

Class: M.Sc. SEM 3

Subject: Actuarial Practice 1

Chapter: Unit 1 Chapter 3

Chapter Name: Structuring a Product

Today's Agenda

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2. Financial Products and Contracts
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1.1 Need for financial products



What are the different kinds of financial needs that may arise, and which may lead to massive cash outflow ?

The unpredictability of future events, is why people buy financial products, that provide benefits fitting into the following categories

1. Benefits available on events that are unpredictable in their occurrence and in the time of occurrence – medical or health insurance benefit covering the treatment cost of an unexpected critical illness
2. Benefits on events that are sure to occur but are unpredictable in time – term assurance benefits payable on death
3. Benefits for immediate consumption
4. Benefits received on events predictable in time – a deferred annuity paying benefits on retirement
5. Benefits from the accumulation of disposable income – the returns earned on government and company bonds

1.2 Types of provision

1. Social Security Benefits

- The State provides a variety of benefits in terms of their amount and type and whether or not they are means tested
- The means test determines whether or not an individual is eligible for receiving state benefits. Individuals are eligible for state benefits only if their income is below a certain level
- When benefits are means tested, people will no longer have a savings ideology as any savings will offset the benefits receivable. They will also not be motivated to make private provisions
- State benefits are subjected to political risk, as they can be withdrawn or reduced at the states call.

1.2 Types of provision

The state benefits can be in the form of :

- Retirement pensions including survivor benefits
- Medical care
- Income support due to unemployment, disability or illness
- Housing support due to low income

Example :

The Ayushman Bharat Yojna under the National Health Protection Scheme provides health insurance coverage to the poor and to those working in the unorganized sector. This scheme is fully taxpayer funded and the entire premium amount is borne by the central and state government in a 60:40 share

2 Financial Products and Contracts

1. Insurance Contracts

An arrangement where the provider pays a single amount or a series of payments at the start of a pre-specified event in return for a single benefit or a series of benefits. Life insurance plans such as term assurance or endowment assurance plans, deferred annuity plans or income protection benefits

2. Reinsurance Contracts

Providers of insurance can transfer a part of the risk that they are subjected to third parties through reinsurance contracts. The amount of risk transferred may be as a proportion of the total risk subject to an upper limit or an absolute amount.

3. Pension Schemes

A pension scheme is involves the accumulation of funds, which earns a certain rate of return. The fund is then paid out as a single accumulated amount or as a series of payment upon retirement to the benefactor or to his family upon death.

2 Financial Products and Contracts

4. Investment Schemes

An arrangement where an investor pays a single amount or a series of amounts with the expectation that a higher amount will be received at a later date. Equity Mutual Funds are collective investment schemes, where investments are pooled together and invested in the stock market

5. Derivatives

A financial instrument that derives its value from the value of the underlying asset. Derivatives can also be used to transfer a part of the risk on a third party using call or put options.



An investor hold shares in a company which is in the hospitality sector, owning chains of hotels worldwide. How can the investor protect himself against the risk of a fall in the value of these shares using derivatives?

3 Principles of Insurance

1. Principle of Insurable Interest

- This is the fundamental principle of insurance. The policyholder is said to have insurable interest when he is able to obtain financial benefits or any other benefit from the continued existence of the object of interest, and the loss of the object would result in financial losses.
- It is necessary for the insured to have insurable interest as it reduces the chance of moral hazard and fraud.
- This ensures that the policyholder will try his best to prevent the claim event from happening and will not encourage it.

Example : There are three parties to a ship, the owner who has the risk of losing the ship, the ship's charter who has the risk of losing freight, and the owner of the cargo who is at a risk of losing his goods. Since all three have an insurable interest in the well being of the ship, none of them will encourage a shipwreck.

