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ACTUZINE 精誌

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ACTUARIAL SOCIETY of HONG KONG 香港精算學會

Message from the editor

Dear readers,

Welcome to the third edition of ACTUZINE 精誌 in 2025!

In this issue, we are excited to present a range of compelling articles. Prof. Johnny Li discusses a Multivariate Risk-Neutral Framework for the HKRBC Regime, while Carl Bezuidenhout explores AI's transformative impact on Actuarial Services. Piet Maree provides insights on Hospital Price Transparency in Hong Kong, and Syed Danish Ali examines On-Chain Shock Absorbers in DeFi, highlighting new opportunities in digital asset insurance. Jateen Vaghela will continue delve into the topic of ALM Strategy. Richard Chan also share some insights on ALM of Par under the Economic Perspective in his article. The Oliver Wyman team shares perspectives on Alternative Assets for Life Insurers, an increasingly crucial topic in Hong Kong. We are also pleased to present an article from Julian Man - his insights offer a forward-looking perspective on product pricing considerations in the context of IFRS 17 and risk-based capital regimes.

Additionally, we are honored to feature an interview with Dr. Patrick Poon, who shares his journey and insights into the profession in our "Celebrity Actuary Interview", along with two articles from the previous "Throwback Special" on Peter Luk in Q2.

In our Council & Committee Updates, we cover some key happenings including the publication and press release of the Hong Kong Assured Life Mortality Table (HKA22), announcements from PDC for the plan to discountinue the Pension Paper and the latest exam results. We also recap some of our events in the past few months.

Last but not least, we encourage you to engage with our upcoming events and continue fostering connections with ASHK!

Happy reading!

ACTUZINE 精誌

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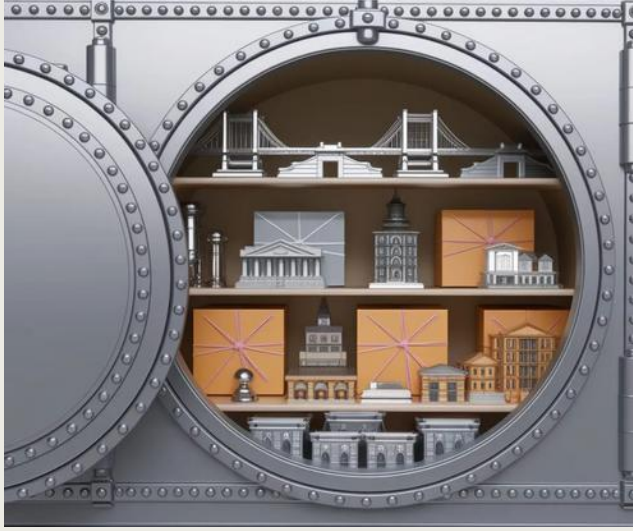


Feature Articles

Council & Committees' Updates

Others

While all articles are welcome, we would especially like to receive submissions for the Feature Articles and Knowledge Sharing sections. If you have written any inspiring articles or have read any interesting articles from other actuarial organisation(s), please feel free to let us know. We will try to reprint them in our magazine.

Welcome to email your articles or views at info@actuaries.org.hk.

ONE SIZE DOESN'T FIT ALL: A MULTIVARIATE RISK-NEUTRAL FRAMEWORK FOR USE WITH THE HKRBC REGIME

Hong Kong's new risk-based capital (HKRBC) regulatory framework, effective from 1 July 2024, aims to strengthen enterprise risk management practices among local insurers. Replacing the previous Hong Kong Insurance Ordinance, the HKRBC introduces more comprehensive capital requirements and enhances industry transparency.

The HKRBC regime consists of three key components:

- **Pillar 1** covers capital adequacy and the valuation of assets and liabilities.
- **Pillar 2** focuses on corporate governance and enterprise risk management.
- **Pillar 3** enhances public disclosure requirements.

HKRBC's Treatment of Options and Financial Guarantees

The valuation basis for Pillar 1 is defined in Part 4 of the Insurance (Valuation and Capital) Rules (Cap. 41R) (hereafter "the Rules"). Section 19 of the Rules focuses on contractual options and financial guarantees offered under an insurance contract, such as guaranteed minimum death benefits (GMDB) and guaranteed minimum maturity benefits (GMMB), which are commonly included in equity-linked insurance products.

Section 19 of the Rules requires insurers to calculate the time values of these options and guarantees using a stochastic simulation approach with risk-neutral scenarios.

Risk-neutral Valuation: An Overview

To simulate risk-neutral scenarios for valuing options and guarantees embedded in an insurance contract, the following steps are taken:

1. **Estimate a stochastic investment model** using historical equity returns. This model - known as a "real-world" or "P-measure" model - is based entirely on actual equity return data. Examples include Mary Hardy's regime-switching log-normal (RSLN) model[1] and AR/GARCH models, which capture return dynamics in different ways.
2. **Convert the model from real-world to risk-neutral (Q-measure)** by adjusting model parameters so that the resulting risk-neutral model produces arbitrage-free option and guarantee prices.
3. **Perform stochastic simulations** using the risk-neutral model.
4. **Calculate the expected payoff** of the option or guarantee based on risk-neutral scenarios from the previous step, and discount the expected payoff at the risk-free interest rate.
5. **Incorporate relevant decrement probabilities**, such as non-lapse probabilities for GMMB.

One Size Doesn't Fit All

Traditional risk-neutral valuation relies on a univariate stochastic investment model. However, policyholders typically choose from multiple investment funds, and their accounts may include more than one fund. A univariate model can only approximate reality, introducing errors that affect pricing and hedging performance - whether the hedge is static or dynamic - due to biased delta estimates.

Additionally, univariate models limit flexibility of risk-neutral valuation with respect to changes in policyholders' asset allocations over time. This lack of adaptability is not ideal, as Section 19 of the Rules states that insurers "must ensure that liability cash flows reflect expected policyholder behavior and foreseeable management actions under different scenarios."

The Multivariate Approach

To address these challenges, CUHK's actuarial science research team developed a multivariate framework for valuing options and guarantees in equity-linked insurance contracts. [2],[3]This framework accommodates a variety of multivariate stochastic investment models, including:

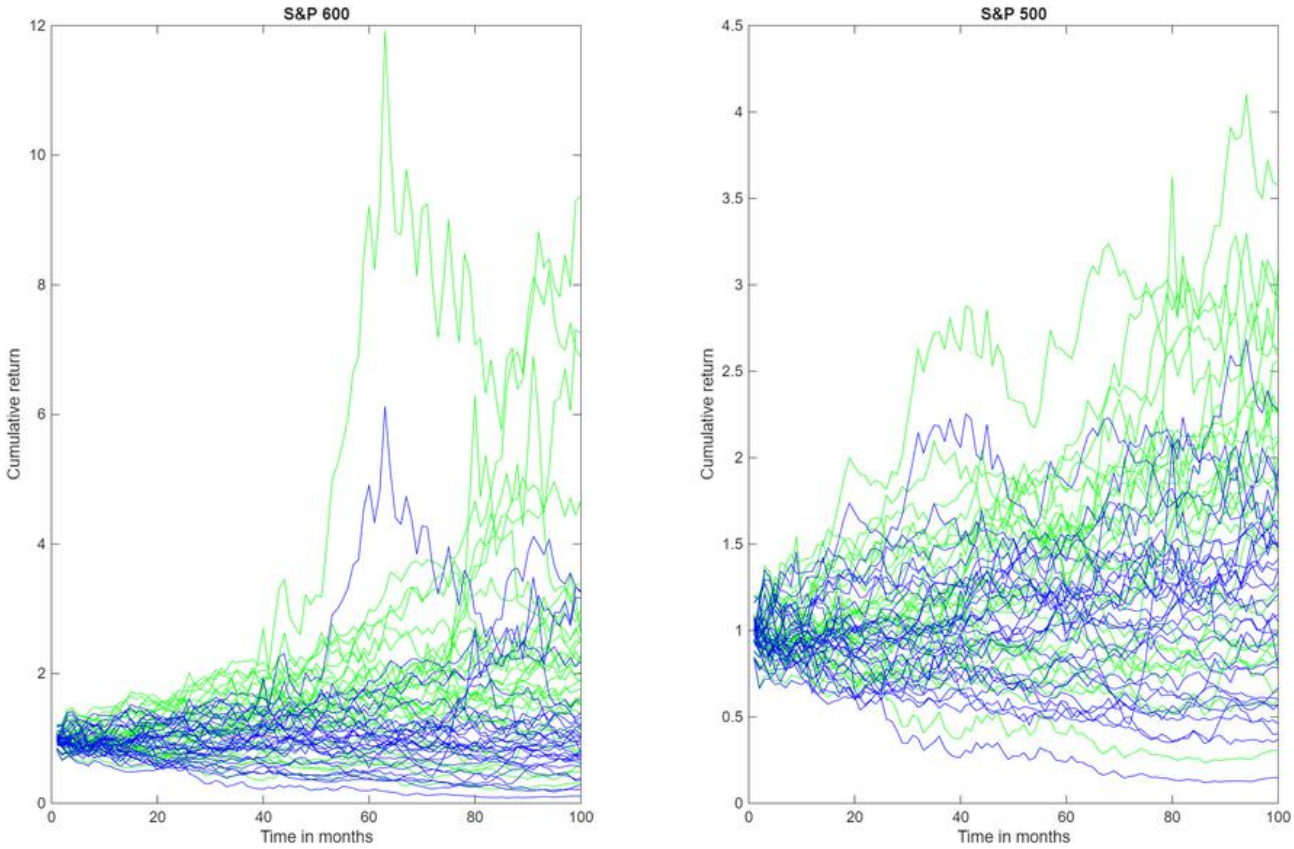
- **Multivariate Regime-Switching Log-normal Model** This is a multivariate extension of the well-known RSLN model, which assumes that the economy transitions between different states, each with distinct expected investment returns and volatilities.
- **Multivariate GARCH Models** These include BEKK-GARCH, CCC-GARCH, and DCC-GARCH models, all of which allow investment return volatilities to vary over time. The key difference among them lies in their treatment of correlations between different investment assets. CCC-GARCH, with its simpler correlation structure, is more suitable when modeling a large number of investment funds.

The most critical component of the framework is the transformation from real-world to risk-neutral. This step is accomplished using a multivariate Esscher transform, which is grounded in utility theory from economics.

To further enhance applicability, CUHK's framework incorporates **quanto functionality**, allowing risk-neutral valuation when policyholders' investment funds are denominated in different currencies.

Illustration

To illustrate, consider the following diagram, which presents scenarios simulated from a BEKK-GARCH model for S&P600 and S&P500. A complete specification of this model is available in the original research paper. [3]



- The **green scenarios** represent real-world BEKK-GARCH model simulations. Since S&P600 consists of small-cap stocks, its return volatility is higher, which is evident in these simulated real-world scenarios.
- The **blue scenarios** are risk-neutral scenarios, generated using a "risk-neutralized" version of the BEKK-GARCH model. These scenarios comply with Section 19 of the Rules.

The software used to generate these scenarios is freely available on the author's website. Interested readers can explore it to experience risk-neutral stochastic simulation in a multivariate framework. ■

[1] Hardy, M. (2003). Investment guarantees: modeling and risk management for equity-linked life insurance. John Wiley & Sons.
[2] Ng, A. C. Y., & Li, J. S. H. (2011). Valuing variable annuity guarantees with the multivariate Esscher transform. Insurance: Mathematics and Economics, 49(3), 393-400.
[3] Ng, A. C. Y., & Li, J. S. H. (2013). Pricing and hedging variable annuity guarantees with multiasset stochastic investment models. North American Actuarial Journal, 17(1), 41-62.

AI'S IMPACT ON ACTUARIAL SERVICES

Business Model Disruption and Strategy Shifts

The AI revolution won't be coded in prompts. It will be written in strategy, and creativity. Beyond the hype lies a deeper challenge: how AI is forcing professional service firms to rethink who they are, what they do, and how they compete.

A recent academic study, *"AI in Professional Services Firms: A Foundational Baseline for Future Research"*, examines the influence of AI on law and accounting firms, offering valuable insights for the adjacent actuarial profession. It shows that AI is reshaping business models, client expectations, and workforce capabilities, and it also exposes ethical tensions, as human experts interact with increasingly capable machines.

Like lawyers and accountants, actuaries apply specialist expertise to support their clients in complex decision-making, maintain continuous professional development, and uphold fiduciary duties. These duties represent the highest standard of care under the law, extending beyond the immediate client to society. Just as investors rely on the verified financial statements, or individuals depend on impartial legal advice to gain access to justice, the public relies on actuaries to model and communicate risk and solvency in ways that support financial stability and improve risk management.

For actuaries, facing similar AI-driven automation, these developments raise important questions about how they could (and should) be shaping the responsible use of AI.

1. AI Challenges and Limitations - risk and reputation management

In legal and accounting firms, AI-driven automation requires increased risk and reputation management.

Legal contracts can now be reviewed in seconds, not hours, with risky clauses flagged or even edited on the go by AI systems. Similarly, accounting administration, such as complex bank reconciliations, is increasingly automated, with real-time risk alerts enhancing human oversight. These advances promise greater efficiency, improved margins, better client satisfaction, and scalable service delivery not constrained by human capacity.

However, the use of AI introduces critical limitations. Generative AI tools, in particular, which can mimic human advice, can also produce incorrect outputs. As AI lacks consciousness, awareness or motive, these inaccuracies are not referred to as lies or fabrications, but rather as hallucinations[1]. Large language models will always hallucinate; it is inherent in their design[2]. They predict the most likely next word in a sequence, based on patterns in training data. Sometimes the most probable continuation looks fluent but is false: probability ≠ accuracy.

These errors have already surfaced in legal proceedings in several countries. Globally, in the legal environment, there have been over 300 legal decisions recorded, where generative AI produced hallucinated content or fake legal case citations[3]. About half of these out of the USA, but very few countries are off the hook. In accounting services, hallucinations can lead to financial misstatements and compliance risks[4]. Compounding this, Generative AI systems present their answers with clarity and confidence, making inaccuracies rather difficult to detect. Actuarial work, especially in risk modelling and financial reporting, shares the same vulnerability.

If AI is used to summarise data, generate reports, or assist with complex projections, hallucinated or biased outputs may go unnoticed, particularly when produced without transparency or interpreted by non-experts. Also, the dependence of AI systems on historical data poses an extra challenge. If data is incomplete, biased, or outdated, the model may reinforce inaccurate assumptions, undermine the integrity of actuarial calculations, and risk reputational damage. Importantly, if AI-generated advice or outputs are incorrect, who is responsible? While several spectacular collapses have resulted from inaccuracies, low adoption and legal challenges[5], regulatory frameworks are still evolving to address these challenges. For instance, the European Union's proposed AI Act aims to establish clear guidelines on AI liability, emphasising the importance of transparency and human oversight.[6]

Further, professionals must protect client confidentiality. Using sensitive client datasets in AI tools, particularly in externally hosted generative models, may breach privacy regulations if consent and governance safeguards are not in place.

Actuaries should ensure AI-generated outputs are subject to scrutiny and independent review, with clear protocols in place to validate and document any reliance on AI tools, especially large language models used in reporting, analysis, or advisory work. Data governance policies should include explicit

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[1] UK judge warns of risk to justice after lawyers cited fake AI-generated cases in court; When AI Hallucinations Become Expert Testimony: A Warning Tale for Litigators
[2] LLMs Will Always Hallucinate, and We Need to Live With This
[3] AI Hallucination Cases
[4] Mitigating AI "Hallucinations" in Accounting: Risks and Strategies

consent procedures, audit trails, and internal checks for bias or incomplete datasets. Training on AI limitations, especially around hallucinations and explainability, should be incorporated into professional development. Crucially, actuaries should not treat AI outputs as neutral; they must remain accountable for how those outputs are used in decision-making and the communication of risks.

2. Business Model Disruptions

The review identifies significant disruption to traditional business models in law and accounting, particularly how services are priced, marketed, and delivered.

When AI completes tasks in seconds that once took hours, time-based billing becomes misaligned with how some work is now done. Core tasks, such as legal case chronologies, audit testing, and tax compliance, are being automated, making time-based billing models increasingly difficult to justify. In response, firms are shifting to fixed-fee, outcome-based, and even subscription or licensing models that prioritise value over time and are more suited for digital delivery. This shift is not only driven by firms seeking increased efficiency, but it is also being accelerated due to client expectations for transparency, speed, and lower costs.

AI also changes what is delivered and how, not just how fast. For example, AI is enabling firms to "productise" services, combining automation with limited customisation to deliver scalable solutions through chatbots, online portals, and template-based advice. Importantly, actuarial models are often embedded in these digital Iplatforms, such as retirement calculators, insurance estimators, and risk profiling tools, which shift the delivery of expertise from one-on-one advice to self-service formats. For actuaries, this means ensuring that model outputs remain accurate, explainable, and ethically applied. As clients interact with automated tools, they may struggle to distinguish between human and AI-generated insights, and more critically, may not know what to trust.

Actuaries, particularly in consulting or advisory roles, face similar pressures. Where time and complexity once justified high-touch, bespoke modelling, clients now expect quicker turnaround and more accessible insights. AI accelerates model development, coding, validation, and data processing, forcing actuaries to rethink where their real value lies. The profession risks being sidelined if tech-developers, such as Insurtech firms or software vendors, can deliver perceived equivalents faster and cheaper. At the same time, this presents a strategic opportunity: to shift from narrow technical outputs to advisory roles that translate AI-derived insights into strategic business decisions. But this will require a fundamental rethink of pricing, service design, and how actuarial expertise is positioned.

