Actuaries Institute Australia

LIFE INSURANCE AND RETIREMENT VALUATION

MODULE 3: PRODUCT CASH FLOWS

Education Program
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Education that Counts

Fellowship Program

Module 3

PRODUCT CASH FLOWS

Education that Counts

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3. Product cash flows

This module provides an introduction to the various types of products offered by life insurers and retirement funds. It addresses the following learning objective:

Item	Unit/Key Performance Objective/Learning Objective
2	**Analyse the cash flows arising under savings and protection products from the viewpoint of the life insurer or retirement fund**
2.1	**Determine the types and characteristics of cash flows that arise for each product type**
2.2	**Identify the key features of the main product types offered by life insurers and retirement funds**
2.3	**Discuss how investment risks may be shared**
2.4	**Explain how mortality and morbidity affect cash flows**

The primary focus of this module is to learn how to question what cash flows arise under any product type. This is facilitated by discussing cash flows that arise under the main product types. The content should be broadly familiar as much of the material has been covered either in the Foundation subjects or the Associate subjects.

There are many difficult questions around designing products and setting prices that meet the needs of stakeholders, particularly in relation to meeting customer needs at point of sale and throughout the term of the contract. These questions are discussed in the LI&R Product Development subject and examined in more detail in the Life Insurance Applications subject and the Superannuation and Retirement Applications subject. A brief summary is also provided in Section 3.1 to provide a context for the products to be discussed in this module.

3.1. Introduction

Customer needs are paramount in the thoughts of financial service companies during product design. Two common customer needs being met by financial service products are:

- the investment of savings to meet the cost of future activities such as the purchase of a house or funding for retirement; and
- the transfer of risk from the individual to the company or fund.

This transfer of risk may be a complete transfer (i.e. removal of the risk for the individual) or a partial transfer (i.e. a reduction of the risk, thereby reducing the variability of possible outcomes for the individual). Risks that customers may want to transfer include:

- mortality (the risk of dying and leaving dependants without a source of income);
- disability/illness (the risk of becoming disabled or ill and unable to continue to work and earn money);
- longevity (the risk of living too long and running out of money); and
- investment (the risk that investment earnings may be inadequate to meet an individual's financial goals within a given time period).

Other drivers of product design include regulatory requirements, tax incentives, competitive pressures (e.g. ensuring customers aren't lost to a competitor due to a new or better product offering), and the provider's overall strategy and level of risk tolerance or aversion.

A range of the major life insurance and retirement products available in Australia and overseas are presented in this module with a focus on the cash flows arising under each product. These products will be revisited in the LI&R Product Development subject, with a focus on the customer needs being met by each product. The Life Insurance Application and Superannuation and Retirement Application subjects will include an in-depth review of products sold in Australia.

Evaluation of the cash flows arising under each type of product is critical in being able to:

- value the liabilities of the insurer or fund;
  - Module 5 (Life valuation);
  - Module 8 (Assumptions); and
  - Module 9 (Retirement valuation);
- estimate and analyse the profit or surplus arising for the entity;
  - Module 6 (Profit); and
  - Module 12 (Analysis of surplus);
- evaluate and manage the risks associated with the business;
  - Module 13 (Risk management);
- calculate the capital requirements of the entity;
  - Module 14 (Capital); and
- estimate the future value of a life insurer;
  - Module 15 (Appraisal values).

Key questions to answer in evaluating the cash flows arising under different products include:

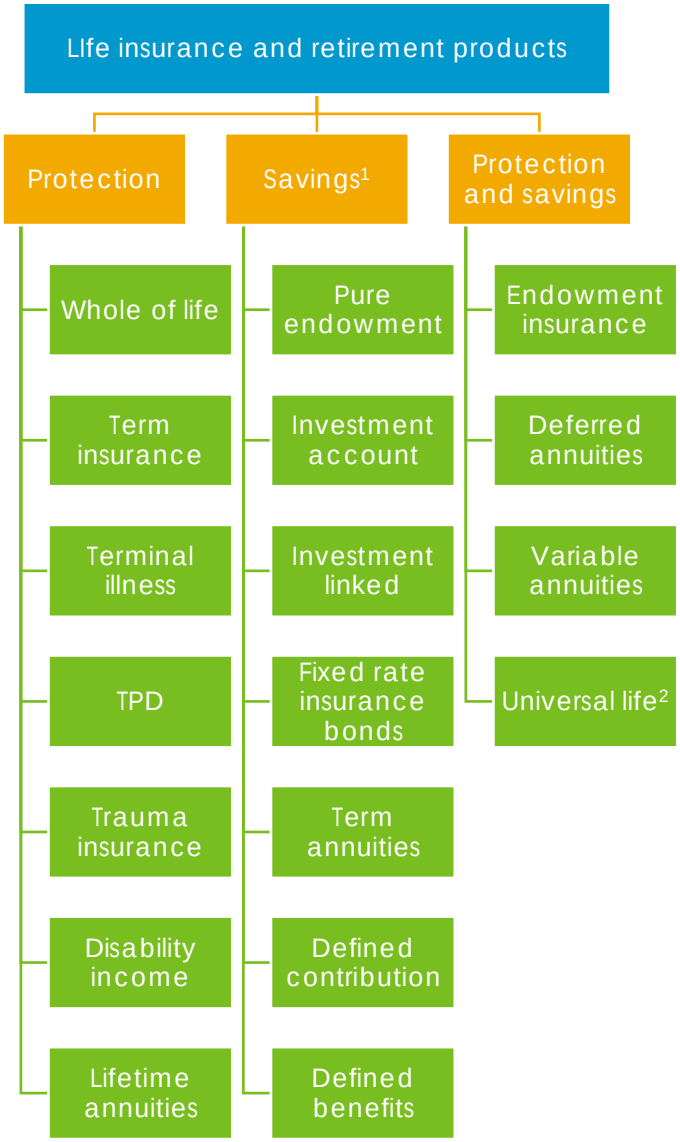
Whose perspective?	•Perspectives include those of customers or those of the product provider. This module is concerned with the perspective of the provider (i.e. the life insurer or retirement fund).
Positive or negative?	•The sign of the cash flow depends on whose perspective is being considered. For example, a claim payment is a positive cash flow for the customer and a negative cash flow for the provider, whereas premiums are a positve cash flow to the provider and a negative cash flow to the policy owner.
Nominal or real?	•Some cash flows move in line with rates of inflation (i.e. have 'real' value), whereas others are constant despite changes in underlying rates of inflation (these have 'nominal' value).
How much?	•The size of cash flows is often set out in the policy or retirement fund contract (e.g. premium amount, size of benefit, % contribution). The amount payable may be known (e.g. sum insured) or unknown (e.g. annuity payments).
How certain?	•Some cash flows have a high degree of certainty (e.g. initial expenses), whereas others are highly uncertain (e.g. benefit payments only made on death within the policy term).
How often?	•Cash flows can be regular (e.g. every month or year) or irregular (e.g. only occuring once, if at all, over the life of the product).
For how long?	•Similar to the size of cash flows, the term of some cash flows is set out in the policy or retirement fund contract (e.g. how long premiums will be paid for and when the contract ends).

As you read through the remainder of this module, make sure you're able to answer all of the questions above for each of the products discussed.

