

Class: M.Sc Sem 3

Subject : Actuarial Practice 1

Chapter: Unit 4 Chapter 18

Chapter Name: Designing a Product

Today's Agenda

1. Parties involved in designing a contract
2. Risk appetite – risk aversion
3. The regulatory environment
4. The need for profitability
5. The market for the product
6. Competitive pressure
7. Deciding on the benefits to offer
8. Discontinuance benefits offered in a life insurance contract
9. Discontinuance benefits offered in a general insurance contract
10. Discontinuance benefits offered in a benefit scheme
11. Financing Considerations
12. Administrative issues
13. Premiums and charges
14. Conflicts when designing a contract

1 The Parties Involved in Contract Design

The parties involved are:

- the providers
- the providers' customers
- actuaries
- lawyers
- accountants
- financial backers
- administrators.

1 The Parties Involved in Contract Design

➤ The Needs and Interests of Providers and the Provider's Customers

The providers and their customers will want financial structures that meet their needs in a cost-effective manner.

The provider's needs will be influenced by:

- the chosen market – here it means the target customers of the provider, their economic and demographic composition such as age, wealth etc and the general economic and commercial environment
- the capital available – this will affect the design and features of the contract and the risk capacity of the provider
- the expertise available – if the provider has access to sufficient expertise internally, than he need not consult other experts. This determines his cost of providing benefits

1 The Parties Involved in Contract Design

The Provider's Customer's Needs will be Influenced by:

- capacity to pay – whether or not he can afford higher premiums
- the risks to be covered
- the benefits that are needed at different times in the future – some customers may need a lumpsum capital payment while others may need a series of regular incomes in the form of annuity
- attitude to financial risk.- some customers may be risk averse and hence choose safe investment options, while others may be risk seeking.

1 The Parties Involved in Contract Design

➤ Other Stakeholders Involved in Contract Design

❑ Actuaries

Actuaries will be involved in the initial costing of the financial structures and the subsequent determination of the provisions that will need to be held to meet future liabilities.

They will also be involved in the ongoing design process through assessing the impact on both the cost and the provisioning implications of modifications to the benefit design.

In general and life insurance, initial costing refers to pricing or rating and establishing the level of money to be held in order to meet future liabilities is known as reserving.

❑ Lawyers

Lawyers will be involved in the drafting of the contracts supporting the financial structures to ensure that the provider is not exposed to the risk of providing more benefits or entering into greater risks than intended.

1 The Parties Involved in Contract Design

☐ Accountants

Accountants will be involved in ensuring that the provider of the financial structures properly accounts for the income and outgo.

☐ Financial Bankers

The financial backers will want regular reports demonstrating proper stewardship of the finance provided.

☐ Administrators

Administrators will need to administer the financial structures. The more complex the financial structures are, the greater the cost of administration. This should be reflected in the amounts paid by the customers.

The higher the complexity of the product, the greater is the operational risk. Thus the cost of administration is increased by complexity.

☐ Sales and Marketing

The sales team needs to be trained with respect to the financial structures of the contract. The more complex the financial structures are, the greater the cost of training and the harder the contracts may be to sell.

Marketing teams can provide important information on the characteristics of the target market

2 Risk Appetite – Risk Aversion

- It is important that the financial structure as designed meets the risk profile of the intended customer, and that the risks involved in the product are clearly explained to the customer.
- Sales of a financial product will be optimised if the product can be designed to be suitable for customers with a wide range of risk appetites. For savings products, whether insurance contracts or benefit schemes, this can be achieved by offering a range of investment choices. Having a range of funds available means that the contract can allow for any change in the customer's risk appetite during the term of the policy.
- The risk averse investor can select investment funds that are designed for the cautious investor. These funds might have a significant percentage in cash or high quality short-dated bonds, with a relatively small equity content. The equity content might be restricted to invest only in 'blue-chip' companies.
- The speculative investor can choose a fund with a low or zero fixed-interest content, and where the equity content is unconstrained. Equity investments might include unquoted companies, emerging markets, and high-risk industries

2 Risk Appetite – Risk Aversion

General insurance products normally allow for differences in customers' risk appetite through the range of risks that can be insured.

For example, motor insurance is commonly written on three bases:

- third party only
- third party, fire and theft
- fully comprehensive.