Actuaries should begin by reviewing how their services are valued. Consider whether traditional hourly billing is still appropriate, or if clients would benefit from fixed fees, tiered solutions, or usage-based pricing. Explore how core actuarial work, such as reserving, scenario testing, or risk profiling, could be made more scalable or accessible through automation or client-facing tools. Some AI systems support this approach, for

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[5] Thomson Reuters v. Ross Intelligence: Copyright, Fair Use, and AI (Round One), and FTC Finalizes Order with DoNotPay That Prohibits Deceptive 'AI Lawyer' Claims, Imposes Monetary Relief, and Requires Notice to Past Subscribers, and Builder.ai faked AI with 700 engineers, now faces bankruptcy and probe, and Inside Forward's failed attempt to revolutionize the doctor's office.
[6] Key unknowns about AI — what is the law and who is responsible?

example, in the legal sector, where case chronologies are automated; the estimated saved "human" time is calculated, allowing the lawyer to quantify and potentially share the benefit with the client.

In an AI driven environment the real value may indeed be through human conversation. Genuine and unscripted conversations with clients and technology developers may open up opportunities for collaboration and the development of new ideas, to shape how actuarial insight is built into digital platforms. Creativity matters here, but so does responsibility. Actuaries need to keep oversight of the assumptions behind model development, and make sure outputs stay transparent and auditable. In doing so, they strengthen trust and remain the interpreters of complex systems.

3. Human-AI Collaboration

The review highlights that AI is not replacing professionals wholesale, but is augmenting certain tasks, creating what the literature terms "human-AI teams."

In law and accounting firms, AI handles repetitive, rules-based tasks, such as document review, data extraction, or anomaly detection, allowing professionals to focus on higher-order judgment, strategy, and empathy in client interaction. However, this collaboration demands new skills: professionals must interpret AI outputs, assess reliability, and translate findings into actionable advice. The rise of AI is also altering workforce structures, introducing new roles like data scientists, digital translators, and technology specialists into firms traditionally dominated by domain experts. Junior professionals, who once learned on the job through repetitive work, now risk being bypassed, threatening long-term workforce planning and succession.

For actuaries, the implications are immediate. Many actuarial tasks, such as data cleansing, experience analysis, and even early-stage model structuring, are ripe for automation. AI can increase efficiency, but only if actuaries know how to integrate it responsibly. Over-reliance on automation risks degrading the core value actuaries provide: professional judgement grounded in context and domain expertise. Furthermore, younger actuaries may struggle to develop foundational skills if basic tasks are removed from their early career experience. This raises strategic concerns about future capability.

Actuaries should invest time in learning how AI systems work, not just as users, but as evaluators. They should engage with machine learning outputs critically, assessing their limitations, assumptions, and potential biases. Senior actuaries have a responsibility to ensure that AI is used in ways that preserve the integrity of advice by embedding human-in-the-loop reviews and oversight. Junior training programs should be redesigned to coach the effective use of AI, including simulated work, mentoring, and deliberate exposure to judgment-based tasks. Actuarial teams should also collaborate with data scientists, IT specialists, and business analysts, forming interdisciplinary teams where the actuary's interpretive role remains central. Ultimately, actuaries must assert their value not as number-crunchers, but as expert human interpreters of human data-driven systems.

4. Strategic Impact

The review finds that AI is fundamentally altering the strategic positioning of professional service firms.

By enabling faster, more scalable, and often automated delivery of services, AI removes

long-standing trade-offs between speed, cost, and quality. Once quality is assured, firms are shifting away from labour-intensive growth models toward leaner, tech-enabled structures. AI also expands the firm's ability to serve new markets, particularly in commoditised compliance or transaction-based services, freeing professionals to focus on higher-value advisory roles. However, these benefits depend on a firm's ability to adapt its governance, workforce, and pricing models to reflect a new operating reality.

For actuaries, the strategic implications are equally profound. Traditional actuarial value, based on rigour, method, and regulation, remains essential, but firms and clients now expect this value to be delivered more efficiently, at scale, and often in near real-time. Actuaries who resist change may find themselves constrained by legacy processes or pricing models that no longer align with client expectations. Those who engage with AI strategically can expand their reach by offering predictive insights, embedded analytics, and designing new services that weren't feasible in an analogue environment. Strategic change must go beyond mere tools and systems; it must engage the entire firm and bring client perspectives to the table, in workforce planning, service innovation, and competitive positioning. Much easier said than done.

Actuaries should play an active role in shaping their firm's AI strategy, not just responding to it. This means asking: What can be automated? What must remain expert-led? In essence, what can be more trusted? Where can actuarial insights deliver new value for clients or internal stakeholders? Actuaries should help design service models that combine automation with oversight, to offer scalable outputs with human interpretation where it matters. At a leadership level, actuaries should advocate for investments in tools, training, and cross-functional collaboration to improve adaptability. Strategically, the profession should reposition itself not as resistant to disruption, but as central to guiding its responsible adoption.

5. The Next Wave - Agentic AI

Since the paper was published, agentic-AI has been gaining traction (not to be confused with AI Agents[7]). While generative AI creates new content, such as text, code, music, or images, based on user prompts and large language models (LLMs), agentic AI takes this a step further. Still beginning with a prompt or predefined risk matrix, Agentic AI can operate autonomously, often using several AI Agents, by breaking tasks into steps, making decisions, and executing actions without continuous human input. This shift from content generation to autonomous action introduces new challenges for governance, accountability, and professional oversight.

As AI evolves from passive prediction to autonomous action, its impact could be profound. These systems don't just process data; they take initiative, update models in real-time, interact with clients and other systems, and manage complex tasks without continuous human intervention. Here are a few scenarios that highlight the opportunities (and risks) of real-time risk assessment, proactive claims initiation and dynamic pricing possibilities:

- Imagine an insurance platform powered by agentic AI that not only underwrites policies (based on its underwriting risk framework, its initial 'prompt') but continuously monitors environmental

[7] AI Agents vs Agentic AI: What's the Difference and Why Does It Matter?

- data, customer behaviour data, and emerging risks (further prompts). Then, based on the new data, it contacts policyholders, adjusts pricing, coverage terms, or even triggers claim settlements without human intervention. For instance, in cyber insurance, an agentic AI system could detect a breach through real-time integration with the client's systems, assess the exposure based on evolving threat intelligence, and initiate pre-approved response protocols, including payout calculations, *all within minutes*.
- A property insurer uses agentic AI to monitor weather patterns on the client site. When a client's location is at high risk of flooding, the system automatically alerts the client, confirms exclusions, adjusts premiums (if allowed), and offers additional short-term coverage, all without requiring human approval.
- A wearable device linked to a life insurer detects a medical emergency. The agentic AI confirms the event through hospital data, calculates benefit eligibility, and initiates a partial payout to support recovery costs, before a claim is even lodged.

These scenarios are based on real capabilities. Many insurers[8] are already use AI to adjust pricing based on telematics (car insurance), weather data (property), and health tracking (wearables). For example, Discovery[9] and Vitality[10] allows for adjusted life insurance premiums based on physical activity. Insurers like Lemonade[11], Ping An[12], and Trōv[13] (Trov has since been acquired by The Travellers Companies[14]), have used AI bots to underwrite policies, process claims, and communicate with customers with minimal human input. Some platforms already offer dynamic suggestions for insurance coverage driven by live data. This shift removes delays, reduces operational costs, and increases responsiveness, but it also introduces significant risks. If a model updates in real-time based on flawed or biased data or if it declines coverage due to a misclassification, the consequences can be severe. The absence of human review challenges fairness, explainability, and professional accountability.

Conclusion

The pace of AI development is advancing rapidly, far beyond what traditional professional frameworks were designed to accommodate. At this pace, today's conclusions may be outdated tomorrow.

Generative AI systems are already capable of producing high-quality outputs in seconds, and the next frontier, agentic AI, introduces systems that can operate with a degree of autonomy, initiating tasks, updating models in real-time, and interacting across systems with minimal human input. These capabilities are not theoretical, they are already here, with profound implications for decision-making, accountability, and professional integrity. Perhaps that is the key issue. Not necessarily which tools will be adopted, or even if these live up to the promises of increased efficiency or margin. Those factors of return and success will be what they will be. However, given AI's expected pervasiveness and ubiquity, the real issues become: how decisions should be made, how professionalism and ethics are preserved, how the professional duty to society is upheld, and how humans can work with, not against, advances in technology.

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[8] Agentic AI in Insurance: The Next Frontier of Autonomous Intelligence
[9] The science behind Vitality - increasing life expectancy
[10] The largest behavior change study on physical activity
[11] Lemonade shatters record by using AI to settle a claim in two seconds, and Lemonade: Using AI to deliver efficient insurance
[12] Ping An Takes Lead in Fortune Fintech Innovator Asia list, Ranked 1st in Insurtech
[13] Trōv – World's First On-demand Insurance for Things You Own
[14] Travelers Acquires Tech Assets of Insurtech Trōv for Personal Insurance

For actuaries, this is a critical moment. The profession's strength lies not only in its analytical skills but also in its disciplined and ethical approach to modelling uncertainty and managing systemic risk, in its structural rigour, and the trust this approach has earned.

These attributes are critically needed in the development and deployment of advanced AI. Actuaries should step forward, be creative, collaborate with developers, advise business leaders, and work alongside regulators to help shape how AI systems are governed, monitored, and explained. By bringing their expertise to the design and oversight of AI use, actuaries can ensure that the next wave of automation will build, rather than erode, the trust placed in expert judgment. ■

HOSPITAL PRICE TRANSPARENCY IN HK: WHAT ACTUARIES NEED TO KNOW

The Coming Change

Would you stay at a hotel if the bill was hidden until you left? For many patients, surgery works the same way.

Hong Kong's private hospital price transparency rules are about to get a major overhaul[1]. The Health Bureau's proposals, moving towards consultation soon, would require standardised publication of fee schedules, patient pre-treatment cost estimates for many common procedures, and annual reporting of historical billing data.

Recent watchdog reports show why change is overdue. The Consumer Council logged nearly 200 complaints about private healthcare in just three years, almost half involving billing disputes. One patient was quoted HK$120,000 for knee surgery, only to see the estimate jump to over HK$200,000 on the day of admission[3] [4]. Knee replacement prices published online - where they exist - range from HK$88,000 to HK$330,000[5]. Most patients don't compare prices, and few receive explanations for big differences.

The timing is deliberate. An ageing population is driving higher demand for hospital care, yet many potential users avoid the private system because they cannot predict what it will cost. Fee disparity is common: for the same procedure in a standard ward, bills can vary by tens of thousands of dollars between hospitals. In some cases, the difference reflects genuine variations in case complexity. In others, it is harder to explain.

Opaque pricing affects more than individual patients. Rising and unpredictable private hospital bills feed into higher insurance premiums, which can reduce uptake of cover and push more demand back into the already stretched public system.

The new measures aim to improve clarity, not to set or cap fees. Hospitals will still be able to price according to their own cost structures and clinical practice. Cost estimates will remain just that - estimates - and no two patients will have identical bills. But for the first time, there will be a common framework for what information is published, how it is presented, and how historical charges can be compared over time.

Legislative Changes in Brief

The Health Bureau's proposals centre on three legislative measures and three longer-term enhancements. Together, they aim to make hospital charges easier to find, interpret, and compare - without dictating what those charges should be.

1. Standardised fee schedules

All licensed private hospitals, day procedure centres, and clinics would need to publish their charges in a common format set by the Director of Health. The schedule must list prices (or price ranges) for:

- Basic service items - such as ward charges, operating theatre time, nursing procedures, diagnostic tests, medications, consumables, and medical reports.
- The most common "specified treatments and procedures" - drawn from the current transparency pilot and the Voluntary Health Insurance Scheme (VHIS) schedule[2].

Hospitals must update these schedules within set timelines, make them visible at reception and on websites, and explain any variation in charges for the same item.

2. Written patient pre-treatment cost estimates

Before admission for a specified procedure, private hospitals would be required to give the patient (or their representative) a written pre-treatment cost estimate in a standard format. This must separately show hospital charges, doctors' fees, and any major cost components such as implants or consumables.

- Price ranges may be given where costs could vary, with estimates for different scenarios (e.g., possible intensive care).
- If the final bill is significantly higher than the estimate - for example, by 20% or more - the hospital must provide a written explanation.

3. Historical fee statistics

Each year, private hospitals would need to publish summary statistics for specified procedures:

- Number of cases, average length of stay, and typical (50th percentile) and high-end (90th percentile) charges, broken down by hospital fees and doctors' fees.
- The range from lowest to highest case.

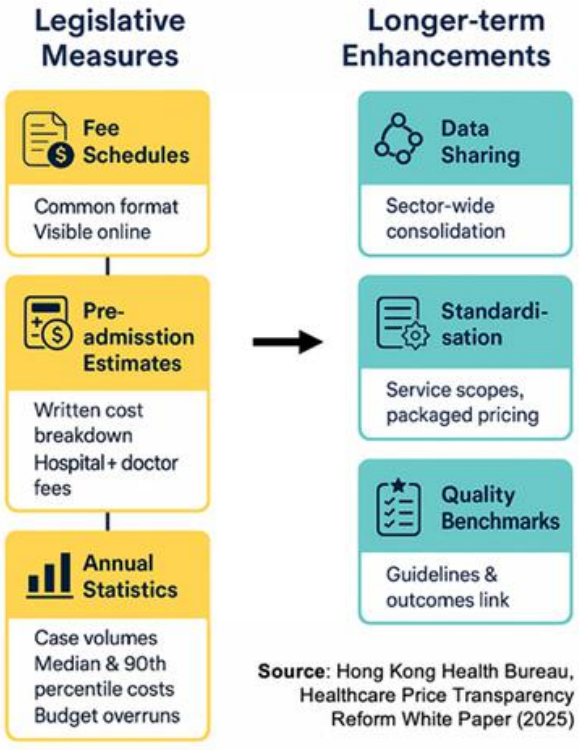
- The number of cases where the final bill exceeded the budget estimate by a significant margin. These figures must also be submitted to the Department of Health for monitoring and published on hospital websites.

Longer-term enhancements would complement the legislative measures:

- **Better data consolidation and sharing** across the health sector and insurers, to create a better picture of utilisation and costs.
- **Standardisation of healthcare service scopes and chargeable items**, including more use of packaged pricing with clear inclusions.
- **Development of clinical guidelines and quality benchmarks** through the newly established Institute for Medical Advancement and Clinical Excellence, potentially linking published prices with outcomes data.

Legislative Measures and Future Enhancements at a Glance

The reforms can be grouped into three immediate legislative steps and three longer-term goals, shown below.



Source: Hong Kong Health Bureau, Healthcare Price Transparency Reform White Paper (2025)

Not Far Enough

Price transparency is only part of the puzzle. Publishing fee schedules and estimates may reduce surprises, but they tell us nothing about quality. Two hospitals may charge similar rates for the same procedure yet deliver very different outcomes. One may have lower complication rates, shorter stays, or higher patient-reported recovery scores - none of which appear on a tariff sheet.

The second gap is data fragmentation. Hong Kong's private hospitals collect clinical information, but each does so in its own way. Coding standards differ, reporting formats are inconsistent, and little of this data is visible outside the hospital walls. For insurers and actuaries, that means decisions are often made blind: there is no common language to judge whether high prices reflect high quality or simply high margins.

What do hospitals have to hide? Perhaps nothing – but without shared definitions and comparable measures, no one can really tell. The reforms still stop short of requiring private hospitals to open up their data in a usable, standardised form. Until they do, transparency will remain only partial.

Why Published Tariffs May Mislead

With standardised fee schedules on the horizon, it may be tempting to assume that comparing hospital prices will become straightforward. For actuaries, network managers, and even patients, the instinct will be to line up the figures in a table and pick the lowest.

But hospital tariffs, even in a common format, are still only part of the story. They typically

reflect what a straightforward case might cost under standard conditions. They say little about:

- The hospital's procedural volume and expertise in a given surgery.
- How complications are handled and billed.
- The role of external specialists and ancillary services.
- Inclusions and exclusions that can shift significant costs onto separate bills.

Without factoring in these elements – and without adjusting for case complexity – headline tariffs can be misleading.

Hypothetical scenario:

When the "Cheapest" Tariff Costs More *(hypothetical)*

Imagine Mr Chan, who needs a laparoscopic cholecystectomy - a routine keyhole gallbladder removal.

He checks the published tariffs for three private hospitals. One stands out: about HK$65,000, compared with HK$90,000 - HK$105,000 elsewhere. Wanting to minimise out-of-pocket costs, he chooses the cheapest option.

The published tariff looks comprehensive, but omits certain factors. This hospital performs the procedure infrequently and does not have an on-site hepatobiliary specialist. Partway through surgery, an unexpected complication arises. Mr Chan needs additional imaging, extended operating theatre time, a surgical consult from outside, and two extra nights in hospital.

The final bill: over HK$150,000 - more than at either of the other hospitals he had compared initially. The "cheapest" tariff became the most expensive outcome, not because of overcharging, but because the published figure assumed a straightforward case with no complications.

This is why comparing headline tariffs without understanding a hospital's typical case-mix, procedural experience, and how unforeseen events are billed can lead to misleading conclusions - for patients and actuaries alike.

For actuaries working with claims data, the lesson is clear: even under a transparency regime, raw price listings need careful interpretation before being used for provider benchmarking or product design.

Case-Mix Adjustment: Level the Field

One reason published tariffs can mislead is that not all cases are clinically alike. Two patients undergoing the "same" procedure on paper may differ in age, co-morbidities, disease severity, or the presence of complications. These factors drive real differences in resources used - operating theatre time, diagnostics, length of stay, and post-operative care - and, inevitably, cost.