3.2. Product types

The life insurance and retirement markets provide a wide range of products for both retail and wholesale clients. These products can be categorised into either protection or savings products, or a combination of both protection and savings, as shown in Figure 3.1.

Figure 3.1: Product categories



Notes:

1. Many of the pure savings contracts shown in Figure 3.1 often have attached risk benefits and could therefore be listed under the protection and savings column.
2. Terminology is not consistent across the world and we have highlighted 'Universal life', which is an American term. In other markets, it may be called a 'Whole of Life' savings and protection product.
3. TPD refers to total and permanent disability

Figure 3.1 provides one way to categorise these products. Other categorisations are also possible, such as by grouping defined contribution, defined benefit and deferred annuities together as 'Retirement' products, or by grouping products based on who provides them (e.g. life insurers or retirement funds). Categorisation of products in this module is only helpful in that it may guide you to think about commonalities and differences between products.

Exercise 3.1

What other categorisations of products are possible?

The following sections of this module analyse the cash flows arising under each of these types of products.

3.3. General concepts

Before examining the cash flows under each of these products, we should discuss some general concepts that apply across products.

3.3.1. Business classification

In general, retirement business attracts favourable tax treatment for individuals compared to other types of investment and insurance arrangements. Because of the favourable treatment, there are restrictions on how individuals may invest in retirement funds, how investment returns are taxed and how benefits are payable to individuals.

For these reasons, life companies classify retirement business separately to non-retirement (or Ordinary) business. The special tax treatment and restrictions on retirement business give rise to separate considerations for companies in product design and resulting product cash flows. Some products may be offered identically as Ordinary or Retirement products, while others may be designed specifically for one or the other market. This can give rise to different fees, unit prices or bonus rates, mainly reflecting differences in taxation.

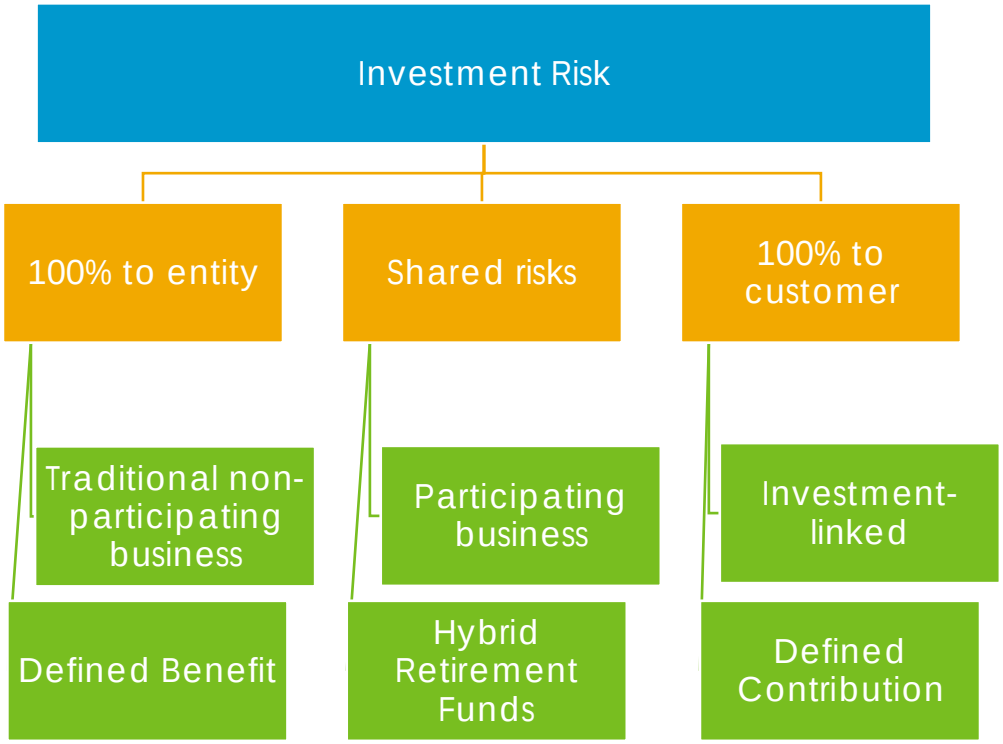
There are other classes of business that receive special tax treatment. For example, policies sold in Australia to Australian residents receive different tax treatment to those sold to non-residents. This gives rise to a further split of Ordinary business into Domestic and Overseas business.

The taxation of life insurance business and how this affects both companies and policy owners is covered in the Life Insurance Applications subject. Taxation rules with respect to Australian superannuation funds are covered in the Superannuation and Retirement Applications subject.

3.3.2. Sharing of investment risks

There are three broad categories regarding how investment returns on monies received are shared between the entity offering the contract and the customer. The discussion that follows in this section ignores fees. In practice, the entity usually extracts some of the investment returns in the form of fees to pay for expenses and possibly profit.

Figure 3.2: Investment risk categories



100% to entity

In life insurance companies, this category is labelled 'traditional' (or conventional) non-participating business. The life company promises a defined benefit in return for a single premium or sequence of regular premiums. The customer knows the amount of benefit at each date where a payment is due, although for protection products the due dates may be uncertain. Very few new business sales of savings products occur with this structure, but many risk products fall into this category.

The entity here represents the provider of the capital. It may be the shareholder, participating policy owners (see below) or a combination of the two.

In terms of retirement funds, this scenario is a defined benefit fund. The member of the fund is promised a benefit based on a formula. The entity promises payment of the benefit irrespective of investment returns.

Shared risks

In life companies, some contracts are written where the premiums substantially exceed the amount required to pay for the insured benefits. The resulting excess returns, if actual experience is above a certain amount, are shared across different generations of policy owners, and if relevant, shareholders. These are known as traditional (or conventional) participating business and were discussed in the Foundation subjects.

The link between each premium paid and the benefits accumulated is not obvious with the traditional approach as policy owner returns are not directly linked to changes in investment markets over the contract term. Policy returns credited to policy owners via bonuses involve averaging actual asset returns and may also include other sources of profits such as mortality profits.

A simplified version of participating business is the Investment Account policy, which is described in Section 3.5.2.

Some retirement funds are a mixture of defined contribution and defined benefit, hence there is an element of sharing investment risks between the sponsor and retirement fund member.

100% to customer

A life company or retirement fund may offer access to a range of investment options. For each option, the customer takes all the risk of changes in asset values.

Some contracts are designed to protect the consumer from falls in asset values. The costs of this protection may be implicit in the design of the investment fund or an explicit fee may be charged, or a mixture of these options may be included in the product design. These ideas are developed in the LI&R Product Development subject.

Many of the contracts that are described in subsequent sections have variations that fit into all of the three categories shown in Figure 3.2.

Investment returns on reserves held by the insurer or retirement fund are a cash flow under all products discussed in this module. The relative importance of this item of cash flow depends on the relative size of reserves held for each product. This is discussed further in Module 5 (Life valuation) and Module 8 (Assumptions).