The risk appetite of the provider also needs to be considered. The provider may reduce his exposure to risk by:

- offering the contract in unit-linked form to avoid a long-term guarantee
- reinsuring a large part of the risk
- incorporating ample margins in the premium rates
- offering the contract as a rider benefit rather than stand alone.

3 The Regulatory Environment

It is essential that the design of a financial product is consistent with any legal or regulatory requirements that apply to the provider or to the particular type of product. For example, in most developed countries motor vehicle insurance must include third party liability cover.

Legislation or regulation may provide a more attractive financial or taxation regime if the policy meets certain conditions. For example, there may be tax advantages that apply to a life insurance product as long as the sum assured on death is a minimum of a specified multiple of the premiums paid. A government might impose this to ensure that products provide a minimum level of protection cover and are not just savings plans.

Where these regimes are optional, the provider needs to decide whether the contract will be designed to be inside or outside the regime. In either case the position needs to be made clear to the customer at the point of sale to avoid misleading them.

Many regulatory regimes impose a 'cooling-off period' for financial products where the customer can cancel and get a full refund within an initial period, perhaps 14 days. For policies that are cancelled in this way, the provider will have incurred initial set up expenses and will make a loss on the policy. It is important that such expenses are recouped. The normal way of doing this is to set initial charges by dividing the total expenses of the new business operation, including dealing with policy cancellations, by the number of policies that go into force, ie are not cancelled.

3 The Regulatory Environment

In some countries there may be requirements on providers to present certain information to potential customers. This may include illustrations of discontinuance terms. If these disclosures are thought to be a feature of a customer's decision to take the policy then the provider may wish to show attractive figures. These attractive figures need to be kept in mind when actually determining surrender values. Even if the company is not liable to offer a guarantee, it could be embarrassing for the company if discontinuance terms quoted in its literature conflict with figures actually quoted to policyholders. Disclosure requirements may also set out the discontinuance basis to be used and hence influence the extent to which policies terminating later, or remaining to maturity, subsidise the benefits offered on short duration discontinuance.

4 Profitability

At the end of the day an insurance company is in business is to earn profits. Hence profitability is a key issue when designing contracts.

The factors affecting an insurance company's profitability are:

- Claims experience
- Expenses and expense inflation
- Investment returns
- Withdrawal experience
- New business sales volumes and mix

5 The Market for the Product

The intended target market will affect the design of a financial product.

Products directed at lower income individuals are likely to be simple contracts with a clear insured event. Such simplicity reduces cost and the product is more likely to be affordable and comprehensible to the target market.

At the other extreme, high net worth individuals are likely to favour flexible products that can be adjusted as their financial circumstances change. The provision of options and guarantees is likely to be attractive to this group. These features add cost, but the target market would normally understand the cost of flexibility and guarantees and be prepared to pay it.

The same applies when products are being designed for advisers to sell to their customers – it is the needs of the advisers' customers that should be considered.



Suggest certain aspects of contract design that would improve its marketability.

6 Competitive Pressures

There are two main types of competitive pressure:

➤ **The Importance of Price**

Some products are designed to cover basic insurance needs where the risk is well defined: term life insurance, annuities, private motor insurance, employer's liability insurance. These products tend to be sold on price and the provider with the lowest price is likely to get the greatest volume of business.

Other products such as with-profit savings contract, unit-linked contracts or long term care contracts, are such that their premium rates do not affect their competitiveness. This is because these contracts are competitive to a considerable extent and hence cannot be easily compared between providers.

➤ **The Importance of Product Features**

Other products cannot be directly compared on price and instead the risks covered, the administrative systems and the claims process all feature in the customer's decision. For example, motor breakdown cover may or may not cover breakdown at the driver's home, may provide a guarantee of attending a claim within a specified time, may offer different options if the vehicle cannot be repaired at the roadside. All these items feature in the decision to purchase as well as the price.

