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Chapter: Unit 0 Chapter A

Chapter Name: Introduction to Life Insurance

Today's Agenda

1. Background
1. Insurance and Annuity Contracts
 1. Insurance Contracts
 2. Traditional Insurance Contracts
 3. Modern Insurance Contracts
 4. Annuity Contracts
2. Underwriting
 1. Premiums
 1. Typical Problems

1 Background



What do you think is the main motive behind companies employing actuarial professionals?

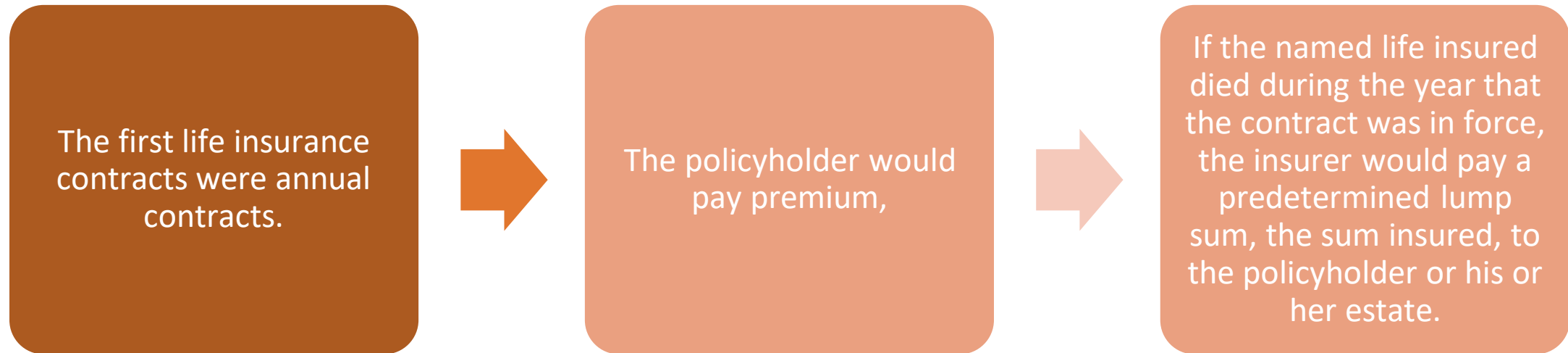
1 Background

The first actuaries were employed by life insurance companies in the early eighteenth century to provide a scientific basis for managing the companies' assets and liabilities.

The liabilities depended on the number of deaths occurring amongst the insured lives each year.

The modelling of mortality became a topic of both commercial and general scientific interest, and it attracted many significant scientists and mathematicians to actuarial problems, with the result that much of the early work in the field of probability was closely connected with the development of solutions to actuarial problems

1 Background



What do you think about the premium for these yearly insurance contracts? Increase, Decrease or Stay Same? Why?

1 Background

Each year the premium would increase as the probability of death increased. If the insured life became very ill at the renewal date, the insurance might not be renewed, in which case no benefit would be paid on the life's subsequent death



What do you think is the problem with this yearly contracts? Will people renew or not?

1 Background

The problem with this was that the annual increases in premiums discouraged policyholders from renewing their contracts.



The level premium policy offered the policyholder the option to lock-in a regular premium, payable perhaps weekly, monthly, quarterly or annually, for a number of years. This was much more popular with policyholders, as they would not be priced out of the insurance contract just when it might be most needed.



For the insurer, the attraction of the longer contract was a greater likelihood of the policyholder paying premiums for a longer period. However, a problem for the insurer was that the longer contracts were more complex to model, and offered more financial risk. For these contracts then, actuarial techniques had to develop beyond the year-to-year modelling of mortality probabilities. In particular, it became necessary to incorporate financial considerations into the modelling of income and outgo.

2 Insurance & Annuity Contracts



What is the difference between insurance contracts and annuity contracts?

2 Insurance & Annuity Contracts

The basic transaction of life insurance is an exchange; the policyholder pays premiums in return for a later payment from the insurer which is life contingent, by which we mean that it depends on the death or survival or possibly the state of health of the policyholder

INSURANCE

We usually use the term 'insurance' when the benefit is paid as a single lump sum, either on the death of the policyholder or on survival to a predetermined maturity date.

ANNUITY

An annuity is a benefit in the form of a regular series of payments, usually conditional on the survival of the policyholder.

2.1 Insurance Contracts



Which type of insurance contracts you know about?
List some...