3 Principles of Insurance

2. Pre – funding

Individuals and corporates are required to keep money aside in advance in light of an uncertain event happening. The uncertainty is with regards to:

- Whether the event will happen or not happen at all e.g. an earthquake, fire etc.
- The timing of the event e.g. life expectancy of a person
- The cost of the event that is sure to occur

The main concern is the amount of money that needs to be provided as a benefit which depends on

- The probability of the event occurring
- The amount that the risk event costs
- The returns that can be earned on the prefunded money before the risk event occurs

3 Principles of Insurance

3. Pooling of risks

- Risk pooling is an important tool for risk management.
- This involves individuals belonging to similar backgrounds coming together and pooling their assets.
- This protects them against the few uncertainties associated with the cost of financing the benefits such as administration costs. The economies of scale achieved by pooling the risks can also lead to cost effective provisions, then if each individual made their own financial provisions
- Example Retirement communities, trade unions, an employee association, people belonging to the same cultural or religious organizations can pool their assets.

4 Microinsurance

- Microinsurance products offer coverage to low-income households or the individuals who have little to no savings. It is tailored specifically for lower valued assets and compensate for illness, injury or death.
- It is mostly found in developing countries where the current insurance markets are inefficient or nonexistent.
- It offers some form of insurance cushioning for the economically vulnerable population, who are unable to afford the popular form of insurance. They can be in the form of general insurance or life insurance
- Microinsurance ensures their products are very simple, with lower expected premiums, and their distribution model also differ, for instance using digital technology to have a wider reach at a lower cost than using traditional insurance broker who charge a commission for their services.

5 Analyzing Stakeholder Needs

1. Logical or Emotional needs

Logical needs are those which arise from having a rational approach, after having pointed out what the customer needs and providing him with a product that fits his needs. Satisfying logical needs involves critical and objective decision making

Emotional needs are more based on what the customer feels he wants, instead of what he should be getting.

Example: A person who is planning to buy a car. If he thinks logically, he will look for a fuel-efficient car, having good features and prioritizes safety and which fits in his budget. However, then he suddenly sees a limited edition model of the same car, which is at a higher price, and is prepared to buy it, this becomes his emotional need.

A logical need may arise to

1. Maintain ones standard of living, eg a person living in a posh locality, may want to continue doing so
2. Saving for future needs eg paying for children's higher education, retirement
3. Protection against death, illness or accident
4. Accumulation for unknown events

5 Analyzing Stakeholder Needs

2. Current or future needs

It is important to establish whether the needs of a customer are for an event in the present or are future oriented.

A current need is such that has an immediate effect on his circumstances, example the need to afford the day-to-day expenses, in case of being laid off without a notice period.

Future needs relate to aspirations for the future, for instance the need to pay for higher studies of their child once he turns 18.



Mention the current and future needs of a group of student who have just completed graduation and have moved to different cities for better job prospectives

5 Analyzing Stakeholder Needs

3. Attitude towards risk

It is important to analyze the client's attitude towards risk, as this will help to provide them with products that fit their needs.

A risk averse individual will always think in a protective frame of mind and will always have a savings mentality in the concern of being protected against high-risk events in the future.

He will give more importance to saving for his future, than having a high lifestyle currently. For example, he will prefer taking a domestic tour over an international trip for his vacations as he prefers saving for his retirement in case his pension is insufficient to satisfy his future needs

A high-risk customer will give a very low probability to a risk event occurring and will consider being protected against them once they occur. They believe in spending in their present rather than provisioning for their future.

6 What is a Pension Plan

- Pension plans offer security in retirement by providing a guaranteed stream of payments to cover basic living expenses
- It also allows dependents such as spouse or children, to inherit the benefits of the pension scheme, if the main beneficiary dies before retirement
- Pension schemes are highly tax efficient. For instance, the government may provide tax exemptions on a proportion of the pension benefit
- Pension plans also give a freedom of changing the form or timing of the benefits. The beneficiary may seek a lumpsum payment of the pension benefit or a stream of payments
- They provide long term protection

6.1 Providers of Pension

1. Pension plans can be provided by the employer, where a part of the payment towards the scheme can be provided by the employer and part can be provided by the employee
2. An individual can opt for a private pension plan where the entire cost of receiving the benefit is borne by him or he can choose a state provided pension plans, where the government will bear a part of the pension payment.