Case-mix adjustment is the process of accounting for these differences so comparisons between hospitals or providers are fair. It is well-established in hospital performance reporting in other markets and follows a principle actuaries already use in other contexts: normalising for underlying risk.

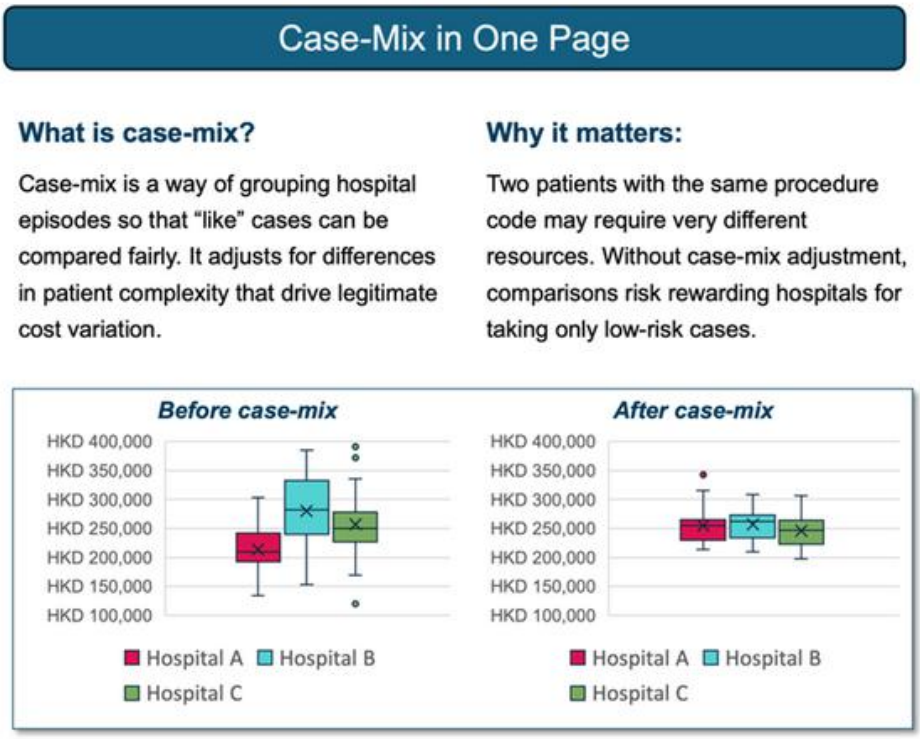
One common approach is the **Diagnosis-Related Group (DRG)** model. In simple terms:

- Each patient's diagnosis, procedures, and key clinical factors are mapped to a defined group representing a type of hospital episode with similar expected resource use.
- Groups are designed so that cases within each group are clinically comparable, and cost variation is primarily due to efficiency, not patient complexity.
- This allows costs to be compared across providers on a like-for-like basis - for example "laparoscopic cholecystectomy **without** complications" vs "laparoscopic cholecystectomy **with major** complications."

For Hong Kong actuaries, this means that:

- Tariffs and historical price statistics should be linked to comparable case groups, not just procedure codes.
- Variance analysis should separate the impact of case-mix from the impact of provider practice patterns or pricing.
- Case-mix models can be adapted from international DRG frameworks but need localisation to Hong Kong's coding, billing, and practice patterns.

In effect, case-mix adjustment turns the new transparency data from a simple price list into a meaningful benchmarking tool. Without it, there is a risk of rewarding providers who select low-complexity cases rather than those who deliver the best value for money.



Case-mix turns raw claims data into fair, comparable metrics that can guide hospital benchmarking, contracting, and quality analysis.

From Tariffs to Claims Insights

For actuaries, the real opportunity in the coming transparency regime lies in linking public tariff data with their own claims experience. Hospital fee schedules and historical statistics can provide useful benchmarks, but only when set against internally consistent, case-mix–adjusted claims data.

A practical approach might follow three steps:

1. Map claims to comparable case groups

- Use DRG-style groupers or similar logic to classify episodes into clinically coherent categories.
- Ensure classification is consistent over time to allow trend analysis.

2. Adjust for complexity and setting

- Incorporate patient factors such as age, co-morbidities, admission type (elective vs emergency), and whether complications arose.
- Where possible, distinguish between inpatient and day-case episodes for the same procedure, as resource use can be very different.

3. Benchmark and monitor

- Compare your adjusted claim costs to the published median (50th percentile) and high-cost (90th percentile) figures, not just to the lowest available tariff.
- Track variation by provider, procedure type, and over time.
- Investigate persistent differences – these may indicate that some hospitals are delivering care more efficiently, that there is room to adjust fees or contract terms, or that patients are being directed to certain hospitals more often than others.

Used in this way, transparency data becomes more than a consumer tool. It allows insurers to monitor network performance, identify outliers, and engage providers with evidence-based discussions on cost and value.

But cost is only half the story – and without a view on quality, the risk remains of steering patients towards lower-cost options that do not deliver the best outcomes. That is where outcomes and patient-reported measures enter the frame.

Bringing Quality into the Equation

Hospital costs tell only part of the value story. A procedure delivered at a lower price may still represent poor value if it results in avoidable complications, readmissions, or poor patient experience.

To benchmark responsibly, actuaries need to pair cost analysis with indicators of clinical quality. These can be grouped into two broad types:

- **Clinical outcomes** – measurable end results of care such as mortality, complication, and readmission rates. In surgical care, metrics like post-operative infection rates or unplanned returns to theatre can be revealing.
- **Patient-reported measures** – structured feedback capturing the patient's own perspective on their health status and care experience. Patient-Reported Outcome Measures (PROMs) focus on functional recovery and symptom change. Patient-Reported Experience Measures (PREMs) are often seen as "satisfaction scores", but when well-designed, they focus on aspects of the care experience that correlate with good clinical outcomes - for example, clarity of discharge instructions, timeliness of follow-up, or involvement in care decisions.

While Hong Kong does not yet publish outcomes data alongside prices, international practice increasingly does. Over time, the Health Bureau's long-term enhancements and the work of the recently launched Institute for Medical Advancement and Clinical Excellence (https://www.imace.org.hk/) may create a platform for this.

In the meantime, insurers can start to build their own view. Claims data, combined with integration with patient feedback platforms, can identify providers who deliver consistently good outcomes at sustainable cost.

For example, a platform such as *Voice of the Patient* (https://voiceofthepatient.com.au/home) which collects and analyses PROMs and clinically-relevant PREMs - can be used internally to complement claims-based monitoring. The key is to interpret quality measures in the context of case-mix, so that comparisons account for differences in patient complexity rather than mistaking them for differences in quality.

Action Plan: The First 90 Days

The reforms will take time to implement, but actuaries can begin preparing now. A focused 90-day plan will set up the data and analytical foundation to make full use of the forthcoming transparency data.

1. **Internal data audit**
   - Confirm that procedure codes, diagnosis codes, and episode-level cost data are consistently recorded across claims systems.
   - Check whether your data can distinguish inpatient, day case, and outpatient episodes for the same procedure.

2. **Case-mix capability**
   - Assess whether you have, or can access, a DRG-style grouper suitable for Hong Kong coding and billing structures.
   - Test classification on a small sample of recent claims to identify coding gaps.

3. **Benchmarking readiness**
   - Decide which published metrics you will match against (e.g., median cost, 90th percentile) and how you will adjust for case-mix.
   - Set up baseline provider benchmarks using your own historical claims data.

4. **Quality data plan**
   - Identify what quality indicators you can already measure from claims (e.g., readmissions) and where additional data (PROMs, PREMs) could be collected.
   - Develop a plan to pilot internal patient feedback tools for targeted procedures.

5. **Engagement strategy**
   - Brief network management and provider relations teams on the upcoming changes.
   - Prepare to discuss results with hospitals in a way that blends cost, complexity, and quality insights.

Starting this groundwork early will ensure that when standardised fee schedules and historical pricing statistics become available, they can be linked directly to your own adjusted claims and quality measures – turning public transparency into actionable intelligence. ■

[1] Hong Kong Health Bureau. Healthcare Price Transparency Reform White Paper (2025). Available at: Agentic AI in Insurance: The Next Frontier of Autonomous Intelligence
[2] Voluntary Health Insurance Scheme (VHIS). Standardised Treatment and Procedure List. Available at: https://www.vhis.gov.hk/doc/en/information_centre/e_standard_plan_template.pdf
[3] Consumer Council, Hong Kong. Private Healthcare Services Study Report (2021–2024). https://www.consumer.org.hk/en/press-release/p-private-healthcare-services-study-report
[4] South China Morning Post. Hong Kong private hospital patients left in the dark on fees, watchdog finds (May 2024).
[5] South China Morning Post. Can Hong Kong convince private hospitals to be clear and upfront about fees? (July 2024).

ON-CHAIN SHOCK ABSORBERS:

Actuarial Frontiers in DeFi and Digital Assets Insurance

The emergence of decentralized finance (DeFi), digital assets, and Web3.0 ecosystems has created a new frontier for insurance. No longer confined to traditional life or property risks, actuaries now find themselves confronting the volatility of smart contracts, systemic risks in liquidity pools, and the peculiarities of insuring virtual identities and digital collectibles. These new risk classes require novel modeling techniques as well as rethinking of pricing, reserving and governance frameworks.

What are we insuring in the Decentralized Era?

Unlike traditional insurance where loss events are largely physical or biological, digital asset and DeFi insurance focuses on protocol-level risks (e.g., smart contract failures), custodial breaches (e.g. wallet hacks) and catastrophic exploits (e.g. price oracle manipulation or rug pulls). These risks are not covered under normal insurance as they do not constitute direct physical losses[1].

At its core, DeFi insurance provides financial protection against failures and risks that are native to blockchain ecosystems. These include smart contract bugs, wallet breaches, bridge hacks, stablecoin de-peggings and validator slashing. Participants can stake assets into its Protection Vault and earn returns while underwriting specific risk pools. If a contract vulnerability is exploited, verified either through an oracle or community voting, the protocol pays out claims. Some real-world examples are:

- Hong Kong's OneDegree, which is a more traditional insurer, operates in the digital asset space. It insures HashKey Exchange's hot and cold wallets against breaches, integrating cyber-risk audits into underwriting. OneDegree, through its OneInfinity product, became one of the first insurers in Asia to offer regulated digital asset insurance. In 2022, it partnered with HashKey Exchange, a licensed crypto exchange in Hong Kong, to provide insurance coverage on both hot and cold wallets. These policies are designed to protect against theft, hacking, internal fraud, and cyber incidents, not market losses. Their model includes active cyber-risk mitigation services, and coverage is triggered by custodial breaches. The policies integrate cyber due diligence with underwriting, creating dynamic pricing structures based on wallet management, exchange security protocols, and asset segregation.
- Degis offers a structured "Protection Vault" where capital providers (akin to underwriters) stake assets and are rewarded with high returns for underwriting risks on-chain. Coverage products include wallet protection and smart contract risk protection. Claims are triggered by clear events such as contract exploit verification, with decisions governed via DAO votes. Their actuarial challenge lies in quantifying tail-heavy losses from low-frequency, high-severity events. Its whitepaper outlines a staking pool model, with participants underwriting smart contract protection and paying claims when validated loss events occur. The protocol enables buyers to insure DeFi assets on Avalanche and similar chains, including coverage for LP positions and tokenized assets. Claims are typically paid if contract vulnerabilities are exploited, based on on-chain oracle verification or governance voting mechanisms.
- TakaDAO, a Takaful (Islamic Insurance) DeFi introduces "Takawriting," a dynamic underwriting method in which benefits are not fixed up front and there is no sum assured. Instead, the system backward-calculates benefits based on target loss ratios and available fund solvency. Actuarially, this reverses the usual pricing logic. Rather than promise a fixed sum assured, the protocol targets a desired loss ratio and adjusts benefit payouts in real time. This ensures that the DAO never commits to coverage it cannot afford; an inherent solution to takaful's longstanding solvency concerns. This means no need for needing investors or provide a return on capital to them. 'Repool' reinsurance by staking is also there to provide interest-free loans/qard-e-hasan where required under distressed or catastrophic times. Each contribution is staked in smart contracts, forming a tabarru'-based pool. If claims arise, payouts are triggered by pre-coded events or DAO votes. If no claims arise, the surplus (underwriting profit) is shared proportionally with members. Smart contracts ensure that all adjustments are transparent, rule-bound, and tamper-proof.

Staking as Underwriting: A Digital Lloyd's Market

Staking in decentralized finance (DeFi) refers to locking up cryptocurrency in a protocol, often to earn rewards or to provide collateral or liquidity for certain insurance functions. In blockchain-based insurance protocols, staking plays a crucial role by allowing users to act as underwriters, similar to capital providers in Lloyd's of London. These individuals or institutions stake capital into insurance pools and earn yield or premiums, but they also bear risk because when claims arise, payouts come from these pools.

Some protocols like Nexus Mutual or InsurAce structured it like a decentralized marketplace, where stakers assess risk and provide backing in exchange for potential returns. Because claims emerge after a time lag, especially if there's a period for verification or voting, actuarial thinking around reserving, including concepts like IBNR (Incurred But Not Reported), becomes highly relevant. The pools must be solvent not just today, but over the lifecycle of policy exposures, so protocols often include capital buffers or simulate claims emergence using stress testing or probabilistic models. This creates a novel actuarial challenge: modeling delayed claims from blockchain events, while pricing and reserving in an unregulated, real-time environment.

DeFi staking protocols often mimic Lloyd's of London. Stakers back risks and earn yield, but risk slashing if claims are needed to be paid. This creates a decentralized capital model where underwriters are also capital providers. Reserves in such systems include catastrophe buffers and slashing pools.

Actuarial modeling should factor in capital volatility, correlated exposures (multiple covers for the same protocol) and slashing risk. Capital adequacy and insolvency probability of ruin becomes a key area to focus upon. For example, in Degis, if the smart contract suffers an exploit and a Protection Vault pays claims, stakers may lose capital. So yield rates must balance expected loss, slashing risk and opportunity cost.

Reserving in DeFi: Not Just IBNR, but IBNER and Tail Buffers

Unlike traditional P&C, DeFi claims often follow the logic of event-driven smart contract calls, and thus introduce both real-time resolution potential and latent tail risks. This means that actuaries should apply both IBNR and IBNER logic. For example, a smart contract may be exploited today but only discovered and claimed against months later.

A claim may be "incurred" the moment a protocol is exploited, but the recognition may lag due to slow detection, user unawareness, slow data propagation or DAO governance and voting delays. So although smart contracts are based on clear rules, codified on blockchain and triggered automatically in claim payments, in practice we expect some level of delay and book IBNR based on that.

The second focus can be on Incurred-but-not-enough-reported ("IBNER"). This occurs in liability products like medical malpractice and some cyber insurance policies on claims-made basis. Claims-made basis is when actual claim can occur anytime in the past, but if it is reported in current active policy's year, the claim will have to be covered. Think of how many silent back-doors are built in online hacking and are present for years in systems but are activated only at the right time when the opportunity is there. As situation reveals itself and develops further, we might need to increase our reserve because it is not being reported enough and might develop significantly over time.

In DeFi, governance plays a key role in reserving and claims handling. Protocols like Etherisc and Nexus Mutual use voting to approve claims, allocate reserves or adjust pricing. This opens a new actuarial domain: modeling governance latency, claim denial rates and reputational drag from bad-faith votes.

Moreover, actuarial reserves in this setting may include:

- **Smart Contract Incident Reserves:** Based on probabilistic failure rates of contract code, akin to failure models in cyber insurance.

- **Liquidity Pool Risk Margins:** DeFi insurance protocols often rely on liquidity pools to underwrite claims. Risk margins here are calibrated using Monte Carlo simulations to account for price volatility and user behavior.

- **Staking Reserve Dynamics:** In protocols like Degis, stakers underwrite risks and earn yield. To protect against mass claim events, protocols may set aside slashing reserves or catastrophe pools. These resemble traditional catastrophe or stop-loss reserves but on-chain.

In claims-made policies, such as medical malpractice or certain D&O liability products, the reserve need is less about pure IBNR (claims not yet reported at all), and more about IBNER which is incurred but not enough reported. This reflects the idea that a claim may have been notified or logged, but the full scope, severity, or cost is still unknown or under development. In DeFi insurance, particularly for smart contract cover or protocol protection, similar patterns may arise: a vulnerability or exploit may be disclosed, but the downstream financial impacts or multiple-layer claims (such as cascading liquidations or oracle failures) may take time to surface fully. Thus reserving practices for DeFi need to include buffers for IBNER-style exposures, not just unreported claims.

The SOA published a report on DeFi (such as "Decentralized Finance (DeFi): Opportunities, Risks, and the Future for Actuaries") which argues that reserving in DeFi should be based on a mix of stochastic simulations such as Monte Carlo and Extreme Value Theory (EVT), on-chain activity metrics (like Total Value Locked TVL or protocol transaction volume) and governance lag modeling. The SOA's "Decentralized Insurance Alternatives" report recommends using capital-at-risk exposure metrics and VaR-based buffers, especially when policy terms are ambiguous or when risk pools are highly correlated. The SOA recommends using heavy-tailed distributions for both frequency and severity in these models, given the fat-tailed nature of crypto losses.

For example, in Nexus Mutual's payout for the Yearn Finance vault exploit in 2021, the claim was only approved after decentralized member voting. This delay mimics the development pattern seen in long-tail liability lines like medical malpractice. In the case of the Cover Protocol exploit in 2020, millions were drained due to a bug in token minting. Had Cover been more rigorous reserving based on protocol TVL volatility or historical oracle errors (which could resemble an IBNR approach), it could have absorbed losses more effectively.

