether the premium accumulated is on the same lines as the calculated premium. This enables the company in determining its solvency. Thus the process by which the value of all the existing policies is ascertained is called **valuation.**

- It is also called valuation of liabilities of the insurance company. And since the process of valuation is taken up by an 'actuary' by applying actuarial principles it is termed as **actuarial valuation.**

- The premium charged on policies covers the expenses incurred by a company. The pool of funds formed as a result of premium balance accumulated after deducting the expenses is called **Life Fund.**

1.1 Method of Valuation

Valuation of liabilities is the process of arriving at the value of policies existent on the day of valuation.

There are different methods of valuation:

1. Prospective method
2. Net premium method of valuation
3. Modified net premium method of valuation
4. Gross premium method of valuation
5. Gross premium method for with-profits policies
6. Retrospective method

1.1 Prospective Method

When this method is used the prospective value of a policy at any time will be equal to the excess premium accumulated, as long as the business growth is anticipated as per the basis on which the premium was computed. In other words this method evaluates the current value of future premiums and the current value of future claims at a particular date.

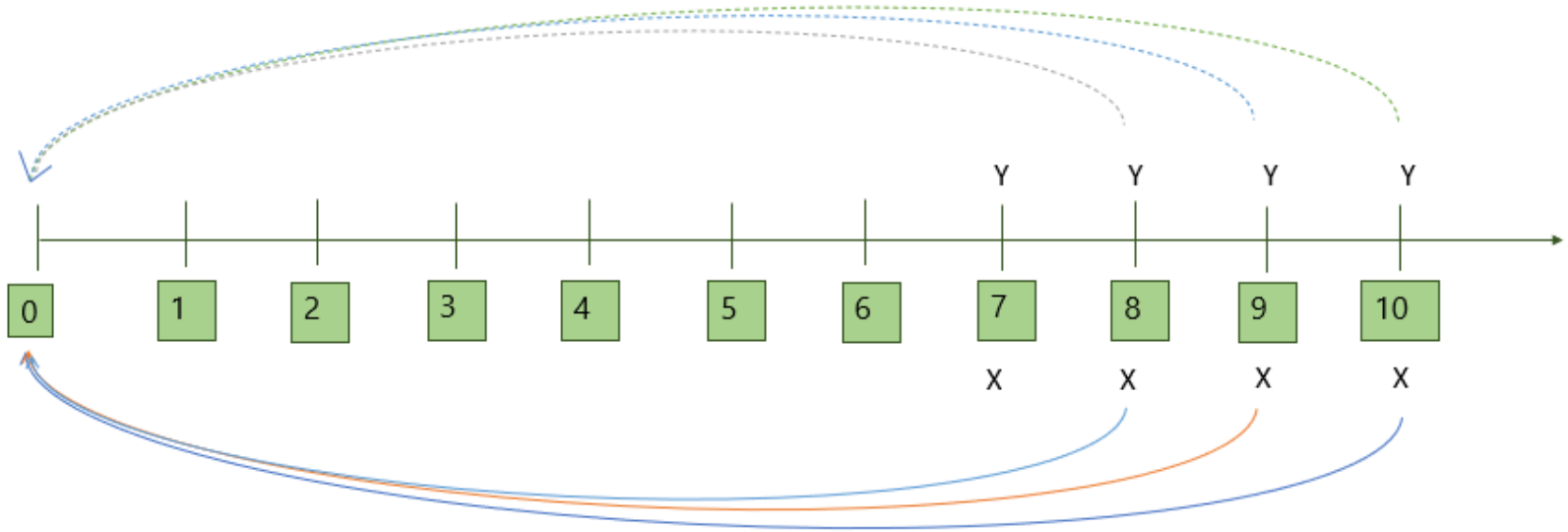
The formula applied to calculate valuation using prospective method is:

$$t_x^v = XA_{x+t} - P_x a_{x+t}$$

where,

- t is the duration elapsed since the date of commencement of the policy, it is reckoned in integral number of years.
- x is the age as in during the latest birthday or next birthday as per the practice of the office.
- T is obtained by calculating the difference between the calendar year of valuation and calendar year of commencement of the policy. But adjustment has to be made with regard to the month of valuation and the month in which the policy begins.
- x + t is the valuation age. It is calculated by adding the duration elapsed (t) to the age (x).

