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ACTUARIAL WATT

Students' Actuarial Society

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The Pivotal Role of Actuaries in Assessing Climate-Related Risks

As experts in quantifying and managing risks, actuaries apply their skills to predict, model, and mitigate climate-related impacts on businesses, communities, and economies

Pensions: Collective Defined Contribution (CDC) Schemes

Collective Defined Contribution (CDC) pension schemes are an innovative type of pension arrangement that combines features of both Defined Contribution (DC) and Defined Benefit (DB) schemes.

Takaful vs Conventional Insurance

Takaful and conventional insurance serve similar purposes—providing financial protection against risks—but they operate under distinct principles and structures due to their different underlying philosophies.

NOTE FROM THE EDITOR

Welcome to the second edition of the Students' Actuarial Society's annual Christmas newsletter! I'm excited to present this special issue, filled with insightful articles and valuable perspectives as we wrap up the year and prepare for a fresh semester of learning and growth in actuarial science.

This edition features topics that reflect pressing developments in our field: **Takaful vs Conventional Insurance, The Pivotal Role of Actuaries in Assessing Climate-Related Risks, and Pensions: Collective Defined Contribution (CDC) Schemes**. These articles invite you to explore emerging trends and critical issues in the actuarial profession, from ethical considerations to practical impacts on society.

Our goal is to inspire both newcomers and seasoned professionals alike with thought-provoking content. We value your feedback, and we look forward to engaging with you throughout the year.

Thank you for your continued support, and have a great Christmas! May the holiday season bring you joy and inspiration for the coming semester.

Best regards,

Zarif

Sincerely,
Zarif Zulkiflee
Editor-in-Chief, Students' Actuarial Society
Current Affairs Director

ZARIF ZULKIFLEE

Takaful vs Conventional Insurance

What is Takaful Insurance?

Takaful is a type of Islamic insurance wherein members contribute money into a pool system to guarantee each other against loss or damage. Takaful-branded insurance is based on ***sharia*** or Islamic religious law, which explains how individuals are responsible to cooperate and protect one another. Takaful policies cover health, life, and general insurance needs.

Takaful insurance companies were introduced as an alternative to those in the commercial insurance industry, which are believed to go against Islamic restrictions on ***riba*** (interest), ***al-maisir*** (gambling), and ***al-gharar*** (uncertainty) principles—all of which are outlawed in sharia.

Understanding Takaful

All parties or policyholders in a takaful arrangement agree to guarantee each other and make contributions to a pool or mutual fund instead of paying premiums. The pool of collected contributions creates the takaful fund.

Each participant's contribution is based on the type of coverage they require and their personal circumstances. A takaful contract specifies the nature of the risk and the length of the coverage, similar to that of a conventional insurance policy.

The takaful fund is managed and administered on behalf of the participants by a takaful operator, who charges an agreed-upon fee to cover costs. Much like a conventional insurance company, costs include sales and marketing, underwriting, and claims management.

Any claims made by participants are paid out of the takaful fund and any remaining surpluses, after making provisions for the likely cost of future claims and other reserves, belong to the participants in the fund—not the takaful operator. Those funds may be distributed to the participants as cash dividends or distributions, or via a reduction in future contributions.

What are the differences between Takaful and Conventional?

Conventional insurance is a type of insurance where an insurer agrees to provide financial compensation to the policyholder in the event of a covered loss or risk, in exchange for a premium payment. It operates on the principle of risk transfer, where the insurer assumes the financial risk of specific events (such as accidents, damage, or illness) and takes on the responsibility of compensating the policyholder for those risks.

Takaful emphasises ethical investments and adherence to Shariah law, avoiding interest, gambling, and excessive uncertainty. In contrast, conventional insurance is a commercial model where the insurer assumes the risk and the policyholder pays premiums in exchange for financial compensation in the event of a loss.

While conventional insurance is profit-driven and allows the insurer to make investments without such restrictions, it does not offer the same level of risk-sharing or ethical oversight as Takaful. Thus, while both provide coverage, Takaful aligns with Islamic values and focuses on cooperation, whereas conventional insurance operates on a profit-oriented basis with individual risk transfer.