Pricing: Dynamic, Peer-Driven, and Heavily Risk-Adjusted

DeFi platforms often base premiums dynamically on usage metrics such as TVL (Total Value Locked), incident history, contract age and audit status. Nexus Mutual uses staking to reflect underwriting sentiment, essentially tying pricing to risk perceptions of other users. In actuarial terms, this resembles experience rating and capital-based pricing in Lloyd's-style syndicates, but on-chain.
Pricing in DeFi must account for high-severity, low-frequency events. Nexus Mutual uses a staking mechanism where members stake NXM tokens to back policies. The more staked capital on a risk, the lower the premium, reflecting a decentralized consensus on perceived risk. This is akin to experience rating in traditional insurance but mediated by token dynamics.

Actuarial models here resemble frequency-severity rating, using public exploit data sets like REKT.news to calibrate assumptions.

A platform like InsurAce, which offered coverage during the TerraUST collapse, may model a 2% annual exploit frequency with severity ranging from $100K to $5M. Premiums can then be calculated using pure premium formulas, loading for volatility, risk margins and operational costs.

Three cases illustrate how pricing and reserving can determine a DeFi insurer's survival.

1. **Nexus Mutual and bZx Hack (2020):** Claims from a bZx protocol exploit were filed and paid after governance approval. Because Nexus had sufficient reserves from staked premiums and a conservative pricing structure, it withstood the payout without destabilization. This shows how properly modeled reserves and risk-adjusted pricing can sustain a decentralized insurer.
2. **Cover Protocol Collapse (2020):** An infinite minting bug drained the protocol, and claims quickly exceeded capital. Cover lacked reserves and governance safeguards and collapsed. This underscores the importance of solvency monitoring and capital-at-risk stress testing.
3. **InsurAce and TerraUST (2022):** During the depeg crisis, InsurAce received over 170 claims. It processed them using predefined eligibility rules and paid from its staked capital pools. While not all claims were accepted, the presence of pooled reserves enabled partial restitution.

Parallels with Traditional Liability and Cyber Insurance

Actuarial lessons from medical malpractice and cyber insurance apply directly to DeFi. Medical malpractice often uses claims-made coverage with reserves focused on IBNER. Likewise, DeFi exploits, such as governance or multisig failures, can be latent and severe, requiring similar reserving logic. Cyber insurance offers further parallels, using external threat intelligence, patch scores, and modular pricing models. DeFi can similarly integrate smart contract audits, bug bounty results, and blockchain security metrics into risk rating.

The SOA's digital asset risk report emphasizes that DeFi demands tailored pricing and reserving frameworks due to its volatility and opacity. Actuaries should combine Monte Carlo simulations and tail risk models with governance and audit quality indicators. Like long-tail liability lines (e.g., D&O or product liability), DeFi must reserve for unreported delayed claims.

Cyber insurance shows how actuaries can operate in data-sparse environments using qualitative underwriting and dynamic risk tiers. Modular cyber products mirror how DeFi may unbundle risks, like validator slashing or wallet breaches. Integrated services, like OneDegree's Vulcan GenAI combining coverage with threat detection, are emerging in both sectors. DeFi insurers may similarly reward time-locks, multi-sigs and governance audits. These analogies offer a playbook for building robust actuarial systems in decentralized finance.

Conclusion

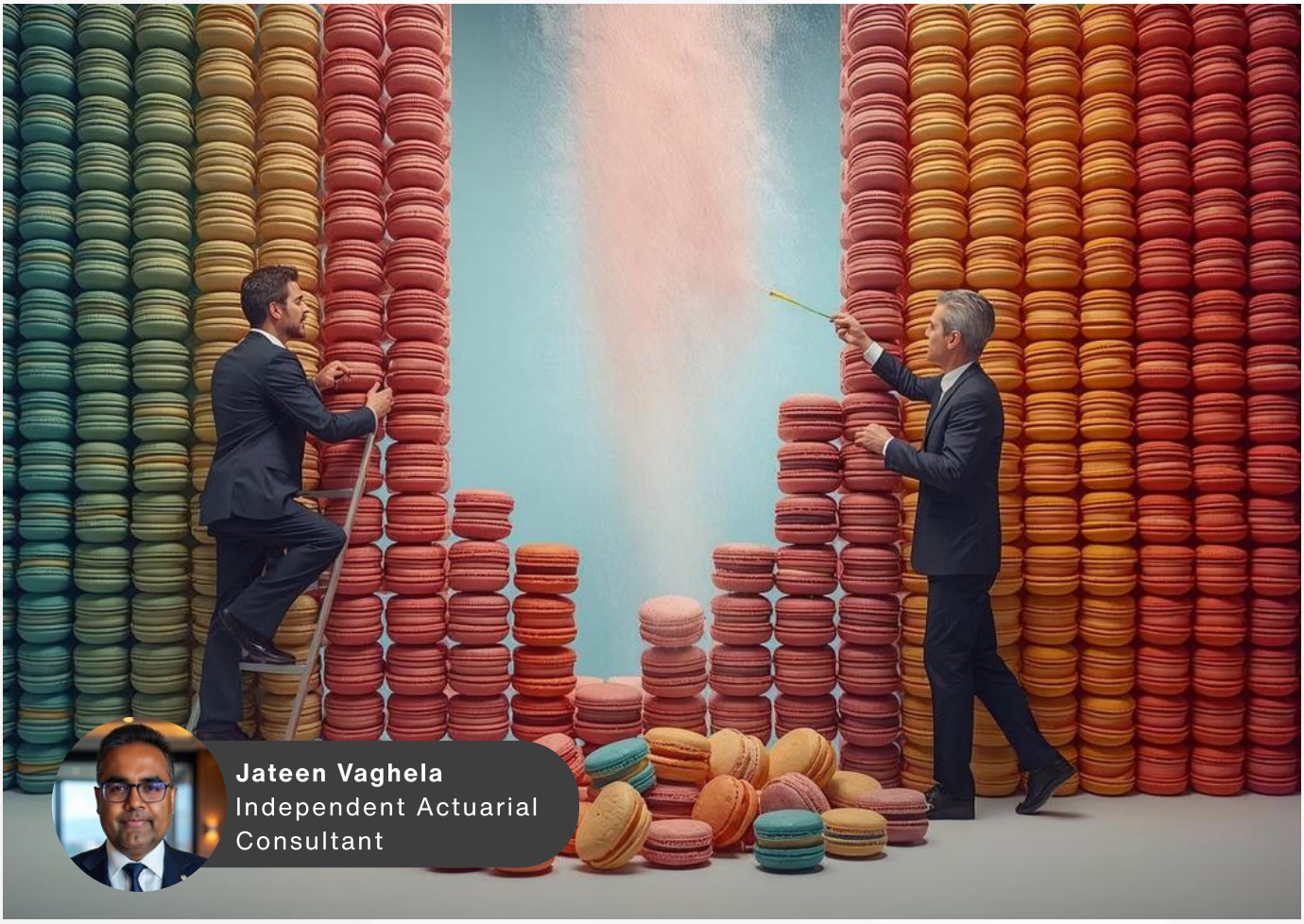
Actuarial reserving in DeFi borrows from IBNR and IBNER logic due to claim emergence lag, while pricing uses dynamic on-chain metrics. Combining these with real claim examples, audit reviews and capital staking models shows how these systems are evolving into decentralized counterparts of traditional insurance.

Even in novel ecosystems, actuaries can apply tried-and-tested frameworks, adjusted for new data and decentralized structures, to ensure sound reserving and fair pricing for

both protocols and users.

Smart contract failures, algorithmic risk (like stablecoin collapse) or governance attacks can all trigger claims. If pricing is not aligned to risk, or if reserves are thin, protocols collapse fast. But where reserves are proactive and actuarially modeled, they act as shock absorbers, much like traditional insurance. The stakes are high, but so are the returns for accurate risk pricing.

[1] https://ar.casact.org/so-your-crypto-got-hackedwhich-insurance-pays-for-it/



NAVIGATING ASIA'S INSURANCE LANDSCAPE:

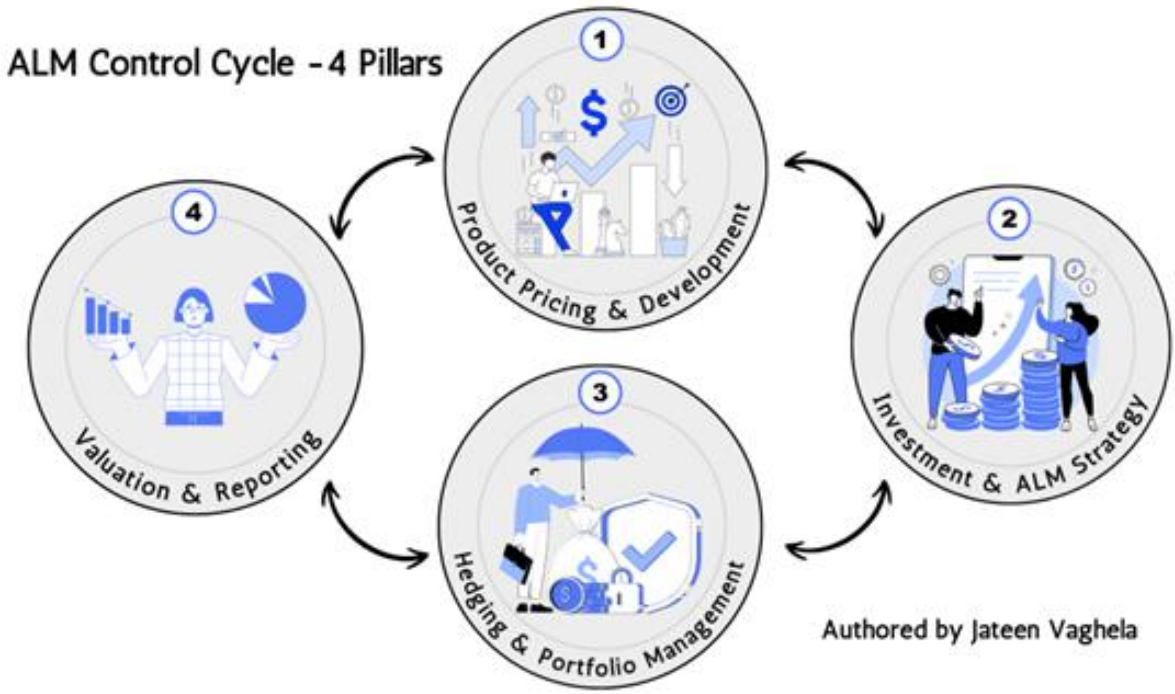
The Critical Role of an ALM Strategy

It's tough to run an insurance business in Asia.

Factors like intense competition, economic volatility, rapid technological shifts, and evolving regulatory and accounting standards all challenge sustainable growth.

A robust Asset-Liability Management (ALM) strategy allows firms to navigate these complexities while supporting earnings on an optimised balance sheet.

This paper completes a 3-part series on ALM. The first paper introduces the Asset-Liability Management Control Cycle; encompassing 4 key pillars: (1) Product Pricing & Development, (2) Investment & ALM Strategy, (3) Hedging & Portfolio Management, and (4) Valuation & Reporting.



Part 2 in the Q2 '25 edition explores the best practices in hedging and application across the 4 pillars.

This paper elevates the discussion to the crucial need and purpose for a robust **ALM Strategy**. This acts as the guiding force for all activities within the ALM Control Cycle, enabling insurers to meet investor and shareholder demands for capital efficiency and higher return on equity.

What is an ALM Strategy?

Insurance companies are inherently complex due to the multitude of valuation bases used to measure, manage, and report performance. These include:

- **Regulatory Capital frameworks:** Focusing on statutory solvency.
- **Accounting standards:** Such as local GAAP or IFRS 17 & 9, driving earnings perspectives. Including the current tax position of an entity.
- **Policyholder Best Estimate basis:** Generally applied to Participating (PAR) Funds and typically captures the policyholder expectations of cashflows.
- **Shareholder/Investor views:** Often centred on Traditional Embedded Value (EV) for publicly listed firms within Asia, or other bespoke metrics for group-owned entities (e.g. Banking groups, or Industrials).
- **Other Stakeholders:** Rating agencies, joint-venture partners.

Adding to this complexity is the organisational hierarchy around which to apply the basis. Ranging from granular product portfolios and segments to legal entities, regional business groups, and the ultimate group level. Within this there are also joint venture legal entities or internal reinsurance entities (typically offshore in Bermuda). Different stakeholders at various organisational tiers often prioritize different bases for performance and measurement.

An ALM Strategy is a foundational document that addresses this intricate landscape. It clearly articulates the approach to managing all these diverse bases and metrics. Critically, it ranks and prioritizes these bases across all levels of the balance sheet (from portfolio to group), incorporating perspectives from

internal management (local to group) and external stakeholders (regulators, shareholders). This strategic clarity significantly increases a firm's chances of achieving its financial objectives.

Key Characteristics of an Effective ALM Strategy:

- **Tailored:** Each firm's ALM Strategy is unique, influenced by its regulatory environment, operating jurisdictions, shareholder structure and organic development of the business.
- **Value-Adding Process:** Its development fosters crucial strategic dialogue across business units, regional offices, and group leaders, raising firm-specific considerations.
- **Integrated:** It bridges the interplay between the Strategic Financial Plan, Risk Appetite, Investment KPIs, and Actuarial Management. For embedding the strategy, it should be shared across all levels of staff involved in the 4 pillars.
- **Inclusive Development:** It requires extensive consultation with all key stakeholders, including the Board, CEO, Finance, Actuarial, Investor Relations, Risk, and Investments leaders, as well as local, regional, and group offices.
- **Complementary:** It supplements, rather than duplicates, existing Financial/Capital Management Strategies and Risk Management Frameworks, filling potential gaps.

As noted in the first paper, a challenge that regularly comes up in developing the Investment Strategy for a segment (Pillar 2 activity) is what the KPIs are and the corresponding measurement basis to apply. Investment teams may have their own internal perspectives (i.e. sometimes referred to as the 'economic basis') to measure the risk-reward of asset strategies. Whilst important, if there is no alignment and connection of this economic lens to any of the business metrics it poses further complications.

However, a well-articulated ALM strategy provides much needed guiding light on what basis to apply, and at which segmented level. This ensures the investment strategy does indeed support the firm's business targets and value generation.

Execution: The ALM Strategy in Action

Successful execution of an ALM Strategy builds on two foundational areas:

1. Asset and Liability Segmentation:

This is paramount. It involves aggregating assets and liabilities into distinct, measurable "pots" to accurately monitor and manage ALM positions. Poor segmentation is a common source of ALM errors. Strategic segmentation not only clarifies ALM risks but also streamlines operations.

While regulatory frameworks, such as Hong Kong's GL34, significantly improve the segmentation of PAR Funds, a comprehensive examination of the broader general fund's segmentation is equally imperative. The established PAR Fund model - delineating policyholder reserves (on a best estimate basis), distributable surplus, and equity - offers an exemplary framework that should be applied across all segments within a legal entity.

Example: Do we manage Earnings or Capital?

For example, consider segments that are initially managed primarily from an earnings perspective (Basis A). To align with the Financial Plan. As we bring these segments together, the regulatory basis (Basis B) may gain greater significance. Particularly for capital strained entities. How can one bridge the gap between these two-an age-old ALM challenge? One effective approach I have

successfully implemented is creating a "Matching Segment" with a specific set of dedicated assets and liabilities. By applying ALM overlay techniques, it becomes possible to effectively manage the differences between the two bases (e.g. value and risk profile). In this straightforward example, the legal entity's top-down view is managed according to the regulatory framework (Basis B); while ensuring the bottom-up segments' performance remains optimised from an earnings perspective. This is a well-organised, clear, and structured solution that ensures both the CFO and CRO feel confident!

Creating a clear and transparent framework for managing the entire balance sheet is essential. This clarity allows us to overcome the constant challenges of managing the inherent complexity of both perspectives at every level of the balance sheet, promoting more effective and streamlined financial management.

Despite the initial complexities of implementation, meticulously defined segmentation yields superior balance sheet clarity, facilitating the early detection and proactive optimisation of ALM discrepancies. This represents a pivotal advancement in ensuring comprehensive and effective ALM at every organizational tier and helps integrate the ALM Control Cycle - 4 Pillars.

2. ALM Function and Expertise

The growing importance of ALM necessitates a robust functional role within the organization. While ALM often resides within Investment, Capital Management, or Actuarial Functions, its effectiveness depends on genuine capabilities rather than just its reporting line.
An ALM function requires a unique blend of expertise from Investment, Actuarial, Finance, Capital, Product and Risk Management, operating cohesively to drive the ALM Control Cycle. Proper placement and empowerment of the ALM function are critical for strategy execution. Besides the organisational structure, the decision-making related to ALM and governance are all key factors to consider. For now, I have merely introduced this topic in this paper.

In conclusion, the development of a company **ALM Strategy**, coupled with a thorough review of asset-liability segmentation and functional setup, is fundamental for strengthening an insurer's financial effectiveness. This approach directly supports capital efficiency, optimizes risk origination, and enhances investment returns through better-articulated strategies and optimised portfolio management. ■

HK PARTICIPATING PRODUCTS

Asset-Liability Management Under an Economic Perspective (Part III)

(A) Introduction

After we introduced the Asset Share ("AS") mechanism of the participating ("Par") products in the first article, and used the financial options to discuss the economic nature of the participating liabilities in the second article, we are now ready to discuss the practical investment and hedging strategies for the participating products.