3.3.3. Group contracts

Within life insurance, there is a distinction between group and individual policies. Group policies are most commonly sold to the trustees of retirement funds as a means of providing death and disability cover to the fund members during their pre-retirement phase. Group business can also include policies purchased by companies to provide cover to employees outside of retirement arrangements. Individual policies, on the other hand, only cover a single person or several related people, such as members of a family or a small group of keypersons in an entity.

Group insurance contracts have the following features which make them quite different to individual insurance contracts:

- the owner of a group policy is the employer/retirement fund trustee;
- the number of lives covered by a group insurance contract can range from very small to hundreds of thousands for contracts owned by large retirement funds;
- group insurance premiums are usually guaranteed for a period of three years. At the end of the premium guarantee period, the policy owners for large group schemes (e.g. retirement fund trustees) will often shop around and seek out the best deal for the following three years. Group insurance contracts are therefore at high risk of being terminated after three years;
- individual lives covered by a group insurance contract can join (e.g. new employees) and leave (e.g. resigning employees) the policy at any time;
- often there is little or no underwriting for lives granted an agreed level of cover under a group insurance contract. While this reduces administrative costs associated with group policies, it also creates a risk for the insurer in terms of the level of health of the lives it is insuring;
- lives are underwritten when members may want more than the agreed level of cover or if they do not meet various requirements such as 'actively at work' when cover is offered; and
- large group contracts may be written where profits are shared between the policy owner (for example, the retirement fund trustee) and the insurance company. This means that a refund of part of the premiums is made at the end of each year. The refund is calculated according to a formula specified in the contract and depends on the claims experience for the year, or is sometimes averaged over a longer period.

3.3.4. Inflation indexation

Inflation indexing of sums insured is a standard benefit for individual protection policies. The policy owner usually has to opt out if they do not want indexation to apply, in which case their cover amount will not automatically increase.

Indexation can also be offered for disability income claims after payment commences. This is a valuable option if there is a long maximum benefit period.

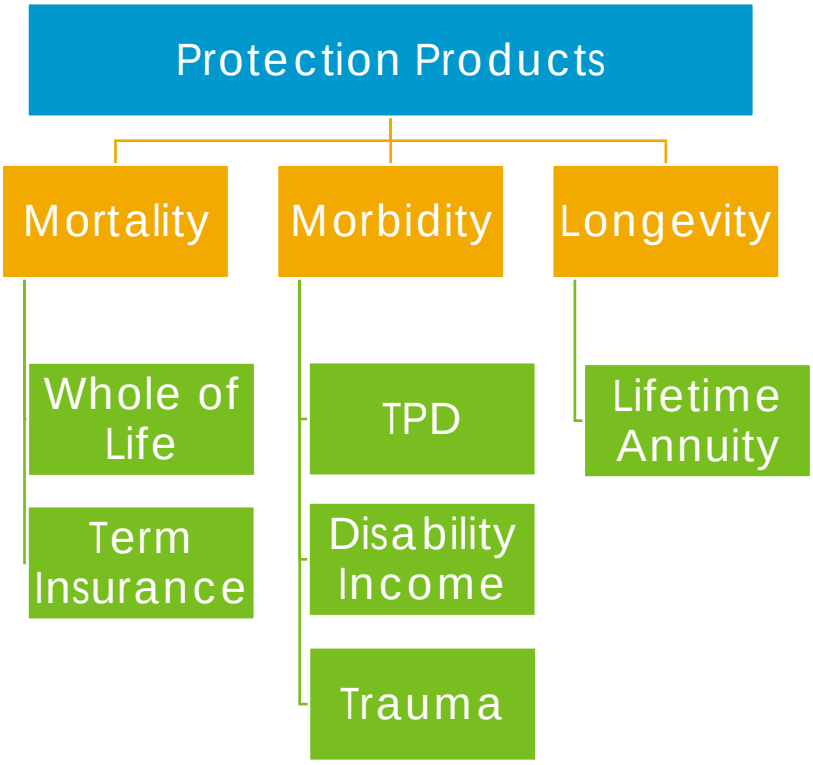
3.4. Protection products

Protection products provide financial cover to the beneficiaries listed in a contract by the policy owner if the life insured dies, becomes disabled or suffers a specific illness or injury. If there are no beneficiaries then valid claims will be paid to the estate of the life insured. The policy owner and the person(s) covered under the insurance policy (the 'life'/'lives insured') may be different people. The beneficiary may be the policy owner or someone else. At the point of sale, it is usual for there to be a link between the life insured and the beneficiaries.

The policy contract sets out the amount, timing and term of premiums to be paid by the policy owner to the company, and the amount and conditions of payment of the sum insured and surrender value, where applicable.

There are a few different protection products discussed in this section and they are summarised in Figure 3.3 below:

Figure 3.3: Protection products



Morbidity protection products are much more complicated than mortality protection products as there are more potential claim events and, in some circumstances, assessing the validity of a morbidity claim can be difficult.

Protection products can be written as either Ordinary or Retirement business and under group or individual contracts. Group contracts have lower premium rates than individual contracts as little or no commission is paid to sales intermediaries and, for most members of group schemes, little or no underwriting is required. Administration costs are also much lower as administrative and customer service functions may be handled by the retirement fund, with the insurer only administering claims. Group contracts are more restrictive in the amounts and types of cover that are available.

Cash flows specific to particular protection products are outlined in the following sections. A key element of valuing contracts is recognising the main assumptions that affect expected cash flows and how to place values on those assumptions. These topics are discussed further in Module 8 (Assumptions) and the Product Development subject.

As a reminder, the consumer needs and product risks are discussed in the Product Development subject.

3.4.1. Whole of life

A whole of life insurance policy pays a benefit on the death of the life insured. The initial sum insured is fixed. The contract may be written on participating or non-participating terms.

Specific cash flows arising under a whole of life policy are:

Cash flow	Description
Premiums (P)	The size of the premiums received from the policy owner are normally level (i.e. don't increase with age), are of known amount and are receivable throughout the term of the contract or until a specified age (e.g. until age 65). Premiums cease at unknown dates that depend on policy owner behaviour (e.g. they cancel the contract) or death of the life insured.
Claims (C)	A known amount of money (sum insured) is paid after the unknown date when the policy owner dies, provided the contract is still in force. Participating policies pay terminal and/or reversionary bonuses to the policy owner when the sum insured is paid (on death). The amount and timing of bonuses are unknown.
Surrenders (S)	A surrender value may be payable to the policy owner if they choose to cease paying premiums and not continue with their insurance cover.
Paid-up Policies	The policy owner may cease paying premiums but not surrender their contract. The contract may continue for a period, depending on the terms of the contract.