Types of pension scheme members

1. Active member – a member who continues to build up pension benefits in the scheme. When a person is still the employee of the employer whose pension scheme, he is a member of.
2. Deferred member – a member who no longer builds up benefits to the pension scheme but are entitled to benefit payments during retirement. An employee who was a member of his previous company's pension scheme, but is now employed at a different company
3. Pensioner – a person who is currently receiving the pension benefits

6.2 Types of Pension Schemes

The types of benefits that a pensioner gets are defined by the type of schemes they select. Also, the risk of the benefits whether it lies on the pensioner, or the sponsor of the scheme is also dependent on the scheme type.

The three types of pension schemes are:

6.2 Defined Benefit Scheme

Here the benefits that a member receives are guaranteed salary like payments and are independent of the returns made from investing the pension payments. If the returns earned on the investments are insufficient, then the cost and risk of paying the benefits promised lies on the sponsor of the scheme.

The level of benefits to be provided can be calculated upon factors like:

- The number of years the member has worked for the company
- The salary at retirement
- Employee's age

Pension schemes are subject to risk such as investment risk, longevity risk, high expense risk.

1. Bearer of risk

Since the benefits to the members are fixed and independent of investment, longevity and expense risk, the risk of providing them lies with the employer. For example, if the investment returns are poor or employees live longer than expected, then the employer needs to pay more money into the scheme to provide the benefits promised.

6.2 Defined Benefit Scheme

2. Investment Strategy

The investment strategy depends on the characteristics of the benefits promised, particularly their nature term. The returns earned from investing the pension payments, must match the outgo which are the benefits promised by the employer.

The pension payments can be invested in

- Fixed interest bonds, as these provide a defined level of income to match the benefits guaranteed in monetary terms
- Index linked bonds and equities to match benefits linked to inflation or salary growth
- Some liquid investment options such as cash deposits at bank for liquidity in case of immediate pension payments if a member dies or retires at an early age

3. Paying for the scheme

Employers need to set aside certain funds in order to pay for the benefits promised. However, the cost of providing them is not always known in advance until they are paid.

They can then have an unfunded pay-as-you go scheme where no money is set aside, and benefits are financed as and when they mature.

Or they can have a funded scheme, where the money is set aside before the benefits are paid and investment returns can be earned on this money

6.2 Defined Benefit Scheme

4. Provisioning

It is a regulatory requirement for a defined benefit schemes to have sufficient assets that match their liabilities. The schemes financial position is found using the funding level which is a ratio of the value of the assets to the value of the liabilities

5. Setting contributions

The contributions to the scheme need to be sufficient to meet the future costs of providing the benefits. Also, any shortfall or surplus in the contributions need to be cleared because the funding level may have fallen or risen above an acceptable level.

6.2 Defined Contribution Scheme

Here the benefits promised on retirement are dependent on the contributions made by the member and the investment returns earned on them.

The member has the freedom to choose his investment options.

The members receive an accumulated fund comprising their accumulated pension payments and returns earned on them as a lumpsum amount on retirement.

Upon reaching retirement when the pension matures, the member can then choose to :

- Take the money as a lumpsum cash amount
- To secure a pension with an insurance community in the form of an immediate annuity product
- To convert the accumulated fund to an income drawdown product, where in the fund remains invested, but the member can withdraw regular incomes from it at his discretion

6.2 Defined Contribution Scheme

1. Bearer of risk

Here the investment, longevity and expense risk primarily lies on the members of the scheme. If the returns earned on the investment are poor, then the member gets a lower annual pension than expected

If he lives longer than expected, then there will be years where he will not be receiving any pension for years after the benefits are exhausted. However, longevity risk can be transferred to an annuity provider, by purchasing one on retirement

Expense risk can be for both the member and the employer or either of them as decided in the terms of the scheme

2. Investment strategy

Here the members have the freedom of choosing their investment options. If the members are risk averse, they may choose fixed bonds, government bonds or savings vehicles etc.