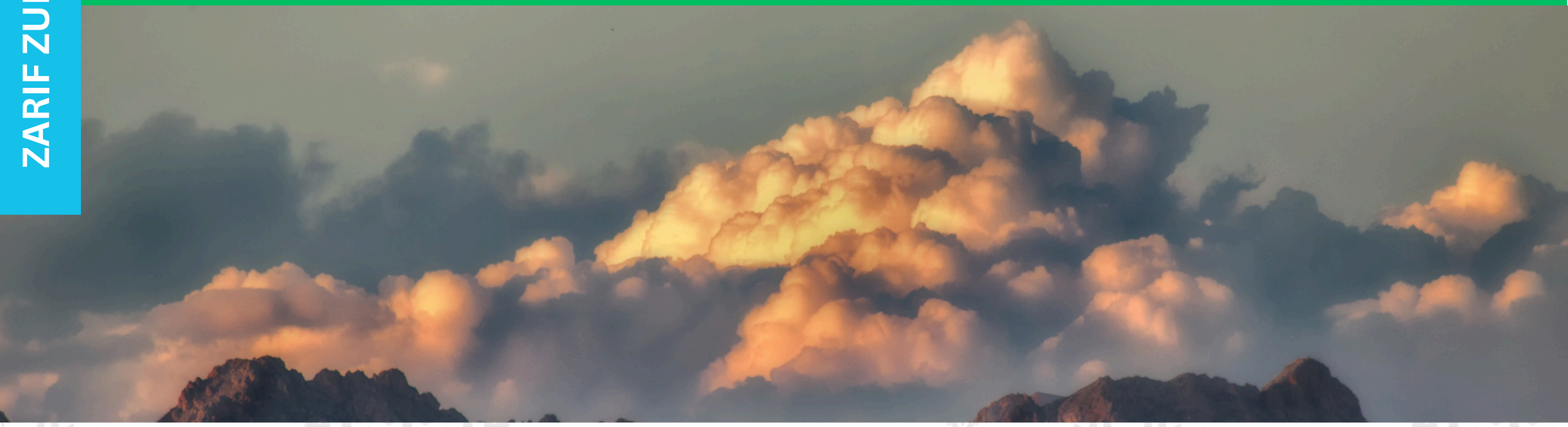
In the spirit of mutual cooperation, takaful organisations are run collectively, plan collectively and are run transparently, with all members being informed of workings of the takaful. When it comes to structuring the pool, the risks, losses and liabilities are spread out among all contributors and most importantly, no one member of the system can derive and advantage over another. Meaning that the Takaful could in theory payout less to everyone should the health of the pool suffer.

Conventional for-profit insurance is (as the name suggests) violates that principle, with the ultimate intention of the insurance provider is obtain a profit. In principle, the insurer assumes the risks stated in the policy and charges the policyholder a premium for that risk to cover potential insurance payouts to customers as well as a profit margin to the insurer.

The risks in conventional insurance aren't spread out, meaning that the insurance provider must payout an agreed upon claim regardless of the financial health of the pool.

ZARIF ZULKIFLEE

The Pivotal Role of Actuaries in Assessing Climate-Related Risks



Actuaries play an increasingly vital role in understanding and managing climate-related risks, which impact insurance, pension plans, and financial systems. Climate-related risk can arise from local conditions but increasingly the world is becoming aware of the importance of understanding its wider regional and global impact and implications. Recent climate-related events have included hurricanes and other types of windstorms, floods, droughts, forest and bush fires. These events have impacted human activity locally and globally through their impact on, for example, vulnerable populations, agricultural production and commercial activity.

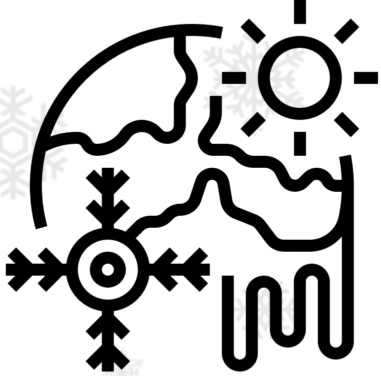
Climate-related events impact our belongings, dwellings, physical structures, crops, infrastructure businesses etc., and may result in damages and financial loss. These events and longer-term variations in the climate may also impact on human health, morbidity, mortality and longevity and the value placed on assets by the financial markets.

Changes in consumer and investor preferences resulting from climate-related risk will create both risks and opportunities, both short-term and in the longer-term.

Important Roles of Actuaries

- Reviewing the underlying models used in their work due to climate-related risk in the short-term as well as longer-term. Such a review may need to consider a system-wide approach to modelling climate-related risk.
- Creating insurance products and pricing structures that align policyholders' financial incentives, with behavior that promotes innovative solutions or climate-adaptive outcomes.