- A
- B
- C
- D

2.2 Traditional Insurance Contracts

Whole life insurance

Pays a lump sum benefit on the death of the policyholder whenever it occurs. For regular premium contracts, the premium is often payable only up to some maximum age, such as 80. This avoids the problem that older lives may be less able to pay the premiums

Term insurance

Pays a lump sum benefit on the death of the policyholder, provided death occurs before the end of a specified term. Term insurance allows a policyholder to provide a fixed sum for his or her dependents in the event of the policyholder's death

Endowment insurance

Offers a lump sum benefit paid either on the death of the policyholder or at the end of a specified term, whichever occurs first. This is a mixture of a term insurance benefit and a savings element

2.3 Modern Insurance Contracts

Universal life insurance

Combines investment and life insurance. The policyholder determines a premium and a level of life insurance cover. Some of the premium is used to fund the life insurance; the remainder is paid into an investment fund

Unitized with-profit

Evolution from the conventional with-profit policy, designed to be more transparent than the original. Premiums are used to purchase units (shares) of an investment fund, called the with-profit fund.

Equity-linked insurance

Has a benefit linked to the performance of an investment fund. There are 2 types – Open-ended investment account and Equity-linked Annuity.

2.4 Annuity Contracts

Annuity contracts offer a regular series of payments. When an annuity depends on the survival of the recipient, it is called a '**life annuity**'. The recipient is called an annuitant

If the annuity continues until the death of the annuitant, it is called a **whole life annuity**

If the annuity is paid for some maximum period, provided the annuitant survives that period, it is called a **term life annuity**

2.4 Annuity Contracts



From the names of the contracts mentioned below, discuss the type of premium paid and benefit they offer.

1. Single Premium Deferred Annuity (SPDA)
1. Single Premium Immediate Annuity (SPIA)
1. Regular Premium Deferred Annuity (RPDA)
1. Joint life annuity
1. Last survivor annuity
1. Reversionary annuity

2.4 Annuity Contracts

1. Single Premium Deferred Annuity (SPDA) - Under an SPDA contract, the policyholder pays a single premium in return for an annuity which commences payment at some future, specified date. The annuity is 'life contingent', by which we mean the annuity is paid only if the policyholder survives to the payment dates. If the policyholder dies before the annuity commences, there may be a death benefit due
1. Single Premium Immediate Annuity (SPIA) - This contract is the same as the SPDA, except that the annuity commences as soon as the contract is effected.
1. Regular Premium Deferred Annuity (RPDA) - The RPDA offers a deferred life annuity with premiums paid through the deferred period. It is otherwise the same as the SPDA.

2.4 Annuity Contracts

- 4. Joint life annuity - A joint life annuity is issued on two lives, typically a married couple. The annuity (which may be single premium or regular premium, immediate or deferred) continues while both lives survive, and ceases on the first death of the couple
- 4. Last survivor annuity - A last survivor annuity is similar to the joint life annuity, except that payment continues while at least one of the lives survives, and ceases on the second death of the couple.
- 4. Reversionary annuity - A reversionary annuity is contingent on two lives, usually a couple. One is designated as the annuitant, and one the insured. No annuity benefit is paid while the insured life survives. On the death of the insured life, if the annuitant is still alive, the annuitant receives an annuity for the remainder of his or her life

3 Underwriting



What do you understand by underwriting in the insurance industry?
What is the purpose of underwriting?

3 Underwriting

- It is important in modelling life insurance liabilities to consider what happens when a life insurance policy is purchased.
- The premium rates will depend on the size of the policy and some other factors known as **rating factors**. Rating factors, generally including their age, gender, smoking habits, occupation, any dangerous hobbies, and personal and family health history. In some cases, particularly for very large sums insured, the life insurer may require that the applicant's health be checked by a doctor employed by the insurer.
- The process of collecting and evaluating this information is called **underwriting**. The purpose of underwriting is, first, to classify potential policyholders into broadly homogeneous risk categories, and secondly to assess what additional premium would be appropriate for applicants whose risk factors indicate that standard premium rates would be too low.

4 Premiums

- A life insurance policy may involve a single premium, payable at the outset of the contract, or a regular series of premiums payable provided the policyholder survives, perhaps with a fixed end date.
- Regular premiums may be paid annually, semi-annually, quarterly, monthly or weekly. An important feature of all premiums is that they are paid at the start of each period.

5

Typical Problems



What problems does an actuary need to face? What important decisions need to be taken?

5

Typical Problems

- The primary responsibility of the life insurance actuary is to maintain the solvency and profitability of the insurer. Premiums must be sufficient to pay benefits; the assets held must be sufficient to pay the contingent liabilities.
- Each year or so, the actuary must determine how much money the insurer or pension plan should hold to ensure that future liabilities will be covered with adequately high probability. This is called the valuation process.
- The problems are rather more complex if the insurance also covers morbidity risk, or involves several lives.
- The actuary may also be involved in decisions about how the premiums are invested. It is vitally important that the insurer remains solvent, as the contracts are very long-term and insurers are responsible for protecting the financial security of the general public.