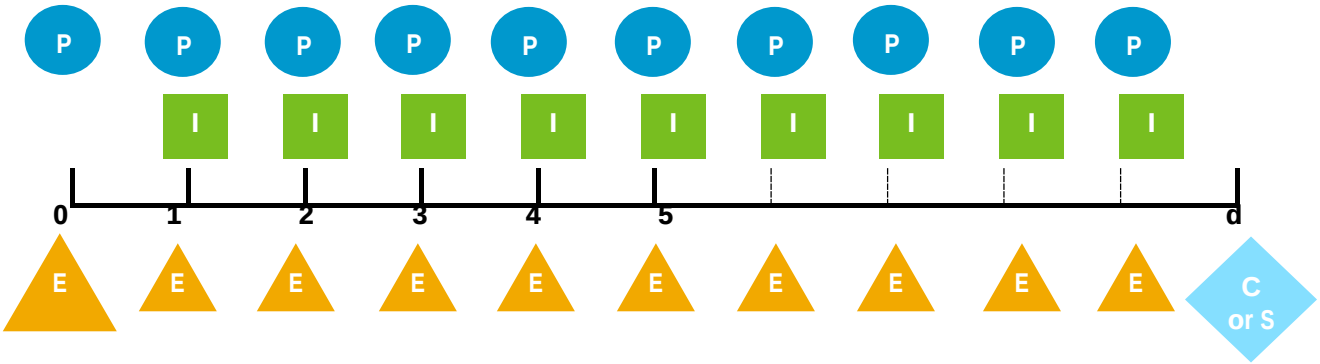
Cash flow	Description
Expenses (E)	Expenses are incurred throughout the contract term. They are typically higher at contract outset than at renewal because of sales commission, underwriting and other acquisition expenses.

The policy contract sets out the amount, timing and term of premiums, and the amount and conditions of payment of the sum insured. The terms for surrender value and paid-up value may be specified in the contract or possibly subject to local regulations.

While it is certain that the sum insured or surrender value, which may be zero, will be paid under a Whole of Life policy, the mortality and lapse experience of the policy owner will impact which of these benefits is paid and when.. From the insurer's perspective, premiums and investment income (I) are positive cash flows and are shown above the line in Figure 3.4, whereas expenses (initial, maintenance and terminal) and claims are negative cash flows[1].

Figure 3.4 illustrates the typical cash flows under a whole of life policy. From the insurer's perspective, premiums and investment income (I) are positive cash flows and are shown above the line in Figure 3.4, whereas expenses (initial, maintenance and terminal) and claims are negative cash flows.

Figure 3.4: Whole of life policy cash flows



[1] Investment income can of course be a negative amount (investment loss) from time to time

In Figure 3.4, d represents the policy owner's year of death (or earlier surrender of the policy).

The size of the shapes in Figure 3.4 does not indicate the relative amount paid under each of the cash flow items. The exception to this is the larger triangle for expenses at time 0, which is a reminder that initial expenses incurred at contract outset are usually substantially larger than expenses incurred in later policy years. Note that the relative size of the first triangle versus the subsequent triangles are not meant to be to scale.

Traditional business, such as whole of life policies (and endowment policies discussed in Sections 3.5.1 and 3.7.1), may have riders attached to them such as:

- additional temporary death cover—this is mainly added to whole of life policies and provides additional cover up to a specified age (e.g. retirement age);
- total and permanent disability (TPD) cover (see Section 3.4.3); and
- waiver of premium (whilst the policy owner is temporarily disabled, the policy premium is waived).

Traditional insurance policies can also have options attached to them, giving the policy owner the right, at a later date, to increase or extend their insurance cover. The main examples of options for traditional business are guaranteed insurability options and conversion options. These options are described in Section 3.4.2.

Exercise 3.2

Explain why a group version of whole of life insurance is unlikely.

3.4.2. Term insurance

A term insurance policy has a fixed duration and pays a benefit if the life insured dies before the end of the policy. Term insurance is usually written on a non-participating basis.

Specific cash flows arising under a term insurance policy are:

Cash flow	Description
Premiums (P)	Regular premiums received from the policy owner can be level or stepped. They are paid throughout the term of the policy but cease on death or policy cancellation. **Level premiums:** • are constant throughout the policy term; • may be guaranteed for the life of the policy[2]; or • may be revised by the life company, in some jurisdictions, for example to reflect emerging experience being worse than expected (provided a notice period is provided). **Stepped premiums**[2], also known as 'yearly renewable term' (YRT): • change each year over the life of the policy (reflecting increasing age of the policy owner); • may be guaranteed or altered in line with emerging experience; • are normally renewable to an advanced age, e.g. 100;

[2] For group business, premium rates are typically guaranteed for 3 years.

[2] Some contracts have premium increases less frequently than one year.

Cash flow	Description
	• can continue to be paid as long as cover is needed and the annual premium increases are affordable or accepted; and • allow the policy owner to switch to another (cheaper) insurer without penalty (subject to underwriting). The premiums for a YRT policy are lower than for a level premium policy in the early years and higher in later years. A disadvantage of YRT policies for policy owners is that the total premiums payable over the life of the contract are likely to be higher than for a level premium policy (the low initial premium and the option to switch without penalty have a long-term cost). In addition, the premium becomes more expensive with each year and may eventually become unaffordable. Group term insurance contracts normally have profit-sharing terms via a refund of a portion of premiums to reflect claims experience.
Claims (C)	A single amount of money (sum insured) is paid if the policy owner dies within the fixed term of the policy. The sum insured may be constant, increasing (with reference to an inflation index), or reducing over time, according to a specified scale. Unlike a whole of life policy, the sum insured is only paid if the policy owner dies within the policy term.
Surrenders (S)	A surrender value is not normally payable. It may be payable for long-term level premium business. (When you have worked through Module 5 (Life valuation), ask yourself why there may be a surrender value.)

Cash flow	Description
Paid-up	This may be possible with some long-term level premium products.
Expenses (E)	As for whole of life policies, expenses are incurred throughout the contract term and are typically higher at contract outset than in later years.

Conversion options

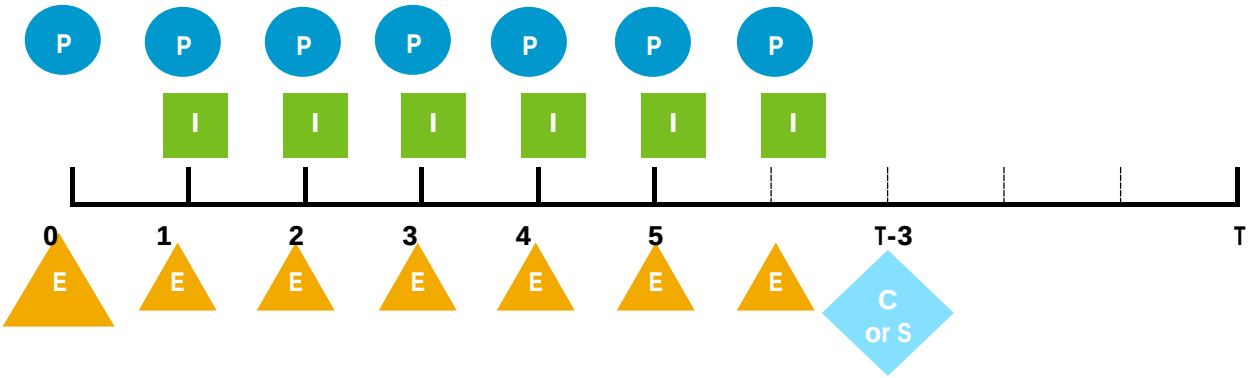
A conversion option may be added to a level premium term insurance policy, allowing the policy owner to purchase a new policy with the same sum insured when the existing policy expires. Adding this option avoids the possibility that the policy owner becomes impaired before the policy expires and is unable to purchase a replacement policy. It is non-trivial to determine the cost of this option.

