MERCER

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Application of Actuarial Methods in Takaful Insurance

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This presentation will cover both Life Takaful and General Takaful

Objectives of Actuarial Concepts in Insurance

- Why have insurance / Takaful in the first place?
  - Risk reduction
  - Life Insurance / Takaful provides a source of long term capital for the economy

Objectives of Actuarial Concepts in Insurance

Takaful thus allows insured to:

- Ensure loved ones are cared for if the breadwinner dies
- Ensures medical costs can be met
- Ensures savings for children education or for own retirement
- Ensures funds are available during retirement (annuity)

Objectives of Actuarial Concepts in Insurance

Takaful allows the operator to:

- Channel long term funds to assist in the development of the economy of the country
- Provide funding for investment in sector/areas that banks are not comfortable making. Banks normally only give loans (this means the bank is only taking a credit risk) and do not participate in equity (the bank does not participate in the market risk)
- Encourages savings
- Facilitate borrowing/lending through protection of policyholders against creditors should premature death occur or the loss of the policyholders assets through a calamity.

Objectives of Actuarial Concepts in Insurance

Risk in Takaful is defined as the:

- Possibility of an unfortunate occurance (Life Takaful)
- Possibility of loss (General Takaful)
- Uncertainty of loss
  – When loss will occur
  – Whether loss will occur
  – How severe the loss will be
  – How many times the loss will occur in a year

Objectives of Actuarial Concepts in Insurance

- **Objective of actuarial science is to quantify these risks and ensure fairness to all parties in the operation of takaful**

Objectives of Actuarial Concepts in Insurance
Definition of Insurance

- A social device in which individuals transfer the financial risks associated with loss of life or health or losing property to a group of individuals
- Involves a transfer of risks and sharing of losses

Objectives of Actuarial Concepts in Insurance
Types of risk

- Business risk & uncertainty
  - Manufacturing a product now which will be ready and sold sometime in the future, represent risk and uncertainty, as profitability depends on selling the product and the price of the product
  - Riskier products imply more reward/profit, so there is a risk/return tradeoff evident

Objectives of Actuarial Concepts in Insurance
Types of risk (continued)

- Pure risk
  - Fear of loss with no chance to gain, such as loss of life, damage to property. In such insurances the compensation amount is equal to the loss incurred.
- Gambling

Objectives of Actuarial Concepts in Insurance
Is Insurance Gambling?

- Insuring only a single life for $1,000 is clearly a gamble
- If the number of insureds increase to 100 there will still be a large element of uncertainty
- As the number increases, the experience will become predictable under normal circumstances. We can only predict **<u>normal</u>** circumstances. Whether other situations happen is up to Allah, which is why reinsurance is necessary, especially for smaller Takaful companies
- Whereas insurance transfer an existing risk, gambling creates a risk where none existed

Objectives of Actuarial Concepts in Insurance

- Risk reduction was evident in the Prophets (PBUH) time:
  - The Prophet (PBUH) wore an armor when in battle
  - Migration to Madina was in batches
  - The Prophet (PBUH) forbade people to go knowingly into a place infected with Cholera

Role of the Actuary in the Insurance Company

- The actuary has the role of technical expert, ensuring fairness and equitability in the insurance company. Particular roles include:
  - Pricing/product development
  - Calculation of mathematical reserves
  - Determination of fair distribution surplus
  - Ensuring company solvency
  - Determination of appropriate reinsurance program
  - Asset liability management
  - General Risk management
  - Development and analysis of industry and company experience

Role of the Actuary in the Insurance Company
Pricing / Product Development

- Pricing Objectives
  - Rate adequacy in light of the benefits promised. If inadequate and a deficit occurs, who will make up the deficit?
  - Must rate equitably for policyholders. No unfair subsidization should exist of any class of insured by any other class of insured
  - Rates should not be excessive in relation to the benefits provided

Role of the Actuary in the Insurance Company

Pricing / Product Development (continued)

- Elements in pricing
  - Probability of the event insured against occuring (and thus development of mortality and morbidity tables to ensure fairness)
  - Time value of money (how much investment profits can the operator be expected to earn in the future from the takaful contributions received at the outset of the policy)
  - The benefits promised
  - Expenses
  - Contingencies

Role of the Actuary in the Insurance Company
Pricing / Product Development (continued)

- Pricing Issue:
  - If pricing is too conservative, it will not be fair to the insured. If it is too aggressive it may be inadequate (who will pay for any deficit?)
  - Legislation may require the set up of conservative reserves resulting in “new business strain” (who will bear this financing strain?)