- Aligning insurance product design (e.g., features, exclusions, pricing etc.) with the needs of consumers, corporates, vulnerable groups, regulators, governments etc.
- Encouraging pension funds, insurers and other clients to be active investors who encourage the management of climate-related risks in the companies in which they invest.
- Sharing their expertise in modelling the financial impact of extreme climate-related events (e.g., catastrophe modelling).
- Developing investment strategies and products that will help to solve or address problems associated with climate-related risks.
- Advising various types of organisations, including governments and other policymakers, on climate-related risk initiatives that encourage improved governance and risk management of this risk
- Contributing to the public debate and review of relevant government programs, public policy issues (e.g., insurance supervision), climate-related disaster planning and in informing building code and land use policies.



Several actuarial organisations are responding to the challenges raised by climate-related risk. In North America, four actuarial organisations, the American Academy of Actuaries (AAA), the Canadian Institute of Actuaries (CIA), the Casualty Actuarial Society (CAS), and the Society of Actuaries (SOA) have joined forces to create and maintain the Actuaries Climate Index.

The Actuaries Institute Australia publishes the Australian Actuaries Climate Index and the Actuarial Association of Europe is investigating a European Climate Index. The Institute and Faculty of Actuaries has published a series of Practical Guides on Climate Change for actuaries, which inspired some of the content of this paper. The IAA Resource and Environment Working Group continues to develop papers that have relevance to and/or affect the work of actuaries.

Major actuarial journals are publishing articles on the topic of climate-related risk relevant not only to general (i.e., property and casualty) insurance but also to life insurance and pensions and thus to the individuals who are the ultimate beneficiaries of their products.

ZARIF ZULKIFLEE

Pensions: Collective Defined Contribution (CDC) Schemes

What is CDC Pension Scheme?

CDC pension schemes are an innovative approach to retirement savings that combine features of both defined benefit (DB) and defined contribution (DC) schemes. They aim to provide members with a regular income for life after retirement.

In a CDC scheme, both the employer and employee contribute to a collective fund. Like a defined benefit scheme, the collective fund pays scheme members an income in retirement. However, unlike in a defined benefit scheme, the employer does not guarantee the pensions paid by the scheme. CDC schemes provide a target pension which is not guaranteed. The fund is managed collectively, unlike in defined contribution schemes where people build up their own pension pots. If the scheme is under (or over) funded, then members' pensions can be decreased (or increased) accordingly.

In defined contribution schemes members manage their own pension pots. Because people cannot accurately predict how long they will live, they risk underspending (dying with unused funds) or overspending (running out of money). This is known as the "longevity risk". By managing the fund collectively, CDC schemes can pay a pension based on average life expectancy across its members. The scheme mitigates the longevity risk as the average longevity of its members are more predictable than the longevity of one specific member.

CDC schemes allow employers to offer a pension scheme, that provides an income in retirement. However unlike in a defined benefit scheme, the employer would not need to provide further funding to the scheme if the scheme's assets are not enough to pay the pensions it has promised.

Advantages of CDC Pension Scheme

1.Retirement in a single package

Members of CDC scheme can both build up a pension (accumulation) and receive a pension (decumulation) in the same scheme. This is also the case in defined benefit schemes, although the income in a CDC scheme is not guaranteed.

In October 2024, the Pensions Minister said that "CDC schemes offer members a seamless transition to a regular retirement income, which many want, without the need for complex financial decisions, which many are ill equipped to make.