6 Competitive Pressures

There is a risk to a provider of offering terms that are very different from the rest of the market. Customers may assume that the terms are consistent with the rest of the market and be disappointed if they don't receive what they expect, even if they receive the benefits specified by the policy. A provider who offers different terms from the market may attract selective business which means that the product mix is not as expected. However, differentiation can be a positive sales point, as it offsets a less price competitive product. In some cases being different from the market can force the market to catch up with the innovators. Because there are more non-smokers than smokers in the UK, the first provider to offer lower life assurance premium rates for non-smokers (and higher rates for smokers) than the rest of the market secured a lot of business. Providers that did not discriminate attracted smokers who benefited from a mixed aggregate premium rate, and therefore those providers' mortality experience was worse than expected. This soon forced the whole market to change to differentiating by smoking status.

The sales process of a product also determines how competitive it is. Selling a product through independent intermediaries results in pricing being more competitive than selling through the company's own sales team. The broker will offer contracts across the entire insurance industry, whereas sales team will only sell contracts pertaining to their company.

7 Deciding on the Benefits to Offer

➤ The Level and Form of Benefits

The level and form of benefits to be provided under any specific financial structure may vary according to the:

- customer's needs
- risks to be covered
- customer's ability to pay.

For example, some car owners may want full cover against damage to or theft of their car, combined with legal protection and an additional premium to protect any no-claims bonus they have accumulated. Other car owners may just want the minimum cover to enable them to drive legally.



Give examples of how the level and form of benefits may vary according to the customer's needs in relation to a health insurance contract.

7 Deciding on the Benefits to Offer

➤ Options and Guarantees

☐ Options

Options in financial products reflect the use of the word option in its normal English sense, ie a choice. One party to a contract has a choice to do something, and the other party cannot prevent the action. However, often the other party can set the conditions under which the option can be exercised.

The approach taken may vary depending on the type of contract:

- For example, on early termination of some types of insurance policy there may be no value. Policies such as term assurances can be terminated by the policyholder stopping premiums. Life cover ceases and there is no surrender payment made to the policyholder ...
 - ... other policies may have a value on termination, and the policyholder may receive a payment if they choose to surrender the policy.
- For a motor insurance policy, the contract may state a formula for a partial refund of the premium if the policy is cancelled early

7 Deciding on the Benefits to Offer

- For a with-profits life assurance a surrender value is paid but there is no guarantee of the amount, which is at the discretion of the company. The surrender value can be set to recover:
 - the expenses which have been incurred (including actual costs of processing the surrender).
 - the expected profit on the contract. The insurer could choose to recover a proportion of the expected profit, based on the duration in force, or it could choose to recover all the profit that was expected to be earned if the policy remained in force.
 - a penalty charge for breaking the contract.
 - the cost of any life cover provided up to the point of surrender.

Some policies give the policyholder the option to convert from one type of policy to another.

Policies may give the insurer the option to increase charges, usually subject to a cap.

Regulations may impose restrictions on the exercise of options that are deemed to be unfair to the consumer.

7 Deciding on the Benefits to Offer

❑ Guarantees

The most common guarantee in financial products is the basic sum assured under a life insurance policy, or the sum assured plus bonuses under a with-profits policy. Other products are written with a conditional guarantee: the maturity value under a unit-linked assurance might be the value of units with a monetary minimum – the guarantee is in the money when unit prices are low. A more complex guarantee might be where a contract's value depends on the growth in a specified equity index (such as the FTSE 100) with a guaranteed minimum growth rate.

Product providers' systems should be designed to pay out the guaranteed amount when a guarantee is in the money. A more difficult issue is whether to tell a customer that a forthcoming guarantee is in the money if the customer seeks, for example, to surrender the policy a few months before the guarantee date.



Give examples of guarantees that might be offered under the following contracts:

- An immediate annuity
- Household property insurance
- A defined benefit pension scheme

7 Deciding on the Benefits to Offer

❑ Guaranteed Options

Guarantees and options are frequently combined. A policyholder may have a choice whether to take a guaranteed surrender value on a specified date, or to continue the policy in the hope of a better return at some later date.

Life insurance policies designed to provide a pension, but which fund for a cash sum at retirement, sometimes have an option to use the cash available at retirement to purchase a pension at a guaranteed rate that is substantially better than the current rates available in the market. Sometimes these policies also have an option to take the proceeds in a lump sum, part of which may be tax free to the recipient. This gives the customer a difficult choice.