Future insurability options

Future insurability options allow the policy owner to purchase additional insurance cover (i.e. increase the sum insured) at specified dates without having to provide evidence of health. The specified dates might be once every five years, on specific birthdays, on marriage or on the birth of a child. The reason for specifying dates is to minimise the risk of anti-selection.

Figure 3.5 illustrates the typical cash flows under a term insurance policy.

Figure 3.5: Term insurance policy cash flows



In Figure 3.5, the policy owner is assumed to die (or surrender their policy) 3 years before the policy term (T) is reached.

3.4.3. Total and permanent disability insurance

As the name suggests, a total and permanent disability (TPD) insurance policy provides financial protection against the policy owner becoming totally and permanently disabled, as defined in the insurance contract.

TPD insurance may be sold as a stand-alone product but is often sold as a rider to another risk product (e.g. term or trauma insurance). Usually, a TPD claim reduces the amount of cover remaining on the term or trauma policy. However, 'double TPD' cover is also possible; if there is a TPD claim, the sum insured is paid and the policy continues with the same sum insured payable under the term or trauma policy. TPD is a common inclusion in group insurance contracts.

The definition of TPD varies between countries and insurance companies and is often based around the inability to ever work again (in any occupation or the insured's own occupation). Full TPD cover is usually available up until 'normal retirement age' or the age pension eligibility age. Some products allow cover to continue to higher ages, but the definition of disablement changes to where the policy owner is unable to look after themselves and needs continuous nursing care.

Specific cash flows arising under a TPD policy are:

Cash flow	Description
Premiums (P)	The known premium may be level or stepped and is payable for an indeterminate time (i.e. it ceases at the end of the contract, in instances of earlier withdrawal or if a claim is made).
Claims (C)	A lump sum payment is made if the policy owner becomes totally and permanently disabled. A waiting period from commencement of the disability usually applies (to allow time to assess the level of disability and its permanence).
Surrenders (S)	TPD products typically have zero surrender value. There may be a surrender value for long-term contracts.
Expenses (E)	Expenses are similar to those for term policies but there are additional claims management expenses incurred in determining the validity of claims.

Based on the information provided, you should attempt to produce a cash flow diagram for a TPD policy, similar to that shown in Figure 3.4 for whole of life and Figure 3.5 term insurance policies. You should also attempt this for the other products described in the rest of the module.

3.4.4. Disability income insurance

Disability income insurance (sometimes called income protection insurance) provides financial protection against the policy owner becoming disabled and being unable to work for a *temporary period* (either totally unable to work over the period of disablement or unable to work as much as they were able to prior to the disability). This contrasts with TPD, where only permanent disabilities are covered.

Group disability income contracts are commonly purchased by retirement funds or employers, and are sometimes called group salary continuance contracts.

Specific cash flows arising under a disability income insurance policy are:

Cash flow	Description
Premiums (P)	Level or stepped premiums may be available. In some jurisdictions, premium rates are normally reviewable annually by the life company. However, individual policies cannot be singled out for rate increases. Premiums are usually waived while the life insured is disabled, as defined in the insurance contract.
Claims (C)	Regular benefit payments are made while the policy owner remains unable to work. Policies usually have a 14- or 28-day waiting period after disability commences, during which no benefit is paid. For longer waiting periods, the premium rates are lower. Policies also have a benefit period (typically 2-year, 5-year or until retirement age), which is the maximum period for which benefits can be paid. Partial benefits may be paid after a period of time for someone who can only go back to work part time or in a reduced capacity. Some products allow partial payments from the outset of a claim. Some allow payment of rehabilitation costs. Benefits are usually paid as monthly income payments, specified at the outset of the contract as either a fixed dollar amount (agreed value products) or as a % of the insured's monthly income at the time of claim. This is often limited to 75% of the insured's pre-claim earnings to provide an incentive to return to work.

Cash flow	Description
	Benefit amounts may be indexed to inflation prior to a claim (benefit indexation) and/or while on claim (claims escalation).
Surrenders (S)	Disability products typically have zero surrender value.
Expenses (E)	Expenses are similar to those under term policies, with extra claims management expenses incurred in managing the ongoing claim.

Assumptions are required for claim inception rates and claim termination rates.

Exercise 3.3

You have been asked to peer review claim termination rates for disability income. What process would you follow?

3.4.5. Trauma insurance

Trauma insurance contracts pay a benefit if the life insured suffers one of the medical conditions or events covered by the policy.

The diseases covered are listed on the insurance contract and usually include heart attack, stroke, cancer and coronary artery disease requiring surgery. Some policies cover a much wider range of conditions. Careful definition of the conditions covered under a trauma insurance policy is important. It is equally important that these definitions keep pace with modern medicine to ensure alignment of expectation between the policy owner and the insurer in terms of what is and isn't covered under the policy.

Trauma insurance is also known as 'dread disease', 'critical illness', 'crisis cover', 'crisis benefit', 'living insurance' and 'recovery insurance'.

Trauma insurance can be written as a stand-alone contract or as a rider to term insurance. The rider benefit is an acceleration of the term assurance benefit.

Specific cash flows arising under a trauma insurance policy are:

Cash flow	Description
Premiums (P)	Level and stepped versions are available. The comments in the TPD section apply here.
Claims (C)	Pays a lump sum benefit if a specified illness or injury occurs. An exclusion period of several months following policy commencement applies for some diseases (to avoid adverse selection by a policy owner). A survival period may apply after the occurrence of a trauma event before a trauma benefit is payable. If sold as stand-alone cover, the benefit: • is not paid if the policy owner dies within a certain period after a trauma event occurs; and • is generally only available once. If sold as an acceleration benefit to term insurance: • the sum insured is usually less than or equal to the death benefit; • payment of the trauma sum insured will reduce the death benefit under the term insurance by the trauma sum insured amount; and • there may be a 'buy-back' option allowing repurchase of death coverage.
Surrenders (S)	Trauma insurance policies typically have zero surrender value.

Cash flow	Description
Expenses (E)	Expenses are similar to those under term policies.

3.4.6. Immediate lifetime annuities

Immediate lifetime annuities protect against longevity risk by providing fixed regular payments until the annuitant dies.

Lifetime annuity contracts may provide a guarantee that a minimum amount will be returned to the policy owner's beneficiaries following their death. The two most common forms of guarantees are:

- a minimum payment period; or
- a return of the balance of the purchase price (after deducting the annuity payments made to date).

Specific cash flows arising under an immediate lifetime annuity policy are:

Cash flow	Description
Premiums (P)	Immediate annuities are always purchased by a single premium.
Claims (C)	The regular annuity payments may be level, increasing at a fixed percentage rate each year or increasing in line with inflation. The benefits are usually also available for joint lives, with the option of reduced, or zero, payments to the survivor after the first death.
Surrenders (S)	Surrenders are generally not applicable for immediate lifetime annuities but if the contract has a claim on death (e.g. the balance of the lump sum less annuity payments received) then, in some jurisdictions, there is a minimum surrender value.

Cash flow	Description
Expenses (E)	Initial expenses may be relatively low as there is no underwriting, unless the annuity is an impaired life annuity. There are some additional expenses compared with, for example, term insurance such as a more active investment policy. Life companies will need to check every so often that the annuitant is still alive.