2. An income without a risk premium

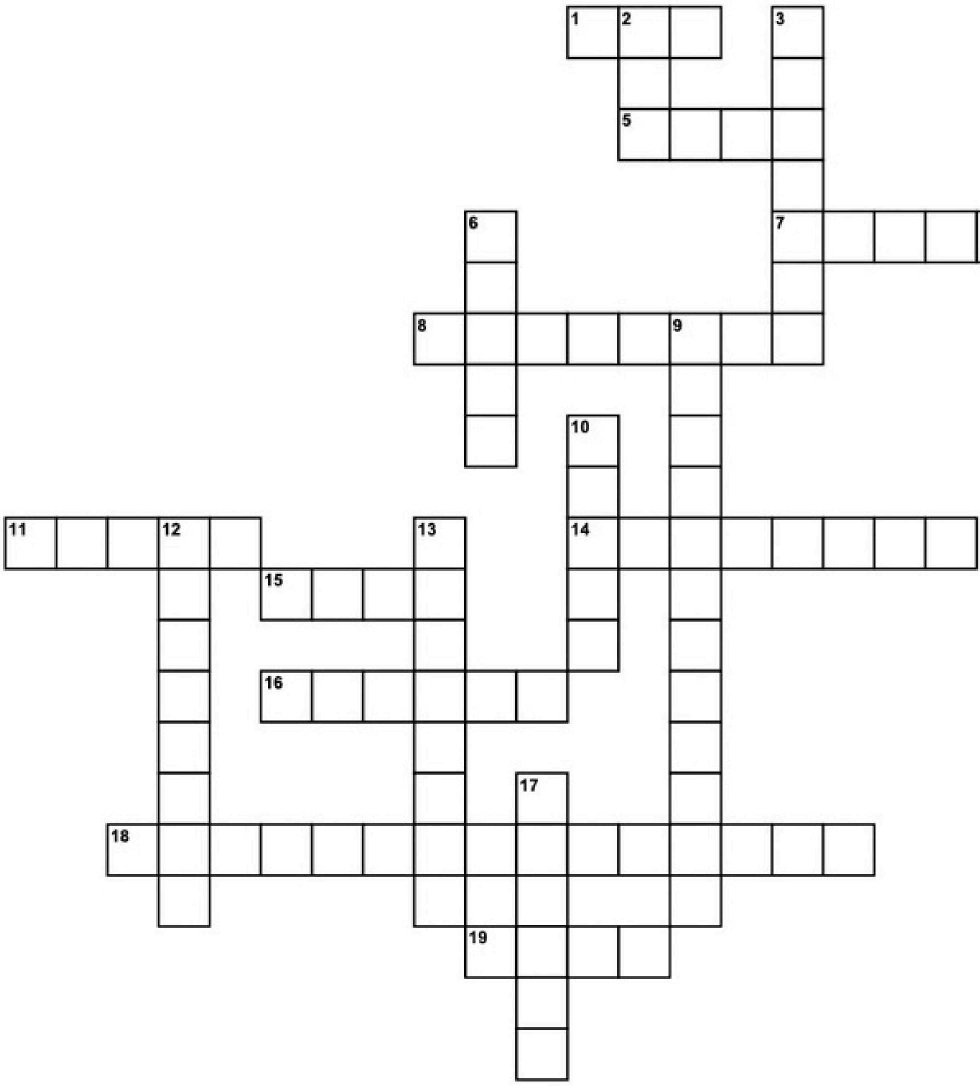
People with defined contribution schemes can receive a guaranteed income by purchasing an annuity, which will provide a guaranteed income for life in retirement. Because an annuity is guaranteed, the cost of purchasing one includes a risk premium in case the cost to the provider is higher than expected, as well as a profit margin. The government said in 2018 that "an insurer in the UK will typically charge around 5% more than it expects the annuity to cost"

It has been argued that CDC schemes will be able to seek higher returns for longer than in a conventional defined contribution scheme. In defined contribution schemes, as someone moves closer to retirement their pension typically moves from higher returning less liquid (accessible) assets to lower returning more liquid assets. This both makes it easier for the scheme to provide an income in retirement and provides the saver greater certainty about their pension savings in retirement, as lower returning assets tend to be less volatile.

CDC schemes are particularly effective for employers seeking a cost-stable pension option and employees who prefer a steady, albeit variable, retirement income without managing their own investments. However, members should be aware of the variability in income and potential reductions during economic downturns.

Crossword Puzzle

Calculus Fun



Across

[1] What type of function is f(-x)=-f(x)?
[5] What type of function is f(-x)=f(x)?
[7] The derivative of 4x^2.
[8] What does the c represent in a function?
[11] Which derivative tells us if the function is increasing or decreasing?
[14] The rate of change of a position with respect to time.
[15] Evaluate lim as x approaches 4 of 3x-7.
[16] Which derivative tells us if the function is concave up or down?
[18] A point where the graph has a tangent line and the concavity changes.
[19] Opposite over Hypotenuse

Down

[2] If a limit does not approach the same number from the left or right it ________?
[3] Opposite over Adjacent.
[4] The derivative of -cosx.
[6] Rise over Run.
[9] The second derivative of a position function.
[10] The derivative of 7x
[12] The derivative of secx.
[13] The first derivative of a position function.
[17] Adjacent over Hypotenuse.

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