1.1 Prospective Method



X = Premiums received annually
Y = Sum assured or any benefits and expenses paid

Valuation surplus = (Life Fund + Present value of future premiums) – Present value of future claims.

There is **valuation deficit** if the present value of future claims is more than the sum of life fund and present value of future premiums.

1.1 Net Premium Method of Valuation

- The premiums charged by insurers are always inclusive of the expense loadings in addition to the net premium. And usually, the actual expense incurred is covered in the premiums, while the expense loading is kept to meet any eventuality in the future. Therefore it is sufficient to consider net valuation for the purpose of valuation.

- The net premium method of valuation is based on the following considerations:
  - For determining the factors required to calculate the value of the insured sum or any additional bonuses declared previously, true mortality tables and true interest rates should be used.
  - Similarly true mortality tables and true interest rates should be used for determining factors required for the calculation of future premiums.

- According to this method of valuation, the valuation of a particular policy starts with zero on the day the policy comes into force. And with the life of the policy the value grows till the assured sum is reached, along with the declared bonuses.

1.1 Net Premium Method of Valuation

- We know that although the office premium for each policy is fixed and known at time of valuation there can be a change in the office premiums as on different dates the office premiums of policies in force will be based on different scales. But this is not the case with the net premium, which has only one value for a particular age at entry in case of whole life assurance and for each age of entry and original term in case of endowment assurance. The difference in value between the office premium and the net premium is termed as valuation loadings.

- If the valuation loadings are not utilised for expenses or contingencies, then they add on to the assets of the company and become a source of disposable surplus. Thus, there will be a surplus at the end of each year if mortality, interest and expenses do not deviate from the assumptions made for valuation. But if the insurance company intends to give bonus in the reversionary form, then the surplus accumulated after successive valuations will cause a reduction in reversionary bonuses. But if the life insurance company intends to follow the reversionary bonus method on a regular basis for the distribution of surplus, then it should reduce the valuation rate of interest to a rate less than what is currently earned by the life fund.

1.1 Modified Net Premium Method

- In this method the net premium value of the policy is reduced and brought to a new value, which is called the modified net premium.

- The deductions are made from the premium of the first year and the reserve formed as a result is termed as full net premium reserve. This implies that the net premium of the first year is set aside for expenses of that year and in doing so the entire modified net premium reserve becomes nil. But at the end of the term both the policy values become equal because the deduction from the net policy value gradually decreases.

- This modified net premium method is suited for a prospective method of valuation as it takes into account a higher value of premium, so that deductions can be made from the benefits to be availed, but finally arrives at a low-priced policy.

1.1 Gross Premium Method

- In this method of valuation, the entire premium or the office premium is considered. The part of the premium that remains after the percentage for expenses is set aside is employed for arriving at the policy value.

- The percentage of the premium, which is set aside for the expenses in the end, will correspond to what total expenses bear to total premiums. The expenses for which amount is set aside is chiefly calculated as the expenditure during the first year, which is heavy and not likely to be incurred again.

- This kind of overall estimation of the expenditure works on the assumption that the proportion of new business to old business in the coming years will be the same as on the date of valuation

1.1 Gross Premium Method

For instance, if the insurance company intends to expand due to which the insurer had been writing a higher proportion of new business in comparison to the old business during valuation. In this case, there is a possibility that after some time the actual proportion of new business to old business is less than that assumed during valuation. Thus, when such a situation arises, to arrive at the premium for valuation, it is better to use a lower expense ratio. Once the percentage set aside for the first-year expenses is removed, the extra expenses are to be met through renewal premium income. The expense ratio derived from the renewal premium income is called renewal expenses ratio, which is nothing but the renewal expenses. It is essential for high priced businesses written by the insurance company that the amount set aside from the office premium to meet expenses is higher than the renewal ratio. However, insurers carry out an analysis of the expense and designate it between the 'initial' and 'renewal' cost of business. And according to the premiums of initial and renewal, cost ratio for new business, renewal servicing and claims (renewal cost ratio) are determined. In this method of valuation there is a considerable margin between the interest and mortality assumptions made during valuation and the actual experience. The mortality rate adopted for valuation is much higher than what would happen in future. With respect to the life fund, the yield earned on the life fund is lower than the rate of interest employed.