Immediate lifetime annuities may be written as non-participating, participating or investment linked.

Under an investment linked basis, annuity payments are defined as a fixed number of units. A consequence is that the value of the annuity payments under an investment-linked annuity vary in line with changes in unit prices.

Participating annuities offer lower guarantees than non-participating annuities. A key feature of participating annuities is the ability for the purchaser to 'anticipate' future bonuses and receive an annuity income similar to the level provided by non-participating contracts. If future bonus declarations are higher than anticipated, then the annuity payment increases. Conversely, if future bonus rates are lower than anticipated, annuity payments will decrease.

3.5. Savings products

There are a variety of savings products sold by financial institutions. This section describes savings products typically sold by life companies. Retirement funds, some of which are managed by life companies, are discussed in Section 3.6.

These savings products compete with those offered by non life-insurance or retirement providers, include bank savings accounts and term deposits, other non-life insurance investment accounts, master trusts, unit trusts and wraps. These will be discussed further in the LI&R Product Development subject.

3.5.1. Pure endowment

A pure endowment is a savings product that pays a benefit on survival to a specified term. They may be written on a non-participating or participating basis.

Specific cash flows arising under an endowment policy are:

Cash flow	Description
Premiums (P)	Can be paid through a single premium or via regular level premiums.
Claims (C)	Payment of the sum insured is made only on survival of the policy owner to the end of the policy term. Because there is no death cover, the sum insured is higher than for an endowment insurance policy (see Section 3.7.1) with the same premium and no underwriting is required. If the policy owner dies prior to the end of the policy term, there is usually a refund of premiums with interest. Participating policies pay terminal and/or reversionary bonuses to the policy owner when the sum insured is paid (on survival to the end of the policy term).
Surrenders (S)	A surrender value, reflecting premiums paid with accumulated interest, is paid to the policy owner if they choose to surrender their policy prior to the end of the policy term.
Expenses (E)	Similar to whole of life policies and term insurance, except that there is no initial underwriting. They are still typically higher at contract outset than at renewal because of sales commission.

3.5.2. Investment account

Investment accounts are policies in which the premiums, fees, policy owner withdrawals and interest are added or deducted from an investment account. An investment account policy is similar to an investment-linked policy (Section 3.5.3), except that investment returns are smoothed by the life company and there is a guarantee that the crediting rate cannot be negative.

Specific cash flows arising under an investment account policy are:

Cash flow	Description
Premiums (P)	Historically, these products were offered as either single premium contracts (or 'bonds') or regular premium contracts (or savings plans). Today, products are often 'repeat single premium' contracts, where the policy owner can pay in as much as they like whenever they like, and the fees are the same for the first and all subsequent premiums.
Fees (F)	Fees are a positive cash flow to the insurer. Historically, a variety of methods for calculating fees was used. These days, fees are typically expressed as a percentage of the investor's account balance and are used to fund expenses, commissions and profit margins. There is usually also an entry fee, designed to pay for initial commission, and possibly an exit fee on withdrawal in the early years of the policy.
Claims (C)	Contracts typically specify that the account balance will be paid either on death of the policy owner or maturity of the policy.

Cash flow	Description
Withdrawals (W)	Policy owners may have the right to withdraw some or all of their funds whenever they like. The exit fee depends on the charging structure and how profits or losses from the smoothing process are credited to policy owners on exit. The latter topic is discussed in the Product Development subject.
Expenses (E)	Expenses are incurred throughout the contract term. They are typically higher at contract outset than at renewal because of sales commission and other business acquisition costs.

Investment policy is a critical element of product design for investment account policies. If risky assets are used (e.g. shares) the value of assets may fall well below the value of the account balances and, in this circumstance, the company will incur losses if policies are surrendered. The capital requirements for this type of business can therefore be large (see Module 14 (Capital)).

If there is the potential for significant differences between asset values and account balances (e.g. the assets include shares, properties or long-term fixed interest), the policy will be regarded as participating. Typically, a high percentage of the profits will have to be allocated to policy owners. The interest credited to accounts is regarded as a distribution of policy owner profits. If losses occur, they may have to be allocated 100% to shareholders if there are no policy owner retained profits remaining. The latter concept is explained in the LI&R Product Development subject and Life Insurance Applications subject.

If the asset values closely match account balances (i.e. all assets are short-term fixed interest), the policy may be regarded as non-participating. For a non-participating policy, any differences between the investment return (net of fees) and the crediting rate are added to or deducted from an investment fluctuations reserve. This reserve is used to smooth the crediting rate over time.

3.5.3. Investment-linked

The main difference between investment account and investment linked business is the mechanism used to determine the account balance.

Policy owners can choose from a number of investment options, which cover a wide range of asset exposures managed by a range of different asset managers, with fees that vary by investment option. The investment options may invest in a single asset class (such as Australian Equities, International Equities, Fixed Interest, Property, Infrastructure or Cash), or a combination of asset classes with different risk profiles. For instance, 'capital growth' risk profiles allow individuals greater weighting towards equities and property, while 'capital stable' risk profiles will be directed more towards fixed interest and cash. For older contracts, the range of options was more restrictive.

The policy owner can usually switch from one investment option to another at any time. A switching fee may be charged.

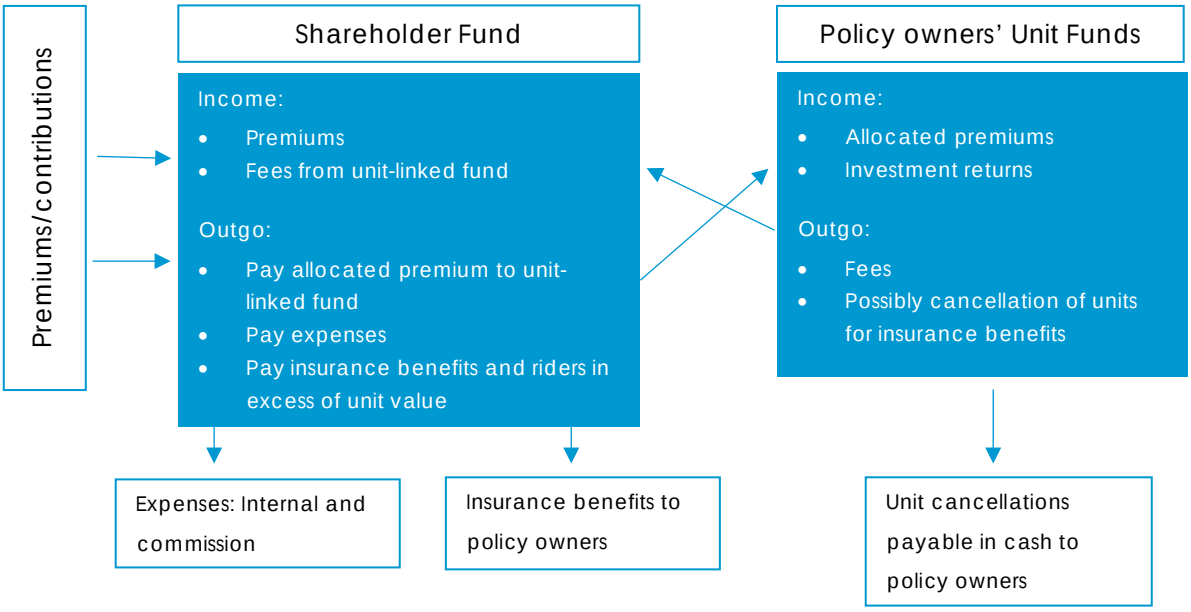
The products can be offered both within and outside the retirement environment.