Role of the Actuary in the Insurance Company

Calculation of Mathematical Reserves

- For single premium plans, the premium is paid at the beginning, of the policy term with benefits and some expenses paid out over the lifetime of the policy. In order to ensure a fair and orderly surplus declaration over the policy term, mathematical reserves are calculated.
- This works similarly for level premium and other plans, where the cost of benefits is expected to increase over time.
- Calculation of reserves:
  a. Estimate the timing and frequency of claims
  b. Estimate the number of future contributions/premiums
  c. Reserves are determined such that

     reserves + future contributions = claims
  d. As timing for a & b is different, need to allow for investment returns

Role of the Actuary in the Insurance Company

Calculation of Mathematical Reserves (continued)

- The underlying theory of reserves is to ensure fairness and equity in that there is matching between premium income recognised for a period and payout of benefits corresponding to that period.
- Mathematical reserves are used to determine solvency to satisfy the Regulators and to determine surplus for profit distribution to policyholders

Role of the Actuary in the Insurance Company

Determination of fair distribution of surplus

Determination of surplus:

Balance Sheet Assets

less

Accounting Liabilities

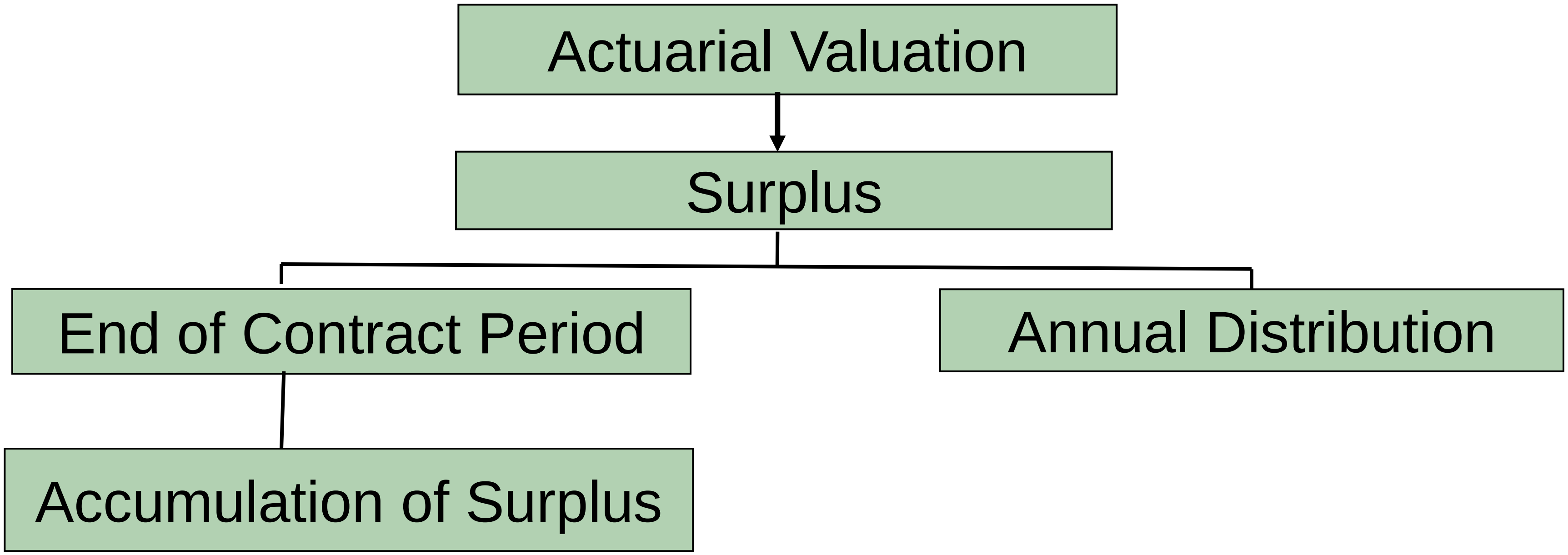
less

Actuarial Liabilities

equals

Surplus

Role of the Actuary in the Insurance Company
Profit Sharing



- Need to balance paying out surplus every year versus leaving some surplus in the fund to ensure solvency
- Asset share studies should be used to ensure fair distribution of surplus at contract maturity

Role of the Actuary in the Insurance Company
Ensuring Company Solvency

- Surplus left in the fund (i.e not distributed as profit) can be used to ensure company solvency
- Calculation of appropriate solvency margin can be done in several ways:
  - Simple method
    - Percentage of reserves
    - Percentage of net amount at risk
    - Percentage of accident & health premiums
  - Not so simple method
    - Instead of % reserves of fund, with different factors for different investment types & risks
  - Complex
    - Detailed calculations accounting for the risks of the individual insurer