Our discussion will be organized into 4 steps:

1. Firstly, we will discuss how an insurer typically organizes funds backing Par and non-Par products, as well as surplus assets.
2. Then, we will use **non-Par products** to explain how insurers can incorporate asset-liability management ("ALM") or total balance sheet considerations in setting their investment strategies, while leveraging the tools commonly used by the asset-only investors.

3. Afterwards, we will discuss the additional **challenges of Par products due to profit-sharing mechanism**, and how to consider investment strategies allowing for both shareholder ("SH") and policyholder ("PH") objectives.
4. Lastly, we will introduce the idea of **value-in-force ("VIF")** hedging. That is, how to further reduce the SH residual risk by using hedging overlays outside the AS funds.

This article will cover points 1 and 2 mentioned above, while the remaining points will be discussed in the next article.

(B) Typical Fund Structure for Insurers with Par Products

Let's start by summarizing how the funds of an insurer with Par products are organized. While the "what" question, i.e. the asset allocation and hedging instruments, are important for ALM, the "where" question is important as well. The same investment asset or derivative, if located in different portfolios, will have different economic and regulatory implications for the insurer due to, for example:

- Par profit-sharing rules,
- Maintenance of asset requirements,
- HKRBC Matching Adjustment calculation,
- IFRS 9/17 assets and liabilities classification,
- IFRS 17 grouping of assets and liabilities for the contract service margin ("CSM") calculation, and
- Difference in the restrictions of each fund.

Referring to figure 1, the insurer should maintain a number of physically or notionally segregated funds.

- Firstly, the Par products are arranged in different blocks of AS, where the grouping granularity can vary significantly across different companies. (A more granular grouping will ensure less cross-subsidy across PHs buying different insurance products, as well as across different generations of PH. On the other hand, a less granular grouping will allow Par policyholders to be benefited from the diversification of the mortality, morbidity and lapse experience due to more policies in the same experience-sharing block.) Each block of AS liability is backed by the respective **AS fund** asset with matching market value.

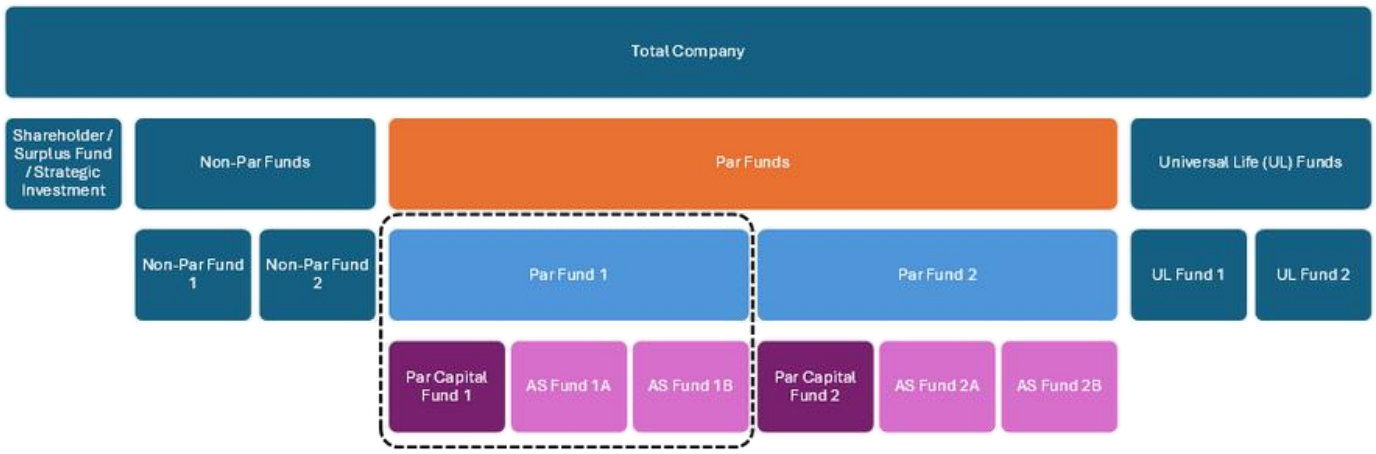


Figure 1: A Typical Fund Structure for Insurers with Par Products

- These AS funds are then grouped into one or more physically segregated **Par funds**. There are various reasons why some insurers may want to have more than one of such Par fund. For example, to avoid pooling policies acquired from acquisition with their own policies or to separate the legacy policies sold before a major corporate restructuring from the new polices. In the context of HKRBC, some insurers maintain different Par funds to tailor Matching Adjustments ("MA") for products with significantly different levels of policy guarantees and asset allocation strategies.

- As discussed in the previous article, the best estimated liability ("BEL") is the sum of the AS and the Net Cost of Guarantee and Smoothing ("NCoGS"), or equivalently, equals the AS minus the VIF (which is the negative of the NCoGS).

  - ➡ If the NCoGS is positive (i.e. VIF is negative), the assets in the AS funds will not be sufficient to cover the total amount of BEL of the Par funds.
  - ➡ If the VIF is positive but too small, there will not be sufficient tangible assets and VIF to cover the capital requirement.

- There are two ways of managing this, either by holding excess assets in the AS funds over the AS liabilities, or establishing a dedicated **Par capital fund**, separate from the AS funds, for each = Par fund. The benefit of the latter approach is that the company would have more flexibility to determine the investment strategy of such Par capital fund, instead of being forced to follow that of the AS funds if the capital is invested within the AS funds.

- Outside the Par funds, the insurers may also have additional **Non-Par liability backing funds** (which in turn have their own capital funds) and also the **Shareholder fund(s)**. Economically, all assets under these funds are fungible as the Profit-and-Loss (P&L) of these assets will be solely attributed to shareholders without sharing them with policyholders. Some insurers will combine them for operating efficiency, while others may still need to maintain more than one to satisfy the regulatory or accounting requirements, or to help the internal attribution of the investment return to different Non-Par blocks for managerial reporting purpose.

(C) Formulating Investment Strategies for an Asset-Only Investor

We now come back to the "what" topic, the investment strategies.

Firstly, recall that for asset-only investors, the typical way to determine the asset allocation is via a mean-variance analysis, or a variation of such.

1. The available investments are first categorized into different asset classes. The risk and return of assets within each asset class should be relatively close to each other, and the correlations of returns of assets within each asset class should be relatively high. Therefore, each asset class can be viewed and modelled as one line of holding.

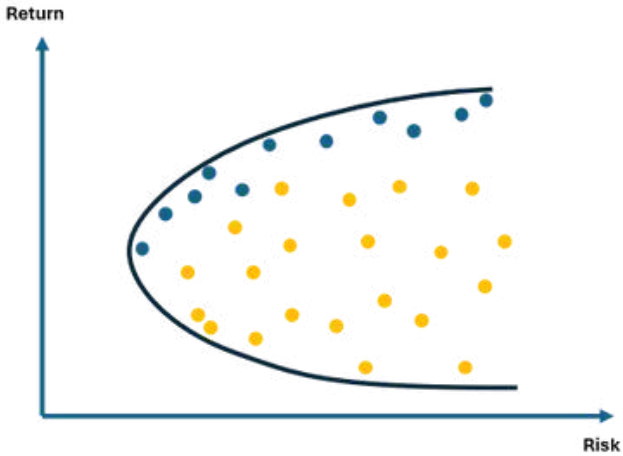


Figure 2: Efficient Frontier ("EF") Analysis for Asset-Only Investors

2. Each asset class will then have its own real-world ("RW") expected return and volatility assumptions, or a full distribution function of the RW returns to capture the higher order risk characteristics (skewness and kurtosis). The RW correlation assumption between different asset classes also need to be specified.

3. Afterwards it will be a trial-and-error optimization process. The investor then identifies all the relevant constraints and selects a large number of different Strategic Asset Allocation ("SAA") candidates satisfying such constraints. The expected return and risk (commonly measured in terms of volatility or value-at-risk ("VaR")) of each SAA candidates are computed to establish the efficient frontier ("EF").

4. The final SAA is decided by picking the SAA candidate that lies on the upper range (relatively high expected return per risk taken) of the EF and satisfying the risk appetite and objectives of the investor.

(D) Establishing Investment Strategies for Non-Participating Products

Now, when it comes to the asset allocation for an ALM-driven insurer, we can follow the same approach but with some modifications to reflect the effect of the liabilities.

D1. Replicating Bond Portfolio Approach

For Non-Par products, one way to reflect the liabilities in the EF analysis is to replacing them with a portfolio of cashflow replicating zero-coupon bonds or interest rate swaps ("IRS"). Thereafter, the asset allocation process becomes an asset-only question, consisting of the long-short portfolio (in which the long-portfolio is the invested assets whose allocation is to be optimized, and the short-portfolio is the replicating bonds or IRS in which the allocation is pre-determined). The EF approach mentioned before can then be applied.

Due to its simplicity, this is a common approach if the SAA is performed by the investment team or an external asset manager who doesn't have access to the insurer's actuarial models.

D2. Embedded Value ("EV") Approach

A shortcoming of the replicating portfolio approach is that it only reflects how much economic value is generated upon different RW scenarios, but does not reflect the insurance-specific regulatory constraints that limit how quickly this economic value generated can be distributed to the SH. Given most insurers have a relatively high cost of capital, the speed of distribution is also a significant factor in deciding on the asset allocation strategy.

The EV approach replaces the economic surplus generated, or in another word, the P&L of the long-short portfolio mentioned in the previous approach, by the EV. The expected value of such EV is the measurement of the returns from an ALM angle, while the uncertainty of such EV is the ALM risk measurement.

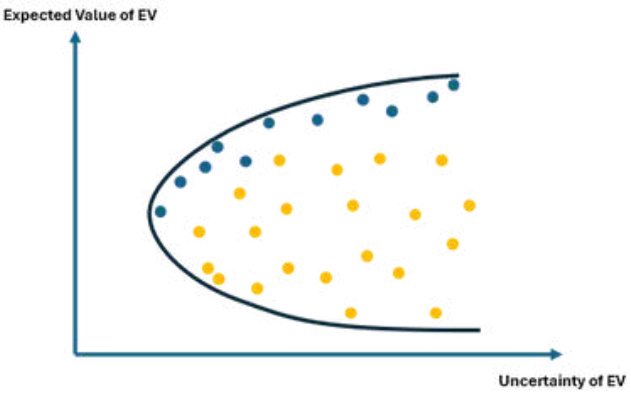


Figure 3: EF Analysis using EV as the Return and Risk Metrics

Recalling that the EV is the present value of the distributable earnings. The distributable earnings consist of the insurance cashflow, the investment return, and well as the amount in each period to be set aside for the actuarial reserve and required capital. Hence, the EV can capture both how the investment strategy will affect the **investment return**, as well as how it will affect the amount to be set aside (e.g. **risk-based capital amount**) and not yet distributed to the shareholders.

There are a few technical details to note when using the EV approach to optimize the SAA:

- To capture the expected return due to the investment risk premium, the EV used for the analysis need to be the RW EV, instead of market-consistent embedded value ("MCEV").
- To avoid double-counting the penalty for the investment risk-taken, it is preferred to use the same risk discount rate to compute the EV under different SAA candidates. One possibility is to use the prevailing risk discount rate ("RDR") in the insurer's traditional EV ("TEV") reporting, and another possible is to simply use a risk-free rate (i.e. a non-risk adjusted EV).
- The EV for reach SAA candidate should be computed with a large number of RW scenarios to come up with the expected return and risk measures. However, if the analysis is performed for the simpler liabilities and to save computation effort, it is also possible to just run two deterministic scenarios (a baseline and a diversified stress scenario) to come up with the return and risk measurement.

D3. Simplified EV Approach

Given the required economic capital (e.g., HKRBC prescribed capital amount) is also a widely used ALM risk measurement, some companies may replace the risk metric in the EV approach (i.e. the uncertainty of EV), by the (standalone or marginal impact to the) required economic capital.

One potential issue to use such simplified approach in the EF analysis is that the required economic capital in most regimes is based on the short-term tailed risks, and hence only reflects the prevailing ALM profile of the liabilities, instead of what over the lifetime of the policies in the real-world projection. For example, it cannot capture:

- The aging effect – i.e. both assets and liabilities' remaining tenor will decrease over time, assuming no active rebalancing;
- The decrease in surrender charge (as buffer for taking risks) in the universal life products over time; and
- The increase in asset share buffer (i.e. terminal dividend cushion) in the participating products over time.

Such simplified hence should only be applied in a situation in which liability profile is relatively stable, for example, in a yearly-renewable non-Par product.

ALM Constraints

Besides having a modified measurement for the return and risk in the EF analysis, an ALM-driven investor also has their own sets of constraints that need to be considered when filtering the SAA options.

The most common ones are

- Maximum duration gap allowed;
- Maximum regulatory capital or minimize solvency ratio allowed, under baseline and/or stressed scenarios; and
- Maximum earning volatilities allowed; and
- Excess liquidity under stressed scenarios.

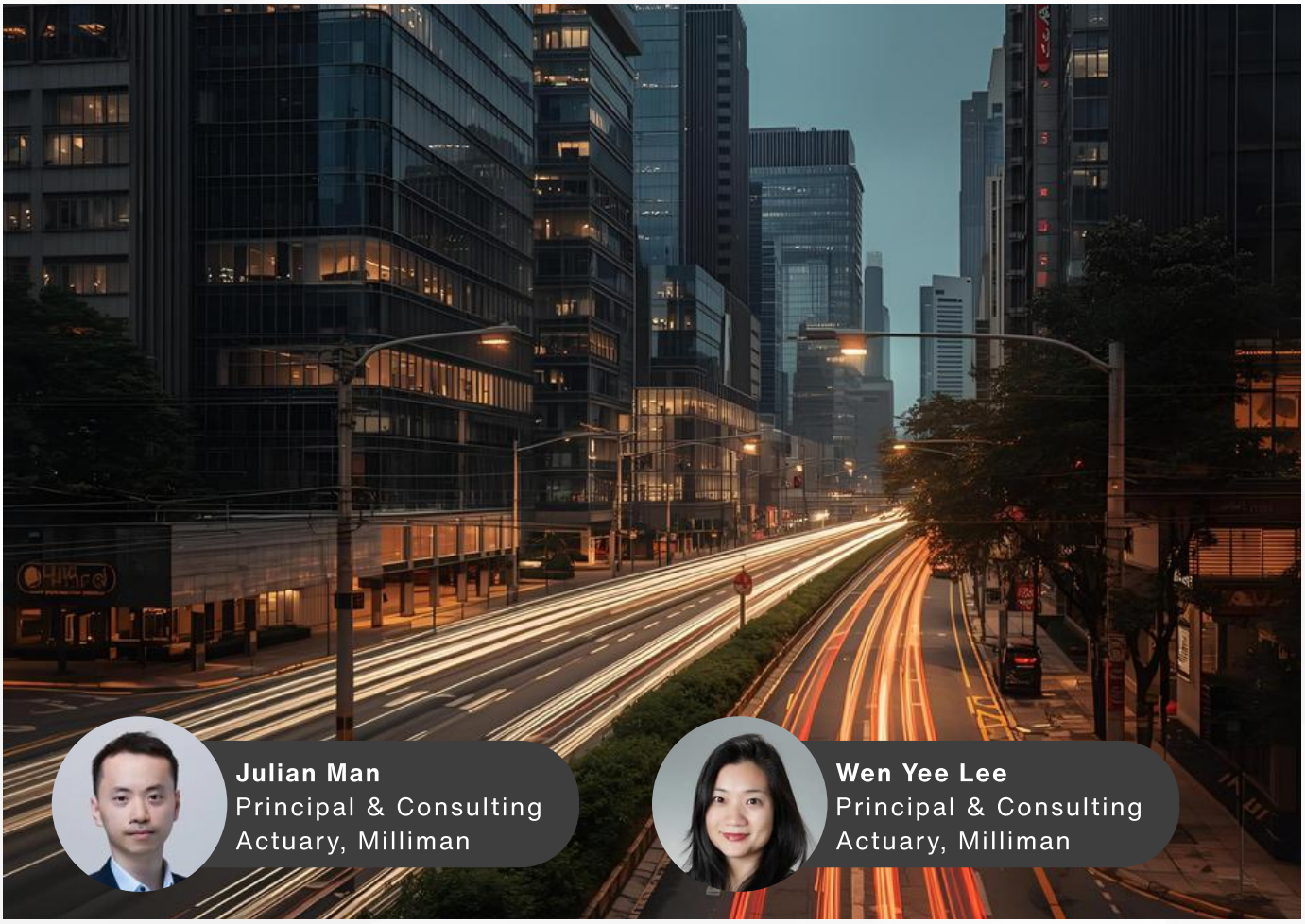
For example, some insurers limit their Non-Par portfolio investments to listed equities, because of the potential IFRS or US GAAP accounting volatility. This is despite the fact that an economically efficient portfolio in the EF analysis may consist of both bonds and equities, to maximize the diversification benefits.

(E) Summary

In this article, we start from how to establish the liability-driven investment strategies for the insurers, which consist of both a "where" (which portfolio to transact the investment and hedge) and a "what" questions (the asset allocation and hedging strategies).

And before we move to the discussion on Par products, which can be quite complicated, we first use the Non-Par portfolios to illustrate some concepts, namely, the replication portfolio approach and embedded value approach for the ALM-based EF analysis.

In the next article, I will further explain how the ALM of a Par product can be different from a non-Par product, and how to apply the EF concepts discussed in this article to fit the Par products. ■



PRODUCT PRICING IN TRANSITION ACROSS ASIA

Considerations for pricing models under IFRS 17 and risk-based capital regimes, and the way ahead

Introduction

The insurance industry across Asia is experiencing profound changes due to the adoption of IFRS 17 and riskbased capital (RBC) frameworks. In addition to the recent implementation efforts for in-force valuation, these regulations demand a reassessment of conventional pricing models and metrics. This paper examines how these shifts affect the development of product pricing models, highlighting the new requirements and key considerations under these regimes. Our goal is to provide insights into how insurers can successfully navigate and prosper in this changing environment, with a particular focus on enhancing pricing models by leveraging new technologies.