Where there are guaranteed options, giving a clear explanation to the customer becomes increasingly necessary. For example, some older pension policies written in the UK provide very attractive in-the-money guaranteed annuity rates for a single life pension payable monthly. The provider has two choices:

- Extend the guarantee voluntarily and generate annuity option rates for other frequencies of pension payment and for joint life annuities, using the same actuarial basis as in the policy guaranteed rates. Then all options can be offered to the customer fairly, but at an increased cost to the insurance company.

7 Deciding on the Benefits to Offer

- Require that joint life and other frequencies of annuity are purchased at non-guaranteed current rates. This will be less costly for the company. However, it will need to ensure that the existence of better rates for monthly single life is made clear, including the financial benefit of selecting the guaranteed option. This approach would also expose the company to reputational risk if it were to be accused of unfair treatment of customers.

❑ Pricing Options and Guarantees

Any options or guarantees that are included in the financial structure will need to be charged for. Ideally this should be a charge included in the premiums paid. The alternative is to charge for guarantees through a reduction in the amount paid when the benefits fall due.

While not charging for options and guarantees from the outset may aid sales, the adverse reaction of customers whose benefits are unexpectedly reduced on payment is likely to outweigh the earlier benefit. Imposing a charge for a guaranteed benefit at the time the benefit is paid – presumably by a deduction from the benefit, means that the benefit doesn't have the guarantee the customer is expecting.

7 Deciding on the Benefits to Offer

➤ Discretionary Benefits

It should be decided by the directors whether profits earned by the company should be distributed amongst the clients or not and if yes then upto what extent.

For example:

- A life insurance contract – the level of bonuses to be provided under a with-profits contract.
- General insurance contract – the level of no claim discount experience rating for a motor insurance
- Defined Benefit Pension Scheme – the level of discretionary pension increases to be awarded in a final salary scheme.

8 Discontinuance Benefits - Life Insurance Contracts

Discontinuance is when a policyholder voluntarily stops paying his premiums. Decision regarding the level of discontinuance benefits to be paid needs to be taken.

Providing the option of opting for early benefits makes the product more attractive and improves its marketability. However, it makes the product more complex and hence harder to administer as the date of the policy maturing is now unknown and lies at the discretion of the policyholder, where earlier it was a fixed maturity date.

The principles underlying the determination of the benefits payable on discontinuance or transfer of rights are broadly the same for insurance contracts and benefit schemes in that the amount offered on discontinuance should be fair to:

- the policyholder or scheme member
- other policyholders and scheme members
- the provider of the benefits.

8 Discontinuance Benefits - Life Insurance Contracts

➤ Discontinuance and Life Insurance Contracts

❑ Determining the Contracts for which to offer Discontinuance Terms

An insurance company needs to decide the contracts for which it will offer discontinuance terms. These may be governed by:

- market practice
- regulatory requirements
- the likelihood of selective withdrawals
- or simply the difficulty of assessing suitable terms, such as the lump sum to pay on the discontinuance of an immediate annuity.

Here selective withdrawals refers to the thought that policyholders who were thought to have a better than expected experience from an insurer's viewpoint withdraw, leaving a pool of policyholders who were anticipated to have worse than expected experience.

8 Discontinuance Benefits - Life Insurance Contracts

❑ Administration Costs

The provider will also consider the cost involved in determining and implementing the terms compared with the benefit available on discontinuance. These would usually be :

- The cost of calculations
- The cost of developing computer systems for determining the level of benefits and its maintenance cost
- Cost of employing and training staff to deal with discontinuance quotations
- Cost of reviewing the discontinuance terms
- Marketing literature cost

8 Discontinuance Benefits - Life Insurance Contracts

❑ The Form of Benefits Offered

Where discontinuance terms are offered, these could take the form of a payment of a lump sum, or a conversion of the contract to a paid-up status with no more premiums being payable.