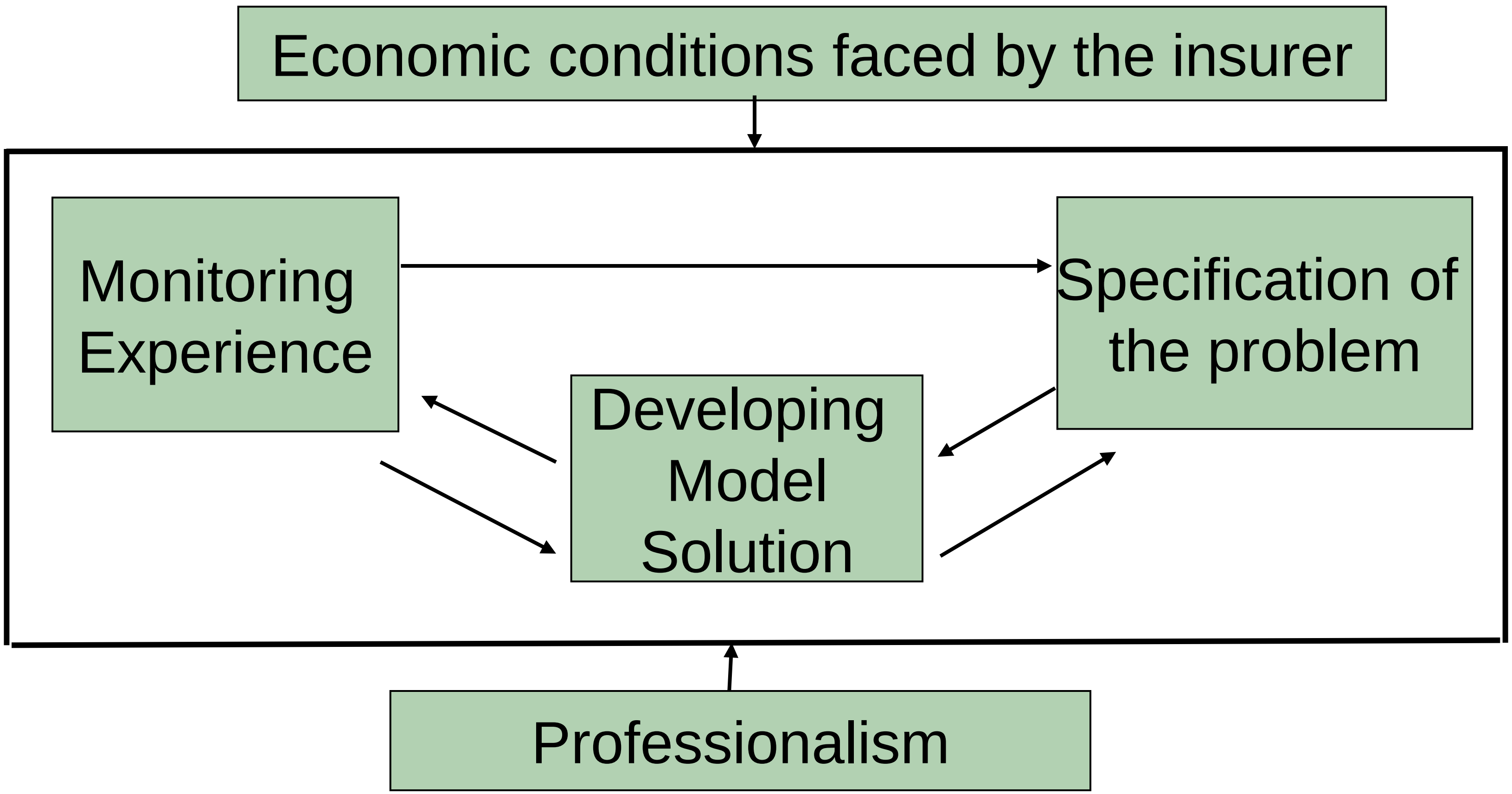
Role of the Actuary in the Insurance Company

Asset Liability Management

- The Actuary should be involved in the asset/liability management of the company. In a developing economy there will be some mismatch between assets and liabilities, but the actuary can:
  - Determine appropriate assets considering the liabilities and cash flow needs of the insurer
  - Determine potential product types / liabilities considering the assets available
  - Ensuring appropriate levels of capital are available where a mismatch strategy is used

Role of the Actuary in the Insurance Company
Risk Management

- Risk management is performed by the actuary through the actuarial control cycle:



Role of the Actuary in the Insurance Company

Risk Management (continued)

- Professionalism is through his being a chartered member of one of the major actuarial societies. The results of this analysis may lead to a number of outcomes, possibly including:
  - Inclusion of different types of reinsurance
  - Stopping sales of certain products
  - Refocusing of sales to certain product types

Contributions of Actuarial Science to the Promotional Improvement of Takaful

- There is a need to increase actuarial involvement in Takaful
- Actuarial developments are normally a precondition of product innovation which will be necessary as demographics change, in particular as the reliance on the family for economic security in old age decreases. Generally, through:
  - Developing technical abilities of the industry, thereby building confidence with the public
  - Analysis & assistance in alternative distribution channels and investments
  - Development of products which cater to the changing needs and demographic of the population

Contributions of Actuarial Science to the Promotional Improvement of Takaful (continued)

- Specific Examples:
  - Product development in line with changing needs of the population
    - Investment linked products
    - Universal life/flexible premium plans
  - Variations on the current Takaful model, e.g. two different ways of structuring single premium mortgage plans
    - Current: entire single premium in the takaful fund, with benefits and surplus paid from the fund
    - Potential: entire single premium put in an investment linked fund, with monthly charges put in the takaful fund for benefits and expenses

Contributions of Actuarial Science to the Promotional Improvement of Takaful (continued)

- Specific Examples:
  - Risk analysis with varying Takaful model types
  - Interaction with the Shariah Council
    - The advantage of a Muslim actuary briefing the Shariah Council and board of directors on a yearly basis of the risks and position of the Takaful Operator cannot be overemphasized.

QUESTIONS???

Please visit our website:

www.takaful.info

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