If they are risk taking, they may choose high yield company bonds.

6.2 Defined Contribution Scheme

3. Paying for the scheme

These are always funded as money is always kept aside gradually over a member's working lifetime. Here the key to earning high returns is investing money at the right time so as to provide for adequate pensions

4. Provisioning

Defined contribution schemes are not subject to regulatory requirements unlike defined benefit schemes. This is because the value of the benefits which is a liability to the employer is directly associated with the value of the assets which is the contribution invested till date

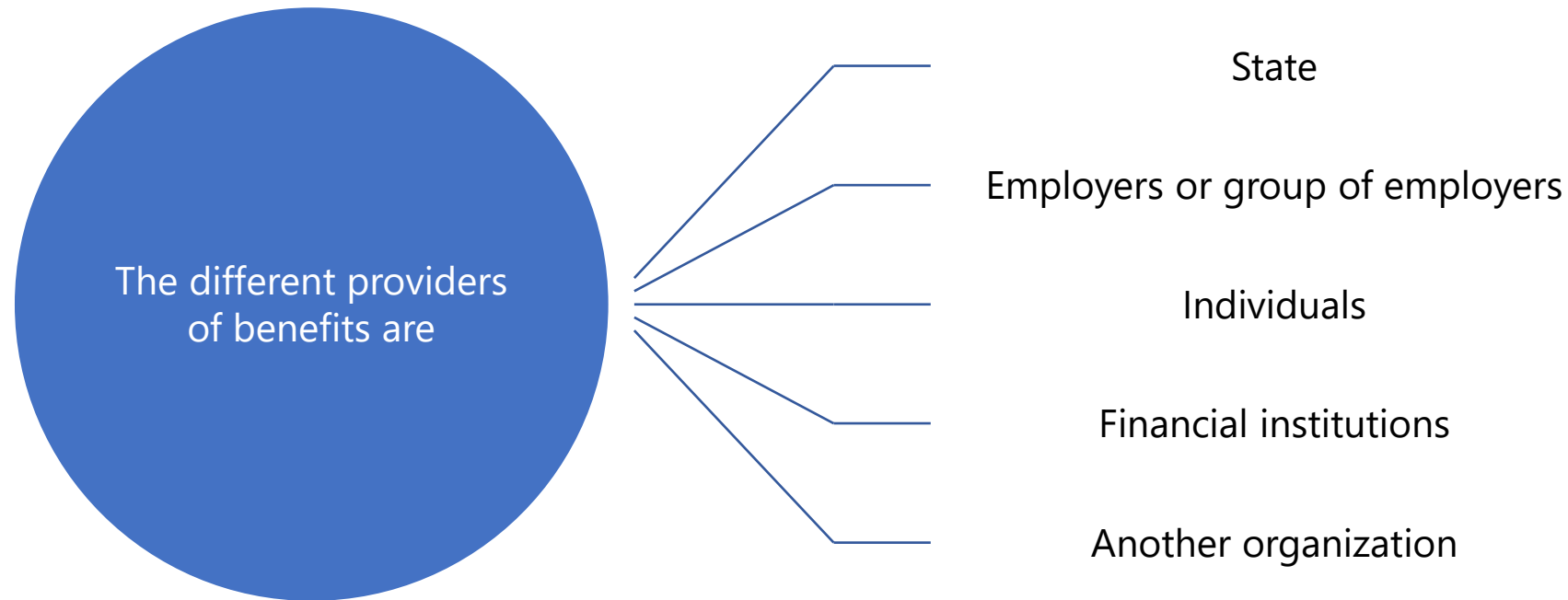
5. Setting contributions

The amount of contributions to be made into the scheme is pre-decided and is usually based on the age and salary of the member. The member has an opinion on the level of contributions he wishes to make