In a life insurance context, discontinuance means :

- Surrender – the policy stops before its maturity, and the policyholder gets a surrender value in the form of a lumpsum payment, usually lesser than the claim amount.
- Lapse – here the policy stops before maturity and no payment is made to the policyholder
- Paid-up – here the policyholder stops making the premium payments, but the cover still exists and the policy continues. Here the benefit amount may be reduced and is then known as the paid-up value.
- withdrawal – it is an umbrella term for surrender and lapse, where the policy is no longer in force and has been withdrawn

8 Discontinuance Benefits - Life Insurance Contracts

For some types of contract the discontinuance terms, or the method of calculating them, may be guaranteed as part of the contract

Consider a unit-linked contract, where it is pre-specified that the surrender value of the contract would be in terms of the bid value of units, which is the number of units held by the policyholder multiplied by their bid price. The bid price is the highest price that the insurance company will agree to pay in order to redeem the units.

❑ Setting the Discontinuance Benefits

The key principles and factors to consider in determining discontinuance terms for life insurance contracts are:

- What the policy is worth
The initial stage of estimating a policy's surrender value, is to assess the policy's current value, i.e. to calculate the retrospective reserve.

8 Discontinuance Benefits - Life Insurance Contracts

- Policyholder expectations – discontinuance at short duration
It is natural for a policyholder to compare the lump-sum discontinuance benefit after a few years' duration with the premiums paid, or even premiums plus some interest. However, the discontinuance benefit at such a stage will often, if not usually, be less than the sum of premiums, or even negative, as significant initial expenses will have been incurred.
If expenses exceed premiums, then clearly the company cannot avoid making a loss. However, it may feel obliged to accept a loss, or at the least a reduced profit, on discontinuance up to several years into the contract so that the lump sum paid does not appear too low compared to premiums paid.
- Policyholder expectations – discontinuance close to maturity
Where a benefit will become payable on the maturity of a contract, the policyholder will expect that a lump sum payable on discontinuance just prior to maturity will be consistent with it.
- Competitive considerations
Companies would want the people to perceive them as offering competitive surrender values and competitive maturity terms in comparison to other companies selling similar products.

8 Discontinuance Benefits - Life Insurance Contracts

❑ Practical Considerations

- Ease of calculation

Discontinuance terms are often based on a simple formula or a table of applicable factors, which can be used to generate a mass of surrender and paid up values by inputting these values in a computer programme. The actuary must ensure balance between the need for simplicity and fairness of discontinuance terms.

- Frequency of change of discontinuance terms

For practical reasons, discontinuance terms must remain stable and not change frequently, unless required by the company's financial conditions or by regulation. This is to reduce the:

1. Risk of not meeting policyholder expectations
2. Cost of determining and implementing new terms

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Discontinuance Benefits - General Insurance Contracts

Benefits offered on discontinuance for a general insurance are simpler in nature because of the small term of a general insurance company.

General insurance contracts have a term of a one year. If a policyholder wishes to discontinue their policy, then he gets paid a lumpsum surrender value, reflecting the premium for the outstanding cover less an administration fee

10 Discontinuance Benefits -Benefit Schemes

- ❑ The form of the benefits offered

In case of a defined benefit scheme, the discontinuance benefit will show the member's account at the date of withdrawal. Generally this account would continue to grow with the investment returns minus and fees up to retirement.

As for a final salary defined benefit scheme benefit is usually based on the number of years' service and the salary at the date of withdrawal increased at some low rate until retirement.

When a member moves from active to deferred status in the scheme the member is likely to be given the option not to transfer benefits away but to retain the full discontinuance benefits in the scheme.

Members have the option to either:

- Continue in the scheme until retirement and receive the benefit, or
- Transfer the value of the benefits to another arrangement any time before retirement

10 Discontinuance Benefits -Benefit Schemes

❑ Setting the Discontinuance Benefits

For a defined benefit scheme, the benefits on discontinuance are likely to be known, but if they are to be transferred to another provider a value will need to be placed on them. The value will need to be equitable between members who leave the scheme and members who stay in the scheme.

❑ Other Considerations

It is not always necessary that a defined benefit scheme will be fully
Any payment to a member leaving the scheme may be reduced to reflect a lower level of funding.
Suppose a scheme is only 80% funded, and a member withdraws from this under-funded scheme, they are likely to be offered a reduced transfer value of about 80% of their vested rights.

11 Financing Considerations

❑ Capital Requirements

It is a common scenario for life insurance companies to face what is known as a new business strain in its first year of inception, where the company is bleeding due to losses.