1.1 Gross Premium Method

A serious fault with this form of valuation is that it overestimates the liability of the insurer, thereby reducing the share of the policy owners (in the form of bonus) from the surplus. It also makes it difficult to ascertain the kind of bonus the fund would support in the coming years.

1.1 Gross Premium Method For With - Profit Policies

- In the method of valuation we discussed above (gross premium method) a part of the office premium is thrown off to meet expenses. Likewise in a situation of expansion of business a percentage higher than the renewal expense ratio, but lower than the ratio of total expenses to total premiums is suitable.

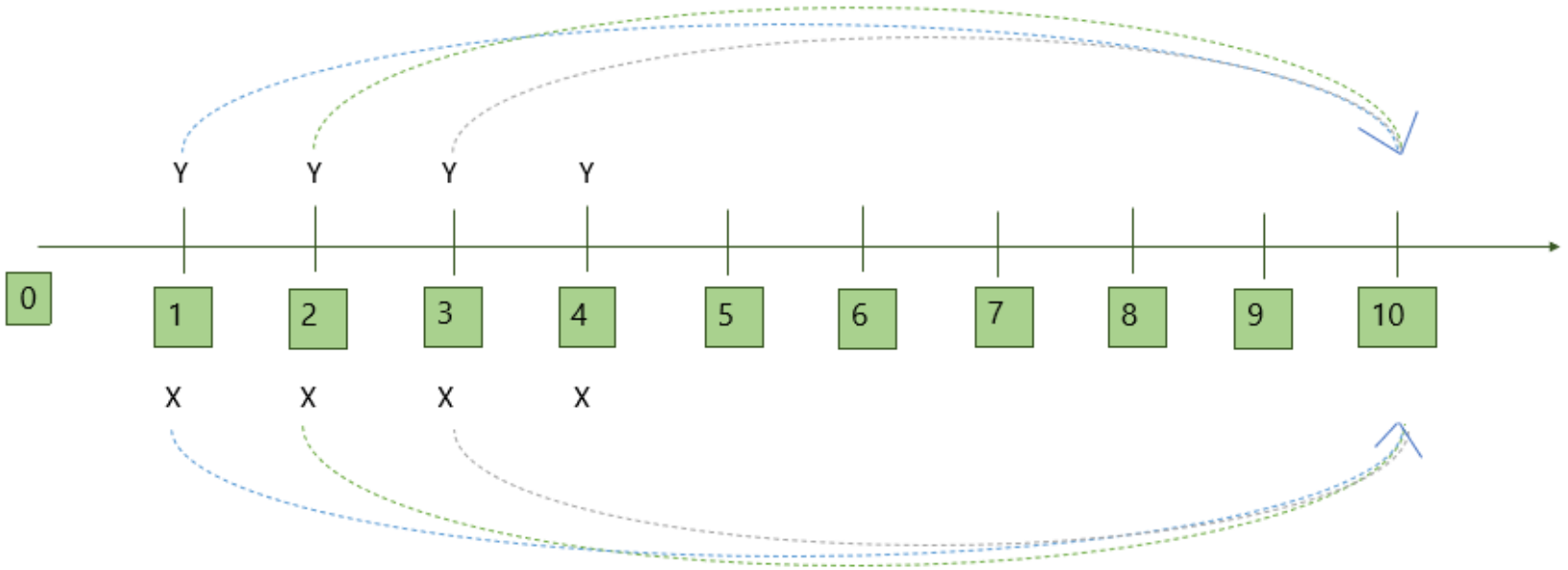
- But such a case is not applicable for With-Profit policies and is only for without profit office premiums. This is because the with-profit office premiums in addition to expenses also contain bonus loadings. Thus in the case of with-profit office premiums a larger percentage has to be thrown off at the time of valuation to meet future bonuses.

1.1 Retrospective Method of Valuation

- A retrospective method is employed to determine the policy values of all the existing policies. The excess of the existing life fund after meeting the value of all the policies is called valuation surplus. There is a valuation deficit if the life fund falls short of the total policy values.

- Valuation surplus = The accumulated value allowing for interest and survivorship of the premiums received to date less the accumulated value allowing for interest and survivorship of the benefits and expenses paid to date

1.1 Retrospective Method of Valuation



X = Premiums received annually
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