Figure 3.6 shows a potential interaction between policy owners' premiums, benefits and cash flows to the entity. This is discussed further in Module 5 (Life valuation). The diagram will change in different jurisdictions and is designed to show how there is a clear separation between the shareholder and the policy owner for this type of product. In this example, it has been assumed that all monies flow through a fund belonging to the shareholder, who then allocates monies to the correct policy owner-owned fund. For example, each investment-linked product will have its own charging structure and will define the proportion of each premium that is allocated to the investment-linked funds and thus the proportion that is retained by the shareholder.

Similarly, the shareholder will organise the cancellation of units and convert the proceeds to the appropriate local currency to pay for death cover, if relevant, and will ensure the policy owner is paid the appropriate amount on death. Again, in this example, any death benefits flow through the shareholder fund to the estate or beneficiaries. There are many alternatives, such as the policy owner may have a life insurance contract directly with an external life insurer.

Fees may be payable by deducting units or directly by reducing the unit price.

Figure 3.6: Investment linked cash flows



Specific cash flows arising under an investment-linked policy are:

Cash flow	Description
Premiums (P)	Premiums are primarily allocated to unit funds but part of the premium, the unallocated premium, is a cash flow to the entity. The premium may be a known amount, but in many countries premiums are based on salary and hence vary, albeit on an annual basis.
Fees (F)	Fees are usually expressed as a percentage of the investor's balance, although historically there was a wide variety of charging mechanisms. Annual fees tend to vary by asset class and type of investment strategy.

Cash flow	Description
	There may be a spread between the buying and selling price of units that accrue to the entity. Fees for insurance benefits are usually extracted by cancelling an appropriate number of units at the then unit price. There may be penalties on early withdrawal, especially if commission was payable on the sale of the product.
Claims (C)	Contracts typically specify that the value of the units will be paid either on death of the policy owner or maturity of the policy.
Withdrawals (W)	Units are sold by the policy owner (at the current unit price) to withdraw funds from their account.
Expenses (E)	Expenses are similar to those under investment account business, although the amount depends on the investment strategy and asset classes offered.

In the remaining sections of this module, we provide a brief definition of the product and expect the reader to think through the cash flows. There will be a tutorial explaining the cash flows. It is in your own interest to write down the cash flows before the tutorial.

3.5.4. Fixed rate and term policies

Fixed rate and term policies are single premium policies that pay a guaranteed interest rate (set in advance) for a fixed period. At the end of the period, policies usually provide an option to roll the proceeds over for a further term with the interest rate to be determined at the time of the rollover. These contracts are similar to bank term deposits and potentially only differ in the way that the interest is taxed.

3.5.5. Term certain annuities

Term certain annuities provide for fixed regular payments to be made for a fixed term. These contracts are 'bundled' in the sense that there are no explicit fees or investment returns. Instead, these items are implicitly allowed for in the purchase price quoted by the life company.

Term annuities are in effect a form of fixed interest investment. Life companies offer term annuities with a wide range of maturity dates. They are purchased by a single premium.

3.5.6. Allocated annuities

Allocated annuities (or pensions) are a type of unbundled contract designed to accept single premiums from retirees or their retirement funds. Regular payments provide the retiree with an income. Investment-linked and investment account products are available.

Government regulations may specify minimum amounts that must be paid to the annuitant each year. These can be set as a percentage of the start of year account balance and increase with age. Payments can be varied each year providing they exceed the minimum.

When the account value reduces to zero, the policy terminates. The retiree bears longevity risk and the investment fluctuation risk under these contracts, unlike an immediate lifetime annuity where both risks are borne by the life company.

3.6. Retirement funds

Retirement funds (variously known as superannuation, pension or provident funds, depending on where you live) are savings vehicles established to provide lump sums (single payments) or pensions (ongoing payments) at retirement. Retirement products of many different kinds are now very common due to:

- growth in living standards (retirement is no longer just for the wealthy); and
- increased length of healthy retirement.

In most countries, governments try to encourage retirement savings by individuals via tax incentives. The benefit for governments is to reduce individuals' reliance on government-funded welfare benefits in retirement. Generally, these tax incentives are offered in exchange for constraints such as limited access to the money before a reasonable retirement age and the requirement to take most of the benefit as an annuity to avoid individuals using all their retirement savings too quickly.

A retirement product consists of two key phases:

- pre retirement: an individual makes contributions to their retirement savings throughout their working life and these savings grow with investment earnings
- post retirement: the individual receives either a lump sum or ongoing benefits from their retirement savings fund once they have retired.

3.6.1. Defined benefit retirement funds

Defined benefit funds are employer-sponsored arrangements where the benefit is defined by a formula. A common formula is in relation to the employee's length of service and salary at, or near, retirement.

Defined benefit funds usually also pay benefits on death, disablement, early retirement, ill-health retirement, resignation and redundancy. The basis for calculating each benefit is defined in the fund's rules or trust deed. Some benefits may be expressed as an accumulation of contributions with interest. Benefits based on salary may be calculated with reference to the average salary over a period. Many other variations are also possible.

From an employee's perspective, the value of a defined benefit fund is that the employer takes the risk that extra contributions will be required to meet the promised benefits. However, it is hard to know what the benefit is worth to the employee, especially because resignation benefits are often very much less generous than retirement benefits.

From an employer's perspective, a defined benefit structure creates a risk that the accumulated value of contributions it has set aside from employees' salaries is less than the defined benefits it owes to its retired workers.

The funding of defined benefit funds is discussed in Module 9 (Retirement valuation).

3.6.2. Defined contribution retirement funds

Under defined contribution funds, benefits are usually the accumulated value of contributions, being the employer's defined contributions and any contributions from the employee, whether defined or voluntary. This structure is also known as money purchase.

Defined contribution funds can also offer insurance benefits, the cost of which may be deducted directly from the fund or may be borne separately by the employer.

For the same level of contributions, a defined contribution fund usually supports higher resignation benefits and lower retirement benefits than a defined benefit fund. This is because under a defined contribution fund, members receive the value of accumulated contributions whether they exit the fund through resignation or withdrawal. On the other hand, members exiting a defined benefit fund via resignation may receive less than the accumulated value of contributions to date. This leaves more accumulated contributions available to meet the benefits available for members reaching retirement. Therefore, when defined contribution funds replace defined benefit funds (as has occurred for the majority of retirement funds in Australia), either the level of contributions will need to increase (to achieve the same level of retirement benefits) or the retirement benefits will become less generous.

3.7. Combined protection and savings

Many products sold today contain elements of both protection and savings. These are discussed in the remaining sections of this module. We expect the reader to work out the cash flows.

Note that taxation rules affect the potential structures but these rules are outside the syllabus.

3.7.1. Endowment insurance

Endowment insurance pays a benefit on survival to a specified date or on earlier death. It was traditionally used by policy owners as a savings vehicle, often for retirement savings.