The changing landscape

PRICING PROCESS

The typical process for developing insurance products involves several critical stages:

- Product design, where insurance products are crafted to meet market demands
- Product classification and assumption setting, where products are categorized and essential assumptions are defined

- Pricing model development, which entails constructing models to forecast costs, set premiums, and ensure profitability under a particular reserving framework
- Profit testing, to evaluate financial viability under various scenarios to meet internal pricing metrics
- Product approval and launch, which involves securing necessary approvals and introducing the products to the market

Although the introduction of new regimes will influence all the aforementioned areas to some extent, the two most significantly impacted areas are pricing model development and profit testing.

CONTINUED EVOLUTION OF PRICING METRICS

A common question is whether pricing metrics should change when moving to a new regime. Generally, pricing metrics fall into three categories: value creation, such as new business value within a traditional or European embedded value framework; return to shareholders, often measured by internal rate of return; and profit emergence, which includes measures like break-even year or distributable earnings profile, concerning the timing of future profit under the statutory balance sheet. Observations from the Hong Kong market, which implemented IFRS 17 in 2023 and adopted Hong Kong RBC (HKRBC) in 2024, indicate that these pricing metrics have largely remained unchanged despite the change in regimes. The changes are limited to the underlying reserve calculation for IFRS 17 and HKRBC, as well as required capital considerations for HKRBC or contractual service margin (CSM) calculations for IFRS 17.

However, we believe companies could consider introducing new pricing metrics to align with the specific focus of each regime. For instance, under IFRS 17, CSM for new business is introduced to represent shareholder value creation on the accounting balance sheet, and the CSM amortization rate indicates future accounting profit release. Furthermore, as companies transition to RBC regimes, asset and liability management (ALM) becomes more important, making it crucial to identify products with significant ALM issues during the pricing stage. Despite this, few companies set ALM constraints during pricing, though they are considering them more actively at this stage, with ALM practices typically managed at the in-force aggregate level.

The new challenges for existing pricing models

THE PROJECTION OF ECONOMIC BALANCE SHEETS DURING PRICING STAGE

The most significant overhaul of the pricing model involves developing a functionality that can project an economic balance sheet (EBS) with sufficient accuracy to capture all essential characteristics while remaining practical enough to accommodate the dynamic nature of product pricing.

Both IFRS 17 and RBC regimes, such as HKRBC, share similar fundamental elements, including a best estimate liability (BEL), which captures the time value of options and guarantees (TVOG), and a risk margin (RM) for RBC or risk adjustment (RA) for IFRS 17. The primary distinction between the two, however, is that IFRS 17 creates an additional CSM liability on the balance sheet to offset any day-one gains, whereas some RBC regimes permit the recognition of a day-one surplus. Under an RBC regime, it is necessary to project the required capital to evaluate both the solvency level and the costs associated with meeting the capital requirements. As assets and liabilities are projected forward,

their corresponding movements will form the basis of the product's profits. The following illustration demonstrates how the profit and loss (P&L) interacts with the balance sheets under IFRS 17.

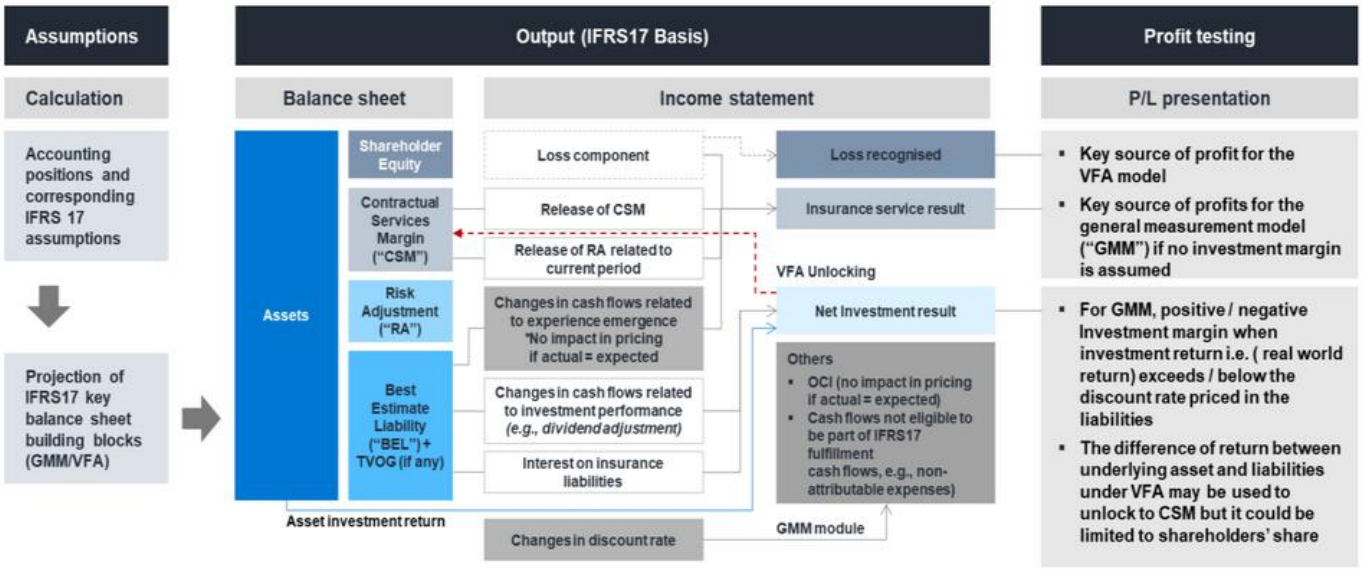


Figure 1: An Overview of Product Pricing based on IFRS 17

THE PROJECTION OF STOCHASTIC BEL DURING PRICING STAGE

A significant challenge is forecasting the stochastic BEL for both IFRS 17 and RBC. Although a nested stochastic model can be created using actuarial software to assess TVOG at each projection year, this method may not be the most practical. Product pricing is usually an iterative process involving the testing of various assumptions and policyholder benefits, which makes a complex in-house actuarial model less appealing. An alternative common approach involves determining the TVOG at inception, deriving a factor based on certain drivers, and projecting the TVOG at future points in time. More advanced factor methods involve analyzing TVOG sensitivity to different interest rates and adjusting the TVOG factor projection according to assumed future interest conditions. Despite all these simplifications, a key consideration persists: whether a stochastic model can be effectively used during the pricing stage, which could be crucial for accurately pricing products under the new framework. The following illustration demonstrates the overview of projection of the balance sheet items under IFRS 17.

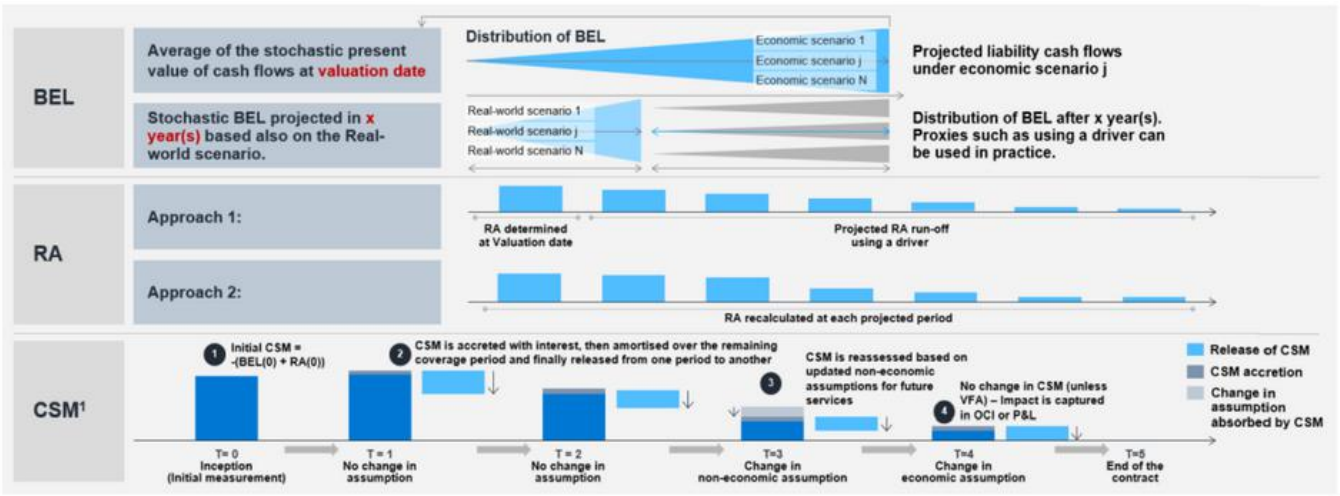


Figure 2: A typical projection of a IFRS17 balance sheets

THE ALM MODEL FOR STOCHASTIC PRICING

Companies typically utilize an ALM model to assess the TVOG, primarily for valuation purposes. Whether implemented through in-house actuarial software, Excel, or other platforms like Python, an ALM model comprises three fundamental components: asset modeling, adjustments to non-guaranteed benefits, and investment strategy.

Asset modeling involves forecasting asset values, whether in market or book value, across different asset classes such as fixed-income securities or equity indices using standard approaches (i.e., discounting asset cash flow for fixed-income assets). Adjustments to non-guaranteed benefits are generally based on the ompany's internal dividend and bonus policies

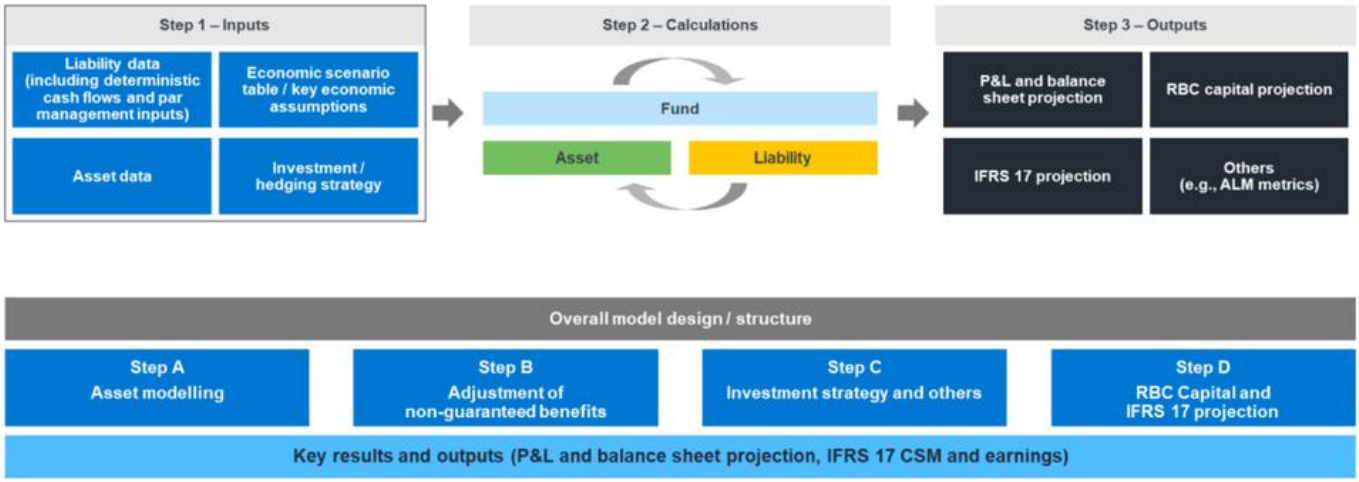


Figure 3: An ALM Model (Exce;-based or other) is typically composed of the following blocks

THE ALM MODEL FOR PROJECTING CAPITAL REQUIREMENTS UNDER AN RBC FRAMEWORK

Besides assessing TVOG, an ALM model can be readily adapted to project capital requirements for market risks under RBC frameworks, including interest rate changes, credit spread widening, and equity shocks from first principles. For instance, the main source of interest rate risk charges, or prescribed capital requirement (PCR), under RBC is the mismatch between asset and liability cash flows. The interest rate PCR corresponds to the drop in net asset value resulting from a specific interest rate shock (as illustrated below). The post-shock asset value can be calculated at each projection point by discounting asset cash flows using the stressed yield curve. Similarly, the impact of an interest rate shock on liabilities can be assessed by discounting the liability cash flows with the stressed yield curve. ALM models will also capture any loss absorption capability of non-guaranteed benefits through the interaction of assets and liabilities.

Another common approach involves using a factor, where the projected PCR is based on drivers derived from an existing block of products with similar features. However, caution is required when applying this method. For example, with a limited pay product that has a five-year premium payment term, the evolution of market risk charges may differ between the premium payment period and after it ends. A factor approach might not capture these impacts with sufficient granularity, potentially failing to identify major ALM issues (for example, the biting direction of interest rate stress may be different from an in-force product) during pricing, but realizing them only once the product is in force.

Additionally, projecting market risk charges at different points in time enables a clear evaluation of the product's ALM risks throughout various phases and helps identify potential management actions, such as reinsurance or derivative hedging, to manage underlying ALM risks during product pricing.

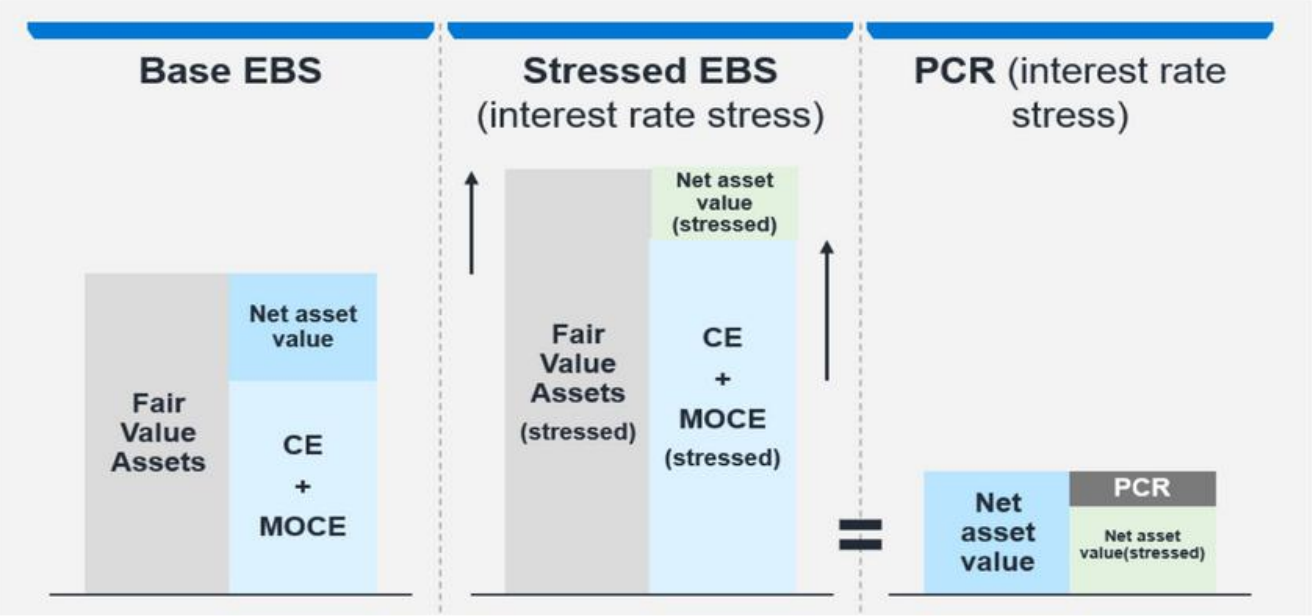


Figure 4: Source of Interest Risk Charges

INTRODUCING ALM METRICS DURING PRICING UNDER RBC

In the context of ALM, achieving regulatory compliance is fundamental, but the optimization of capital efficiency and the management of surplus at risk are equally critical during the pricing stage. A common metric used in assessing ALM risk is DV01 (or DV100), which measures the change in value for a one-basis-point (or 100 basis points for DV100) parallel shift in the interest rate yield curve. This metric serves as a proxy for assessing interest rate risk charges. Metrics such as surplus DV01—calculated as the DV01 of assets minus the DV01 of liabilities—and matching ratios, like the DV01 of assets as a percentage of the DV01 of liabilities, are essential for evaluating ALM effectiveness. In addition to DV01, key-rate duration metrics such as KDV01 are considered to assess the impact of nonparallel yield curve movements. KDV01 measures the change in value for a one-basispoint shift at a specific term on the yield curve. Although convexity metrics are less frequently utilized, defining metrics and setting risk tolerance targets in line with ALM risk management policies is crucial.

For example, a goal might be to keep the surplus shortfall within 1% of the baseline surplus for each one-basispoint shift in interest rates. Identifying key projection years for analysis is crucial; these could include the starting point (time 0), the moment when all premiums are paid for limited-pay products, and regular intervals such as every five or 10 years. Recognizing that the process could be time-consuming, it may not be necessary to calculate metrics from first principles for all projection years.

To enhance the analysis, simplifications or proxies can be applied. For example, when managing new products within a wider product category composed of existing in-force products, consider a business plan approach where cash flows from the new product are integrated into the existing portfolio using a projected sales mix. The main goal is to determine if the inclusion of new sales adversely affects the ALM metrics in the early years— something not evident in a standalone assessment of a new product, as the diversification effect between in-force products are not captured.