New business strain is a result of premiums received in the first year being insufficient to cover the total of the initial expenses, the initial commission paid and the initial increase in provisions and solvency capital requirements. Insurers act in a prudent manner by keeping solvency capital levels and provisions at a high level to demonstrate security to policyholders.

In the following years, the companies start making profits as more premiums are earned and the initial costs are no longer borne, and the reserves are released.

The capital requirements depend on the 'riskiness' of the benefits promised. Some 'attractive' contracts may require the provider to hold an unacceptable level of capital even if they can sell the contracts on profitable terms. This might particularly be the case where the regulatory capital requirements are assessed on a basis that is inconsistent with the economic capital requirements of the contract.

11 Financing Considerations

❑ Financing the Benefits to be Provided

Whenever there is a period of time between a financial structure being set up and the benefits actually being provided, there is a choice as to how and when monies should be set aside to pay for the benefits.

Consider an insurance company, where the premium may be paid as a lumpsum amount or as a series of regular payments. In any case the benefits have been funded in advance.

A defined benefit scheme has a range of options so as to finance the scheme:

- pay as you go – here benefits are set aside as when each payment is made, having an unfunded approach
- funding all the benefit in advance
- regular payments building up a fund
- paying an amount when the benefit event happens for example purchasing an annuity at the point of retirement

If benefits are funded in advance, a decision will be required as to the way the funds are to be invested, in the case of defined contribution scheme where regular contributions are made into the scheme to provide a retirement fund

12 Administrative Issues

➤ Administrative Issues

The product will need to be administered, this might be on the provider's own systems or might be outsourced to a third party. In any event, the system used needs to be able to carry out the functions that have been built into the product design at the cost that has been built into the product price. Systems changes needed to adapt to the requirements of a revised product design also need to be included as part of the development cost of the product.

Many product designs involve options or changes that only take effect some years after the launch of a product. An example might be offering a guaranteed surrender value on the fifth anniversary of a unit-linked savings bond. It is clearly not necessary to have these surrender processes working at the product launch, and if they are omitted the product can be launched more quickly. But the need to carry out the work at some point in the first five years will always be present, and it may be difficult for the business to schedule an appropriate time to carry out such work.

13 Premiums, Contributions and Charges

➤ Premium / Contribution Pattern

When policyholders are provided a certain degree of flexibility with respect to premium payments, such as the freedom to choose a lumpsum payment, a series of payments, annual or semi-annual payments, the administration and calculations involved become complicated and expensive. However this additional flexibility may enhance the marketability of the product and give it a competitive advantage over other products in the market, as it caters to the various needs of the customer.

➤ Charges vs Expenses

The charges that are levied will need to meet the costs incurred by the provider in setting up and managing the financial structures in place and contribute towards the profit of the insurer.



State the key risk when designing the charges vs expenses aspect of the contract.

13 Premiums, Contributions and Charges

For an insurance company, the costs will include:

- contract design
- advertising / sales
- commission
- the initial administration of setting up new policyholder records
- the ongoing administration of collecting premiums
- the administration of paying the claims / benefits as they fall due
- management of assets
- the overheads of the insurer, eg rental of office space, IT departments etc.

13 Premiums, Contributions and Charges

➤ Extent of Cross-subsidies

The insurer may allow for cross-subsidies within or across contract types.

An example of a cross-subsidy within a line of business would be to require larger policies to contribute more towards expenses and profits than smaller policies. So the larger contract is subsidising the smaller contract.

➤ Consistency with Other Contracts

The provider must ensure consistency in the contract design and pricing with existing contracts being sold.

If the new contract is strikingly different from the existing ones, then the provider will need to incur additional costs in developing a new system.

Costs of training the administration and sales staff, printing and marketing literature will also be borne.

Also the existing customers may feel dissatisfied and unjust if the new design of the contract appears more favourable to the new customers

14 Conflicts when Designing a Contract

Several issues may arise during contract designing, where one factor conflicts with the other :

- When the contract is designed to enhance profitability by charging higher premiums, it interferes with the marketability and competitiveness of the contract, as people will prefer policies that charges a lower premium
- The desire to offer guarantees conflicts with the desire to reduce the financing requirements
- The desire to cater to every customer's needs and provide customised contracts may conflict with the desire to have a simple and less expensive administrative cost