6.2 Defined Ambition Scheme

- Here the risks are shared between the different parties involved, for example scheme members, employers, insurers and investment businesses.
- It aims at providing the best of both worlds, by providing greater certainty for members than what is provided by a defined contribution scheme, and less volatility for employers than a defined benefit scheme.
- Scope for defined ambition schemes is very wide as there can be various pension arrangements which suit the needs of the various stakeholders.
- For example
 - A collective defined contribution scheme which has a fixed contribution rate for employers, a target pension income for employees, with provisions for adjustments if the scheme is underfunded, and pooling of scheme assets. This provided greater stability than a defined contribution scheme
 - Cash balance schemes which provide a lumpsum amount on retirement in place of regular incomes throughout retirement
 - Schemes with increased retirement ages, in light of increased life expectancy, where the post retirement longevity risk is transferred from the employer to the member

7 Providers of Benefits



An individual's need for a particular benefit may be satisfied by more than one provider. Employer sponsored schemes and personal pension schemes aim at complementing state sponsored schemes or compensating for their shortcomings. For example, if the State provides emergency healthcare schemes, then the individual can take a non-emergency healthcare scheme from a private insurance company.

7.1 The State

The state plays a major role in providing benefits, encouraging the provision of benefits, educating the public on the importance of these benefits, regulating the benefit providers. In providing these services, it also needs to maintain a balance between them. Benefits may be in the form of:

- Retirement benefits
- Unemployment benefits
- Illness benefits
- Healthcare
- Housing

7.1 The State

1. Direct provision of retirement benefits

- An rise in life expectancy way beyond the retirement age, has increased the need and importance of an individual receiving retirement income.
- Not all sectors of the population are capable of providing for their retirement benefits, as they may not have earned or would not have accumulated enough in their working lifetime. Transferring this responsibility to the employers, may help the low-income employees, but not those who are unemployed or self – employed.
- This is where the state steps in as a safety net directly providing the benefits. Retirement benefits may be means tested and can be reduced or offset by considering an individual level of income and other sources of retirement benefits.
- The higher the retirement benefits provided by the state, higher is the cost for the state. The state can maintain the budget by either increasing the level of taxation or by borrowing.

7.1 The State

2. Sponsor the provision of benefits

- The state may also be the sponsor of a retirement benefit scheme, filling the gaps in retirement plan coverage, by offering simple low cost retirement savings plans to employees.
- The Employees Provident Fund is a popular savings scheme introduced by the EPFO under the supervision of the Government of India. This requires the employee and employer each to contribute 12% of the employee's basic salary and dearness allowance to the EPF. The EPF earns a minimum return of 8% p.a. the returns are tax free and employees gets a lumpsum amount on retirement which can then be used to purchase a lifetime annuity with a state owned or a private insurance company

7.1 The State

3. Provide Financial Incentives

- In order to encourage people to invest in pensions, the government gives financial incentives such as tax exemptions on either the pension scheme contributions or investments. At times the benefits may be entirely tax free or only a part of it may be subject to taxation

4. Education

- People need to be educated about the advantages of having a pension scheme and need to be well informed about the terms and conditions of the scheme before they decide to take one. The State may undertake this role of educating the public, or make it a regulatory requirement for pension providers such as bank and insurance companies to keep the people well informed

7.1 The State

5. Regulation to encourage or compel benefit provision

- The state may either encourage employees to make provisions for their retirement through pension schemes by incentivizing them through tax reliefs or by making it mandatory for the working class to take up a pension scheme.
- Employees may either need to join an employer provided or a private pension scheme.
- This reduces the pressure on the government to provide for people once they reach retirement.