Additionally, for products without a comparable existing portfolio, rather than assessing ALM metrics for a single year, it is advisable to analyze future sales and estimate aggregated ALM metrics, weighted by specific drivers, to understand the overall impact at specific time intervals. Hence, in light of the shift toward EBS frameworks and the uncertain interest rate environment, the demand for more sophisticated pricing tools has markedly increased.

KEY FEATURES FOR NEXT-GENERATION PRICING TOOLS FOR IFRS 17 AND RBC

The next generation of pricing tools will feature three key elements that are essential for effectively assessing different pricing metrics.

The first feature involves projecting assets and analyzing their interactions with liabilities. This is crucial for evaluating the TVOG, as well as understanding policyholder behaviors, such as dynamic lapses. These insights are vital for accurately assessing risk and ensuring the financial soundness of products under these new regimes.

The second feature is the development of a pricing model that integrates both IFRS 17 and RBC calculations. This integration is expected to result in a sophisticated model, but it may lead to longer execution times, which can be challenging given the rapid pace of pricing activities. Therefore, maintaining speed and efficiency will be critical to meet business demands, considering the dynamic nature of product pricing.

The final feature is that both IFRS 17 and RBC require complex calculations and projections, which necessitate careful scrutiny and awareness of potential model risks. Ensuring the accuracy and reliability of these calculations is paramount, making verifiability and clarity in the modeling process essential to mitigate risks and enhance decision making.

The revamp of existing pricing tools and the case study of Milliman Mind

The first of the previously described key features can be met through the use of an ALM model, which can be Excel-based or use other platforms, while the second and third features can be addressed by utilizing the latest technologies. For example, cloud-based software can significantly reduce processing time by utilizing GPUs instead of conventional CPU calculations. Milliman Mind is one such example.

Milliman Mind uses Excel-like formulas for users and incorporates high-performance computing technology to provide superior calculation capabilities, allowing large-scale complex models to be processed quickly and efficiently. Conversion to Milliman Mind can be based on an original Excel model, with limited modifications that will maximize the effectiveness of Milliman Mind functions.

As an example, Milliman's Hong Kong office has developed an Excel-based ALM model to estimate the TVOG for a participating product offering reversionary and terminal bonuses. This model incorporates asset share based on projected asset values with annual time-step calculation and bonus adjustment mechanisms, while the input consists of liability cash flows from a separate liability model. Running this model on a system with 12 cores takes roughly one hour for 1,000 scenarios. After migrating to the Mind platform, the model reduced core usage to eight and completed the runs in just three minutes.

Cloud-based solutions also offer process automation to streamline workflows that may take longer due to manual operations. In our previous scenario, the ALM model relies on cash flows from an Excel-based liability

model. The process to update the liability cash flows in the ALM model from the underlying liability model can become cumbersome when pricing assumptions change, as the liability cash flows must be manually recalculated from the liability model before being input into the ALM model. By converting both the ALM model and the liability model to the Mind platform, the interlinks function in the platform can connect the output of the liability model directly to the ALM model as its input, allowing ALM results to be generated automatically after the liability calculations are completed. Since Mind utilizes GPU technology, it allows for the simultaneous execution of multiple Excel calculations, greatly enhancing process efficiency.

A practical example of the interlinks function during the pricing stage is its ability to configure multiple runs with different assumptions or premium rates in the liabilities model. This setup provides various liability cash flows to the ALM model, allowing it to be rerun and generate varied results based on different liability profiles, all within a single execution. In the past, this would have required multiple executions in Excel to achieve the same outcome.

At the same time, software such as Milliman Mind is designed to maintain audit trails, enhancing governance and transparency while preventing any black-box calculations.

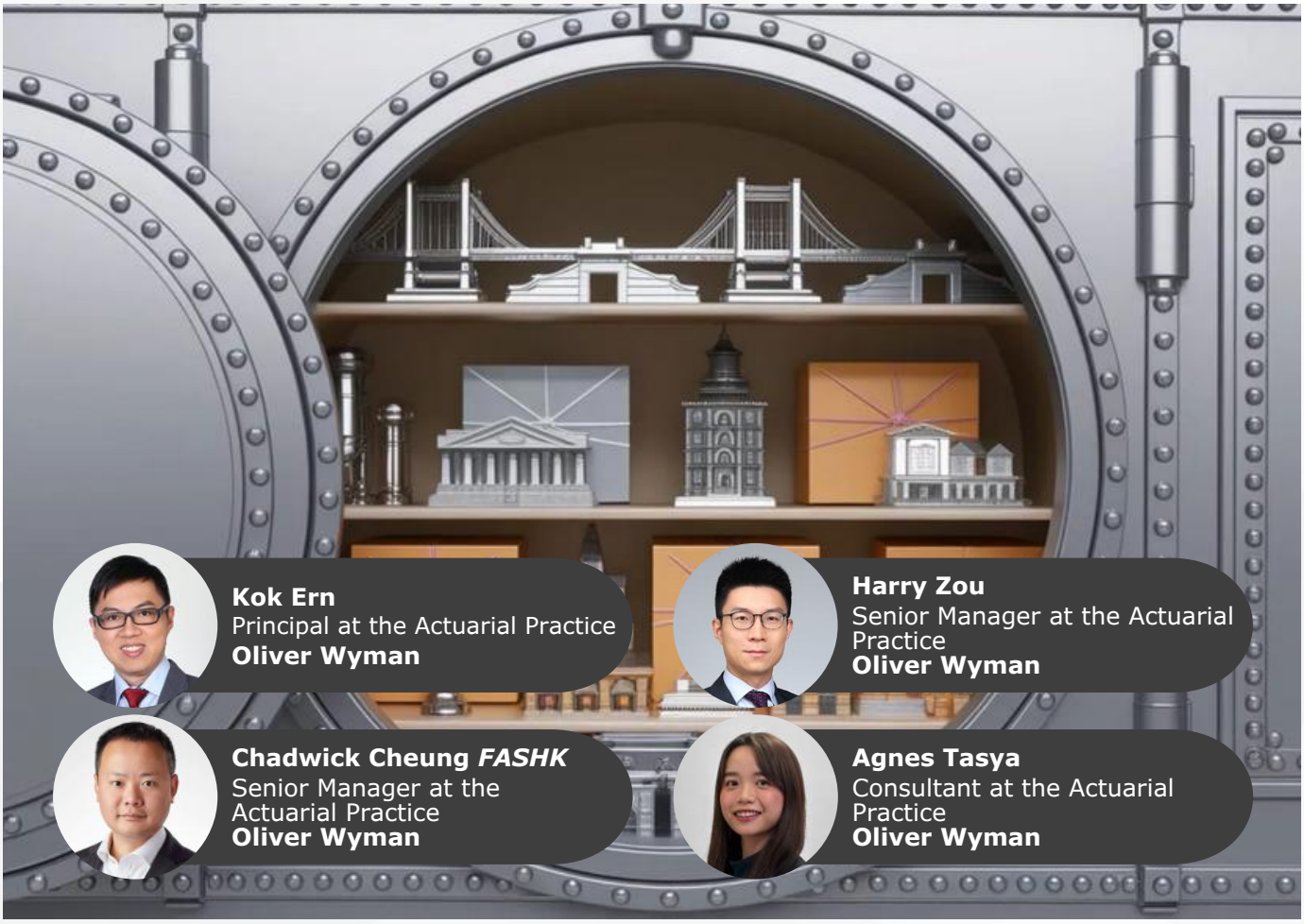
Conclusion and the way ahead

The insurance industry in Asia is undergoing a significant transformation due to the implementation of IFRS 17 and RBC frameworks. These changes necessitate a reconsideration of traditional pricing models to ensure compliance with new standards while maintaining competitive advantage. This paper has explored the impact of these regulatory shifts on product pricing models, highlighting the need for insurers to adapt and innovate.

The introduction of economic balance sheets and the focus on ALM have brought new challenges to pricing processes, demanding more sophisticated tools and methodologies. The projection of stochastic BELs and the integration of ALM models for assessing TVOG and capital requirements are crucial steps in this adaptation.

As insurers transition to these new regimes, leveraging advanced technologies like cloud-based solutions can significantly enhance efficiency and accuracy. Milliman Mind, for instance, exemplifies how modern platforms can streamline complex calculations and automate processes, reducing execution times and facilitating dynamic pricing strategies. By integrating IFRS 17 and RBC calculations within pricing models, insurers can better manage risks and optimize capital efficiency, ensuring financial soundness while meeting regulatory demands.

In conclusion, the shift toward EBS frameworks and the evolving interest rate environment underscore the necessity for next-generation pricing tools. Insurers must embrace innovation and technology to navigate the complexities of IFRS 17 and RBC regimes successfully. By doing so, they can not only achieve regulatory compliance but also enhance their competitive position and drive value creation for shareholders. As the industry continues to evolve, the insights and strategies discussed in this paper will serve as a foundation for future advancements in product pricing across Asia.



ALTERNATIVE ASSETS FOR LIFE INSURERS IN HK

1. Introduction

Life insurers in Hong Kong have long been investing in government and corporate bonds as the main asset classes backing long-duration liabilities, coupled with equities to provide better long-term returns. As yields remained low for much of the past decade and liability durations extended, many insurers are increasingly turning to alternative assets which typically offer yield enhancement opportunities and liability-matching characteristics that traditional fixed-income assets may not adequately provide in a competitive market.

Recent developments in Hong Kong also mean that now is an opportune time to consider how alternative assets could play a role in the insurance balance sheet:

- The new Hong Kong Risk-Based Capital ("HK RBC") regime became effective on 1 July 2024, requiring insurers to hold sufficient capital commensurate with their risk exposures. At the same time, insurers strive to become more capital efficient in order to remain competitive. Hence, insurers are increasingly exploring alternative assets (private assets in particular) that align with their asset-liability management ("ALM") and investment objectives.

- The Insurance Authority ("IA") is reviewing[1] the capital requirements under HK RBC with the aim to incentivize insurers to invest in local infrastructure projects for risk diversification and supporting long-term economic development in Hong Kong.
- Hong Kong's wider role in Greater Bay Area connectivity, Renminbi ("RMB") internationalization, green finance hub, etc. further widens the spectrum of alternative assets available to insurers.

Increasing investment in alternative assets is also observed globally. For example, in a Mercer and Oliver Wyman's 2024 Global Insurance Investment Survey[2] a key finding was that almost three-quarters of insurers were currently investing in private markets or plan to do so in the next 12 months. Furthermore, 39% of insurers planned to increase private market allocation, with private debt topping the shopping list.

In this article, we will introduce some of the alternative assets life insurers typically invest in, reasons why life insurers might invest in these assets, common challenges facing alternative asset owners, regulatory considerations and wider practical considerations.

2. Alternative Assets Insurers Typically Invest In

What are alternative assets? Broadly speaking, they are assets that fall outside of the traditional asset classes such as stocks, bonds and cash. Alternative assets generally have the following key characteristics (not exhaustive):

- **Diversification** - their returns tend to be less correlated with traditional markets, helping reduce overall portfolio volatility.
- **Liquidity** - they are less liquid, requiring longer holding periods and more complex exit processes.
- **Complexity** - they may involve sophisticated structures and high minimum investments.

The table below illustrates some of the alternative assets that insurers typically invest in, along with an indicative level of liquidity risk and valuation complexity for each (which is further detailed in Section 4).

Asset class	Description	Liquidity Risk	Valuation Complexity
Infrastructure Equity	Direct ownership stakes in infrastructure assets, typically held through private investment vehicles	●●●●●	●●●●●
Private Equity / Venture Capital	Investments in privately held companies or startups, often through funds or direct ownership	●●●●●	●●●●●

Asset class	Description	Liquidity Risk	Valuation Complexity
Structured Credit	Financial instruments created by pooling and tranching debt obligations, such as loans or receivables	●●●	●●●●●
Real Estate	Investments in physical properties, including commercial, industrial, or residential buildings	●●●●	●●●●
Infrastructure Debt	Long-term loans to fund essential infrastructure projects.	●●●●	●●●●
Private Credit / Direct Lending	Loans or debt financing provided directly to companies outside of the public bond markets	●●●	●●●
Insurance-Linked Securities ("ILS") / Catastrophe Bonds	Financial instruments that transfer insurance-related risks to capital market investors	●●●	●●●
Hedge Funds	Pooled investment vehicles that use a variety of strategies to invest in public or private assets	●●●	●●
Environmental, Social, Governance ("ESG") and Green Bonds	Bonds issued to finance projects or initiatives that meet environmental, social, or governance criteria	●	●

Ratings are presented on a scale of 1 to 5, where "●" represents the lowest liquidity risk/valuation complexity and "●●●●●" represents the highest liquidity risk/valuation complexity. Note that these ratings are indicative and highly dependent on the specifics of the asset.

There is a growing interest among life insurers in Hong Kong in exploring private assets such as real estate, infrastructure debt, and private credit. Alongside this, insurers are increasingly focusing on developing robust processes around asset selection, assumptions setting and valuation to effectively manage the unique risks and complexities associated with these alternative investments. This evolving approach reflects a broader industry trend toward diversifying portfolios to enhance yield and optimize capital efficiency.

[1] Insurance Authority welcomes 2024 Policy Address
[2] Mercer & Oliver Wyman 2024 Global Insurance Investment Survey

3. Reasons Why Life Insurers Invest in Alternative Assets

Life insurers have increasingly been exploring alternative assets as part of their asset allocation due to the benefits they typically offer. These include:

- **Higher yields**

Many alternative assets such as private credit, infrastructure debt and real estate offer a higher yield over traditional fixed income. Private credit could offer an additional 350 - 600 bps[3] over global investment grade bonds. Higher yields in alternative assets come from taking on illiquidity risk and tapping into opportunities that require specialist expertise from asset managers (e.g. asset origination).

- **Diversification**

Alternative assets often have low correlation with public equities and bonds, helping to reduce overall portfolio risk. Hedge funds may employ strategies unlinked to market direction, while private markets (e.g. private equity or real estate) respond to different economic and operational drivers compared to listed securities. This diversification can smooth overall investment performance and mitigate exposures to broad market downturns.

- **Liability and duration matching**

For insurers with long-dated liabilities, alternative assets such as infrastructure debt provide predictable and long-duration cash flows. These assets can be structured to align closely with future obligations, reducing interest rate and reinvestment risk often seen in traditional bond portfolios.

Certain alternative assets, such as structured products with prepayment features, can also help mitigate lapse risk. The prepayments on these assets behave similarly to policy lapses: both tend to respond similarly to interest rates changes. For example, in a scenario where interest rates increase, these investments generate more prepayments, which can be used to pay off the surrender claims.

- **Inflation hedging**

Real assets such as infrastructure equity and real estate often feature inflation-linked revenue or intrinsic value that appreciates over time in line with inflation.

- **ESG and green alternatives**

Alternative investments offer a platform for a more direct influence over ESG outcomes. Green bonds and renewable energy infrastructure align with insurer-led climate commitments.

- **Accounting "smoothing"**

Alternative assets could dampen reported volatility in both profit and loss ("P&L") and the balance sheet because many are valued on appraisal-based or manager-reported net asset values ("NAVs") rather than continuous market pricing. This creates a natural smoothing and timing lag where shifts in public markets may not be recognized immediately in alternative investments, reducing apparent drawdowns and correlations in turbulent periods, but with potential "catch-up" adjustments later.

4. Challenges Associated with Holding Alternative Assets

While alternative assets offer a number of benefits, it is important to understand the risks that come with these investments.

- **Illiquidity risk**

Liquidity is a challenge for alternative assets

[3] Franklin Templeton Capital Markets Insights Group, As of 31 December 2024.

because they lack the continuous, transparent markets and standardized trading mechanisms that make traditional securities easy to transact. The key factors driving this illiquidity include:

- Long lock-up periods - Alternative assets such as private equity and venture capital require investors to commit capital for a fixed period before any distributions, preventing redemptions during the lock-up period
- Limited secondary markets - Direct stakes in private companies and infrastructure loans trade infrequently and only through negotiated transactions
- Redemption restrictions - Hedge funds and unlisted property trusts often impose notice periods (typically 30 - 90 days) and quarterly / annual redemption windows
- High transaction costs - Selling real assets or structured loans involves due diligence, legal documentation and broker fees

This lack of liquidity can pose challenges in managing uncertain cash flows or meeting unexpected obligations. However, alternative assets usually make up only a minor portion of an insurer's portfolio. Liquidity needs in stressed situations would typically be met first by drawing on the most liquid conventional assets rather than resorting to fire sales of alternative assets.

- **Valuation complexity**

Unlike publicly traded assets, the valuation of alternative assets presents unique difficulties compared with traditional assets. The primary challenges include:

- Infrequent transactions - Without continuous price discovery in a liquid market, valuations often rely on appraisals, mark-to-model techniques or comparable transaction data rather than transparent market quotes
- Heterogeneous structures - Many alternative assets feature bespoke legal and financial structures such as tranche subordination in collateralized loan obligations or waterfall distributions in private equity. Each structure's cash flow profile and risk allocation require sophisticated, asset-specific valuation models
- Limited and inconsistent data - Performance and risk metrics for alternative assets often derive from self-reported fund returns, appraisals or sponsor-provided forecasts, which could suffer from selection bias, subjective assumptions and inconsistent reporting standards

This subjectivity can lead to discrepancies in fair value estimation and affect performance reporting. IFRS 9 requires financial assets to be measured at amortized cost, fair value through profit or loss ("FVTPL") or fair value through other comprehensive income ("FVTOCI"). If alternative assets were measured at FVTPL, this could introduce earnings volatility, as changes in fair value directly flow to the financial statement.