Traditional participating endowment insurance policies were predominantly monthly premium contracts, although annual premiums were common.

3.7.2. Deferred annuities

These are whole of life contracts that change in form as the contract duration progresses.

A date is chosen at contract outset, the vesting date, at which the contract changes from a savings contract to an annuity contract. The contract may be written on a non-participating, participating or investment-linked basis. It is possible for this basis to change pre and post vesting (e.g. a policy may be participating during the pre-vesting stage and non-participating during the post vesting stage).

Historically, there were a variety of death benefits options in the pre-vesting stage of these contracts:

- no benefit on death;
- return of premiums on death, with or without interest; or
- a sum insured, plus attaching and terminal bonuses payable on death.

These contracts typically have an option at the vesting date to take a cash lump sum instead of converting to a lifetime annuity.

The annuity rate at the vesting date may be guaranteed at outset or non-guaranteed.

3.7.3. Universal life

These are whole of life contracts that provide flexibility on when both premiums and benefits are payable. This is simply another name for the Investment Account or Investment-linked policy where a death benefit is attached. There is no end date and policy owners can surrender at any time, although there may be an exit fee in the early years of the contract.

It may be used in a similar way to a deferred annuity but has more flexibility as there is no concept of a vesting date. The policy owner may choose to continue to save at older ages or may make partial surrenders to provide an income. Alternatively, the policy owner may mimic a deferred annuity by surrendering the contract and purchasing an annuity contract with some, or all, of the proceeds.

3.7.4. Variable annuities

A variable annuity is a loose term that covers a variety of contract types on an investment-linked basis.

A defining feature when compared with other products are the so-called GMXB guarantees. The policy owner selects a particular guarantee at outset. The choices are:

- GMDB — guaranteed return of premiums on death;
- GMAB — guaranteed minimum return at the vesting date;
- GMIB — guaranteed minimum income on annuitisation at the vesting date; and
- GMWB — guaranteed minimum withdrawal from the fund each year post-vesting for a defined period, with the potential to surrender the fund.

These types of products tend to be quite complicated and it can be very difficult to judge whether the additional fees for the guarantees provide value for money. So far, variable annuities have not proved popular in Australia, although they have been successfully marketed in some overseas countries, including the USA and Japan.

3.8. Key learning points

- Life insurance and retirement products can provide protection or savings benefits, or a combination of both. They often include either complete or partial transfer of risk, for which premiums or fees are charged.
- Protection can be provided to policy owners against mortality, disability or illness, longevity and investment risk.
- An understanding of cash flows arising under life insurance and retirement products is important for a range of financial functions, such as valuation of liabilities, estimation of profit or surplus, management of risks and calculation of capital requirements.
- Key cash flow characteristics to consider for valuation include the sign of the cash flow (e.g. premium, contribution or benefit payment), size, level of certainty, nominal or real (changing/increasing according to an index), how often the cash flow occurs and for how long.
- In general, retirement business attracts favourable tax treatment for individuals compared to other types of investment and insurance arrangements.
- Group policies are most commonly sold to the trustees of retirement funds to provide death and disability cover to the fund members.
- Morbidity protection products are more complicated than mortality as there are more potential claim events.
- Trauma insurance can be written as a stand-alone contract or as a rider to term insurance. The rider benefit is often an acceleration of the term assurance benefit.
- Disability income insurance provides financial protection against the policy owner becoming disabled and being unable to work for a temporary period.
- Investment risks may be borne by the provider of capital or the policy owner, or shared.
- Investment linked policies offer a range of investment options and asset exposures.
- 'Variable annuity' is a loose term that covers a variety of deferred annuity products. A defining feature is the range of optional guarantees available.
- Lifetime annuity contracts may provide a guarantee that a minimum amount will be returned to the policy owner's beneficiaries following their death.

3.9. Answers to exercises

Exercise 3.1

What other categorisations of products are possible?

Answer:

Figure 3.1 listed products by protection, savings or a combination. There are many potential categories, some more useful than others. For example:

- investment type;
- who bears the investment risk (see Figure 3.2);
- individual or group;
- tax-status – a classic organization is a split between superannuation or otherwise;
- the domestic tax office may require a split into superannuation, domestic and overseas;
- only one claim or multiple claims possible;
- insurance and reinsurance;
- a class of products may be refined into sub-groups e.g. immediate annuities may be split into compulsory purchase or otherwise;
- guaranteed charges e.g. a contract may not allow the insurer to change its charges during the contract life; and
- accounting standards typically split contracts into insurance and investment, with significant consequences on recognition of profits.

Exercise 3.2

Explain why a group version of whole of life insurance is unlikely.

Answer:

A significant issue is that the employer, who normally pays the premium, would not have easy access on the state of the lives who have left the employer.

The contract would be very valuable to ex-employees and possibly desired by that group although the employer has less of an interest in them. Death benefits are usually restricted up until the date of leaving employment although there are often spouse's and children's pensions, subject to various conditions, in defined benefit funds.

Exercise 3.3

You have been asked to peer review claim termination rates for disability income. What process would you follow?

Answer:

This is a slightly odd question at this point in your studies as we derive rates in the Product Development subject and we have not discussed what is meant by peer review. Don't worry if you struggled with this question.

In Australia, there is information published by the Actuaries Institute on the concept of peer review. You may have come across Practice Guidance 1General Actuarial Practice as part of your Associateship studies.

That document provides advice on peer review and the relevant section is pasted below.

2.11 Peer Review

The Member should consider to what extent, if at all, it is appropriate for the Report to be independently reviewed, in totality or by component, before the final Report is delivered to the Principal or distributed to the Intended Users. The purpose of peer review is to support the quality of the Report, with the process tailored to the complexity of the Work and the specific environment in which the Member works. If a peer review is deemed to be appropriate:

a. The Member should select a reviewer who is suitably independent of the specific component(s) reviewed and is knowledgeable and experienced in the practice area of the Applicable Professional Services.

b. If the reviewer is a Member, the reviewer should comply with the guidance of this PG, as applicable, in performing the review.

Whilst you have been asked to provide a peer review, it appears from the above description that you should make a decision whether or not it is appropriate for you to peer review the results.

Assuming you have experience in experience reviews, although not necessarily claim termination rates, and have the time to provide advice in a timely manner (as often described in a typical Code of Professional Practice note) then you may want to discuss the report with the author to ascertain:

- the author's experience;
- the size of the task;
- how the task was completed, including the source of data, how the data was checked for accuracy and completeness and whether the model was checked in detail by suitable qualified persons;
- the importance of the derived rates to the end-user of the report; and
- if the results look reasonable.

The question in the textbook originally asked about peer review claim termination rates for TPD. As that class of business does not have termination rates then the answer would have been that there is no need for peer review. The intention of the original question was to test if you understood the contract design rather than peer review.

However, the actual question does highlight some points to think about. How did you approach an answer to the question? Were you able to generate ideas? Was there anything obvious to state? I would argue that the answer is possible from first principles:

- Does it need a review – no, then end of process
- If yes, then it is high-level and not detailed.
- Was it a big and important job?
- How was it completed?
- How do the results compare with expected (e.g. last time's results)?

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