6. Regulation of other benefit providers

- Other benefit providers such as private insurance companies and banks need to be regulated to protect consumers from being misled. However, regulations need to be balanced, to allow flexibility and freedom of action to the providers and protect the benefits to the members. Regulations may be in respect of level and security of benefits, rights of the beneficiaries and their dependents in case of early retirement or death, competition in this sector

7.1 The State- Non-Retirement Benefits

- Apart from providing retirement benefits, the state provides other benefits as well for the well being of the people. For instance, in India the Code on Social Security, 2020 is a part of the Indian Labour Code that deals with employee's social security and have provisions apart from pensions such as healthcare insurance and medical benefits, sick pay and leaves, unemployment benefits and paid parental leaves.
- The government also guarantees food security to all Indians under the National Food Security Act, 2013 where it provides food grains to economically vulnerable people at a very subsidised rate.
- The state also provides benefits to protect dependents on the death of an individual. These benefits are also means tested.
- The state may also incentivize employers through tax exemptions if they operate life assurance schemes that provide life cover to their employees

7.1 The State - Financial Instruments

- The state can also provide financial instruments which individuals can consider as a mode of investment and thereby make provisions for future benefits
- Government financial instruments and securities are considered to be least risky of all financial instruments as people have trust that they will receive their due diligence from the government and chances of the government failing on their obligations and going bankrupt are very minimal as opposed to private institutions.

The government instruments can be in the form of:

- Direct investment in the National Debt in the form of Government Bonds
- State sponsored savings plan
- Deposits with the State bank or with local authorities

7.2 Employers

- Just like the State, employers may also encourage their employees to make provisions for their future. They can educate them on the importance of having a retirement pension plan.
- They may even consider operating a retirement scheme for them or financing the benefits for the employees. However, by operating a scheme, employers have greater control on the benefits being provided and the costs associated with it.

- An employee may wish to finance benefits for his employees to
 - Retain good quality employees
 - As means of getting incentives such as tax exemptions from the state
 - As a part of corporate social responsibility
 - A desire to look after their employees and their dependents

7.2 Employers

➤ **Flexible Benefit Plan**

Different employees have different needs. A particular type of benefits plan suitable for one employee may not always be suitable for the other. A flexible benefit plan, allows employees to choose between additional salary, additional pensions, extra holidays, long – term sickness benefits, additional maternity leaves etc. Each benefit is quantified monetarily, and the employee has a notional sum of money to purchase benefits.

➤ **Single employer schemes**

Where the employer and employee both contribute to the financing of benefits, it is called a contributory scheme, and if the employer is sole person contributing to the benefits received by the employees, it is known as a non-contributory scheme.

➤ **Multi employer schemes**

Here employers from similar industries come together and set up a retirement scheme for all the employees. This makes the scheme more cost-effective and pools in additional expertise in its administration. However, such schemes need great care when allocating funds as the insolvency of one employer can lead to the failure of the entire scheme. Hence fund segregation is an important element of such a scheme

7.3 Individuals

- Apart from the state and employers, individuals may also consider provisioning their benefits by financing them on their own.
- The need to finance their own benefits, stems from the idea to provide additional security for themselves and their dependents, to maintain their standard of living post retirement. Financing one's benefits, may either be encouraged or made compulsory by the state or the employer.
- Individuals may finance their benefits by taking up a state sponsored scheme or an employer sponsored schemes. They also take private schemes launched by insurance companies, banks or other financial institutions.
- The kind of scheme or investment option an individual chooses, depends on their specific needs, their available resources and external factors. A person wanting higher returns and is fine with taking risk, will invest in schemes offered by private companies, promising higher returns and greater benefits, whereas somebody who is risk averse will prefer schemes sponsored by the state.
- The state can also drive individuals towards a preferred method of provisioning for themselves, by providing tax reliefs on the scheme. There can be a tax relief on the contributions, or a part of the benefits can be made tax free

7.4 Financial Institutions

- Financial institutions such as life insurers, general insurers, banks, investment institutions spearhead the entire benefits system. They not only provide instruments that meet people's needs, but at times also make them aware of their future needs and the consequences of not having proper arrangements in place for them.
- This includes awareness campaigns, social media promotions, road shows and customer meets. These elements are not for brand promotion or advertising but purely for insurance awareness

For example, PNB MetLife Insurance company, reached out to schools and colleges to organize sessions on insurance awareness for students. The program enables the young generation to understand the basics of money management and thereby incorporating the importance of financial planning.