- **Lack of credit rating**

Unlike traditional securities, alternative assets such as private equity and infrastructure debt/equity often lack transparent pricing and standardized ratings, complicating regulatory capital and risk assessments. This necessitates specialized expertise to thoroughly evaluate investment risks, including illiquidity and valuation uncertainty. Ongoing management requires dedicated professionals to monitor performance, conduct stress tests and ensure transparent reporting, which are key to regulatory compliance and effective risk management.

- **Lack of expertise and a steep learning curve**

Alternative assets demand skills many insurers may not have historically built in-house, such as private credit underwriting and monitoring, asset valuation, legal structuring and special servicing. Standing up the operating model requires cross-functional talent and time, often relying on external managers and vendors while internal teams upskill. The transition phase introduces execution risk and model/governance risk as policies, controls and accountabilities mature.

- **Higher investment charges**

Alternative strategies typically carry higher management and performance fees than public markets, with additional layers such as fund-of-funds or special purpose vehicles ("SPVs") increasing all-in costs. Transaction and ongoing expenses (legal and tax structuring, due diligence, valuation, administration, custody and monitoring) add to fee drag and can narrow the illiquidity premium if not tightly managed. Insurers should consider evaluating net-of-fee, net-of-capital returns and negotiate fee structures to ensure economics remain compelling.

It is worth noting that alternative assets are not always riskier than other assets that insurers might consider "conventional".

5. HK Regulatory Considerations

As life insurers seek to optimize their investment portfolios with alternative assets, they need to consider regulatory implications such as capital charges under HK RBC, prudent management of the assets and having a clear understanding of the risk exposures.

The following summarizes the HK RBC treatment on alternative assets, grouped under the key risk capital modules:

- **Credit spread risk capital:** Apply credit stress factors corresponding to the credit rating band and remaining term to maturity of the asset (Part 5, Division 2, Rule 48 of HK RBC)
    - *Structured Credit, Hedge Funds (debt):* Apply look-through if applicable
    - *Infrastructure Debt, Green/ESG Bonds:* For recognized bonds, stress factors are multiplied by a factor of 0.9
    - *Private Credit / Direct Lending*
    - *ILS/Catastrophe Bonds*

- **Equity risk capital:** Apply the adjusted equity downward stress factor according to the type of equity. (Part 5, Division 2, Rule 49 of HK RBC)
    - *Private Equity / Venture Capital, Hedge Funds (equity):* Apply look-through if applicable (e.g. funds or portfolio investments)
- **Property risk capital:** Risk charge of 25% (Part 5, Division 2, Rule 50 of HK RBC)
    - *Real Estate*

The look-through approach for portfolio investments aims to align capital requirements with the true economic risk of underlying assets. If look-through is not possible, a punitive 50% capital charge is applied, regardless of the underlying asset mix. While primarily targeted at investment portfolios, this treatment is also applicable to some alternative assets such as private credit, real estate investment trusts ("REITs") and hedge funds. However, implementing look-through can be operationally demanding, requiring detailed disclosures and ongoing data management.

Additionally, Guideline 13 ("GL13") by the IA sets principles for prudent asset management

by authorized insurers, and requires a Board-approved investment policy that defines permissible assets, risk appetite, concentration limits, etc. supported by strong governance and manager oversight. Although it does not specifically highlight the treatment of alternative assets, it emphasizes robust risk monitoring, independent and transparent valuation (particularly for illiquid or model-priced assets) and regular stress and scenario testing, including liquidity considerations. GL13 also expects investment strategies to align with ALM objectives and liability profiles, ensuring liquidity and solvency considerations are embedded.

6. Key Considerations for Insurers to Expand into Alternative Assets

Expanding into alternative assets presents significant opportunities for life insurers in Hong Kong but also introduces unique challenges that require careful management across risk, capital, liquidity, manager selection and strategic integration. Below are some key considerations insurers should consider navigating in this evolving landscape.

- **Impact on risk and capital**

As discussed earlier in the article, unlike traditional public market investments, alternative assets are typically more complex and more challenging to evaluate. Under a risk-based capital regime, riskier assets generally attract higher capital charges. Not all alternative assets are inherently riskier than conventional assets, however, the capital risk charge treatment depends on the underlying nature, liquidity, and credit quality of the asset class. Insurers should consider the impact on solvency and how this translates into risk-adjusted returns. Stress and scenario testing helps to understand if exposures are consistent with the insurer's risk appetite and ensure that the capital position is resilient.

With potential capital relief for infrastructure equity and a strong policy focusing on green investments and Greater Bay Area projects, alternative assets are expected to grow in importance among life insurers in Hong Kong. Looking ahead, investment mandates, technical know-how and risk management frameworks will also need to evolve in sync, enabling insurers to harness these alternative assets more effectively.

- **Integration into ALM and SAA processes**

The strategic incorporation of alternative assets needs to be seamlessly integrated into the insurer's ALM and strategic asset allocation ("SAA") frameworks at the level of decision-making. Alternative assets affect liability matching, capital requirements, liquidity profiles and earnings volatility. Boards and senior management should consider explicitly incorporating alternative asset cash flows, risks, and capital impacts into their Own Risk and Solvency Assessment ("ORSA") and capital planning. This integration enables holistic decision-making that balances yield enhancement with risk management objectives and policyholder obligations. Transparent reporting helps the board understand the implications and approve portfolio allocations aligned with long-term solvency and shareholder value.

7. Conclusion

Alternative assets are moving from the periphery to a more strategic focus for life insurers in Hong Kong. As yields normalize and the market demands competitive products, alternative assets offer the opportunity to enhance yields, diversify risks and better match long-duration, sometimes inflation-sensitive liabilities. They also provide a route to align portfolios with broader priorities such as sustainability and regional development goals.

CELEBRITY ACTUARY INTERVIEW

Dr. Patrick S. C. POON *FASHK, SBS* | ASHK President (1984)

Dr. POON is a pioneering actuary and insurance leader with over 40 years of experience in the insurance industry. He has served in senior roles of various multinational insurance companies, including AIA, Aetna, ING, and China Pacific Life Insurance. He is the first Hong Kong-born citizen to obtain full professional qualifications from the Institute of Actuaries (IoA) in the UK. He also serves in leadership roles across universities, charities, and community groups, showing his lifelong commitment to actuarial education, the insurance profession, and society.

We are honoured that Dr. POON has accepted our interview invitation with our past ASHK President, Simon LAM, and the Membership & Communications Committee Chairperson, Dr. K. P. WAT.

ASHK: **As the first generation of actuaries in Hong Kong, how did you first learn about this profession and become an actuary?**

Patrick Poon: Not many people knew about this profession in my school years. During my childhood in elementary school, I was self-disciplined and rarely relied on others. I finished my homework independently, and whenever I didn't understand anything, I researched and explored it myself. My Maths performance was full of extremes - at times I failed completely with a zero, yet at other times I proudly scored a perfect 100 once I fully understood the concept.

During my high school years at King's College, I was interested in Chemistry. And to me, Maths was just a subject that I had to study for exams. And what may surprise you, I had better grades in liberal subjects than science subjects in public exam. I even failed my first Maths test during Lower Six (equivalent to current Secondary Six). I first learned about "Actuary" from my Maths teacher, "People who studied Mathematics make the most money as an actuary." Despite this, my interest was always in Chemistry. I had never thought of becoming an actuary. My parents, who are grassroots, never pressured me on studies. Instead, they simply hoped that I would get a job to financially support myself and the family after completing education.

Patrick Poon: With a full scholarship, I further pursued a double major in Chemistry and Mathematics at the University of Hong Kong. By that time, my dream was still becoming a Chemistry researcher. However, in my final year exams, I had very good grades in Maths but suffered a setback in Chemistry. This led me to rethink my direction. With my outstanding Maths results, I got an offer from AIA as an actuarial trainee. At the same time, I also successfully passed the government examination for Executive Officer (EO). Considering stability and expectations from parents, I started my career in a government department.

Approaching the end of the two-year probation period as an EO, I started to rethink my career again. Working as a civil servant was stable, but it lacked stimulation and challenge. I could almost foresee the rest of my life, which deserves to be guided by a bigger dream. So, it brought to my mind the opportunity from AIA two years ago. I am grateful that Terry Jenkins created this headcount for me with extra budget at that time. Although the salary was lower than my prior role in the government, I still decided to step into the insurance industry as an actuarial trainee. Since then, I was motivated to work hard for actuarial exams, partly because I wanted to get the qualifications as early as possible, and partly because the salary increment was important for me as a newlywed. Finally, I successfully passed all exams for professional qualifications within 3 years, and my salary was almost three times as much as it was when I initially began my actuarial career.

ASHK: **You were our ASHK President in 1984. Could you share with us your involvement with the actuarial profession?**

Patrick Poon: After obtaining my professional qualifications, I did actuarial jobs for around 3 months. I was then promoted to a management role as an Administrative Vice President, overseeing internal affairs, including operations, claims, underwriting, accounting, and property in AIA's Malaysia branch. Prior to being the ASHK President, I founded the Actuarial Society of Malaysia (ASM) during my time in Malaysia. At that time, there were in total only four actuaries in Malaysia. Later, I returned to Hong Kong and was nominated to succeed Peter LUK as ASHK President in 1984. Thanks to the excellent work of previous presidents, the association was thriving. I simply followed the footsteps of those before me.

ASHK: **You have worked in various multinational insurance companies across different regions, such as Malaysia, Taiwan and Shanghai. Could you share how your career developed?**

Patrick Poon: After obtaining my actuarial qualifications in 1975, I was assigned to work overseas in AIA Malaysia, helping to lead its local operations. Later I was transferred to the listed company "Malaysian American Assurance (MAA)", where I designed innovative insurance products, restructured assured life tables specific for Malaysian populations, and revisited surplus distribution schemes. With all these, the stock price of MAA rose from $1 to $4 within two years. Indeed, at the time, Hongkongers rarely worked overseas because Hong Kong had a really good economic environment with many foreign investments and high growth. For me

Patrick Poon: the opportunity in Malaysia as a training to shift me from a technical role to a management role, has a great impact in my career.

By 1987, it was the time when the Taiwan insurance market opened to foreign players. I decided to take on new challenges, joining Aetna to start up its new life insurance subsidiary in Taiwan, and introduce groundbreaking innovations. Later in 2000, Aetna Taiwan was acquired by ING, and I was invited as a member of ING Board of Directors, I learnt a lot about the European governance structure while working in this position.

After 5 years, I retired from ING and went to Shanghai joining China Pacific Life Insurance (CPL) as the Chairman of the Operations Committee and represent its foreign private equity investor Carlyle. I was there to provide technical expertise - streamlining and restructuring their operations which supports their Initial Public Offer (IPO) afterwards.

ASHK: **You always engage in community service and devote to leadership roles across universities and charities. What motivates you to do so?**

Patrick Poon: My biggest motivation is to give back to society. I was lucky to have opportunity to attend University with a full scholarship, which gave me a sound base for my future career. So, I always want to give back to universities and the profession, so as to nurture the next generation. I focus my donations on education. Over the years, I have made donations to the University of Hong Kong, including those for establishing scholarships and endowed professorship. I also supported the development of The Hong Kong Polytechnic University (PolyU), serving as a council member and chairman of its Foundation. There was an interesting story here. With the successful run of the foundation, I was grateful to be awarded an Honorary Degree of Doctor of Laws. In recent years, I collaborated with Hang Seng Bank and Hang Seng Management College, helping it successfully obtained the University name and founded its Foundation.

Want to Know More?

If you want to know more about Dr. POON, you are encouraged to read his biography：《膽大包天》，《聽老闆的，就錯：Patrick's Way》，《百變應萬變：百變CEO 潘燊昌職場成功75策》. You will be amazed by his exceptional accomplishment and learn a lot from his professional philosophy.

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THE THROWBACK SPECIAL

Appendix 1: Insights from Mr. Luk on Insurance and Actuarial Science

Yang Bao Hua
Associate Professor of Finance,
School of Business, Shanghai
Normal University

Originally published in Actuarial Communications Vol. 7, No. 1 (June 2009). Transcribed by Yang Bao Hua.

Editor's Note: Mr. Luk is one of the most respected friends among our editorial board. We admire not only his extensive professional expertise but also his unwavering professional ethics and authentic character. Thus, we seize every opportunity during Mr. Luk's visits to Shanghai to engage him with questions from students, academics, and practitioners—aiming to share his invaluable insights broadly.

In mid-April 2009, following a board meeting at PICC, Mr. Luk visited Shanghai. On April 23, our journal hosted an intimate seminar at Shanghai University of Finance and Economics, attended by over a dozen actuarial research students and teachers from actuarial science, insurance, and accounting disciplines. The discussion was dynamic and insightful. Research student Yang Bao Hua transcribed the seminar in Q&A format, with all answers attributed to Mr. Luk. Minor edits were made at Mr. Luk's request for publication suitability.

(Prof. Xie Zhi Gang, as moderator, introduced Mr. Luk and outlined discussion guidelines.)

Q: Mr. Luk, many of our students know of your "smoking cessation insurance policy" story. Was your ultimate success in quitting smoking due to personal willpower or the external accountability enforced by the policy?

Luk: Willpower alone is rarely sufficient - this is an experiential truth and a crucial reason that motivated my friends and colleagues to purchase the policy. That policy's constraints on me were potent! Professor Xie's description omitted a key detail: I didn't merely pay $100 per violation; it was $100 per cigarette. One pack would cost me $2,000 per policyholder! How could I possibly afford it!

Q: A related question: Your policy carried a large coverage, then the corresponding liability exposure would also reasonably become significant. Had "risk capital" adequacy been considered by the insurer given the business scale?

Luk: We lacked today's sophistication - it was a jest, essentially gambling, with no solvency or capital assessment. You rightly identify the core issue: insurance without solvency capital is gambling. One root cause of the subprime crisis was unconstrained capital requirements for financial derivatives.

Q: One more question regarding the solvency capital: China's Insurance Law (2009 Edition, Art. 102) caps P&C insurers' retained premiums at 4 times their total capital and provident fund. This implies a minimum solvency capital requirement of 25% of annual premiums. Yet, CIRC's current solvency framework (since 2000), refer to EU's old rules, requires around 16% of annual premiums (≈6x leverage). Is this regulatory misalignment?

Luk: Two observations for your reference: First, modern insurance regulation emphasizes "principles-based" over "rules-based" approaches, prompting gradual legal revisions. Second, CIRC's 2008 Solvency Management Regulations classify 150% solvency adequacy as "Class II." Setting 150% as the de facto minimum aligns with the China's Insurance Law's 4x limit (150% × 4 = 6). The optimal multiple warrants further study.

Q: The global insurance industry focuses on EU's Solvency II implementation scheduled in 2012. What are your views?

Luk: I hold a sceptical view on this. The principle of Solvency II is good. Its "principles-based" regulatory framework by implementing proactive risk management philosophy is sound. However, I distrust the "Internal Model" for calculating capital requirement (SCR). It would allow firms to choose the models that align with their interest. Gillian Tett's "Fool's Gold" (Financial Times) articulates this well.

Similar problems are correlated with insurance liability, known as mark-to-model liability. I also mentioned this at the 9th Actuarial annual conference last year. Unless you collected long-term and robust data, otherwise model simulation would only be self-deception. In short, I doubt the feasibility of implementation of Solvency II in 2012 that EU is advocating.

Post-subprime-crisis, people will become more risk averse. With or without Solvency II, the probability that systemic failure will occur again in the short time future is small. But with the time going, people's risk appetite inevitably rebounds. Whether Solvency II's framework can effectively control future risks remains uncertain - a decade of observation is needed.

(Moderator reminded: Balance technical questions with general topics!)

Q: We are particularly interested in your insights on mainland China's insurance industry. For instance, in March 2009, the China Insurance Regulatory Commission (CIRC) introduced a series of policies to encourage insurance investments, including: "Guidelines on the Establishment of Insurance Fund Debt Investment Plans", "Notice on Insurance Institutions Establishing Infrastructure Debt Plans", "Notice on Adjusting Bond Investment Policies", "Credit Risk Management Capability Standards for Insurance Institutions", "Equity Investment Management Capability Standards for Insurance Companies". Notably, the "Equity Investment Management Capability Standards" permit qualified small and medium-sized insurers to invest directly in stock markets. If losses occur under such regulatory encouragement, who bears the responsibility?

Luk: Regarding mainland affairs, I should be learning from you all. You likely possess deeper local insights, so I'll refrain from speculation. Instead, let me share an overseas case for reference:

In the early 1990s (1990–1991), South Korea's stock market plummeted drastically (historical charts verify this). To stabilize prices, the government mandated all insurers (including domestic and foreign) to purchase stocks with specific quotas. While domestic insurers complied silently, foreign insurers protested this intervention in corporate investment decisions. U.S. firms negotiated via the American Chamber of Commerce, but the Korean government remained uncompromising. Forced to comply, foreign insurers reluctantly purchased stocks. Ironically, the market subsequently surged, generating substantial profits - a comedic resolution.

Q: We notice that many domestic insurers now issue subordinated debt to boost solvency capital adequacy ratios. What risks does this "borrowing to demonstrate solvency" pose? Could cross-holdings of such debt among financial institutions artificially inflate regulatory capital and create systemic risk?

Luk: Using subordinated debt to enhance capital adequacy has been internationally prevalent over the past decade. Key safeguards include stringent issuer supervision and enhanced transparency. The primary risk lies in the issuer's debt repayment capacity. Regulators must rigorously assess the issuer's projected cash flows. If firms cannot justify the projected cash flows contain sufficient solvency, then no approval will be granted from the regulators.

Q: Your 2008 lecture (and subsequent presentation at the China Actuarial Conference) on actuarial models and risk management was highly influential. Have your views evolved?

Luk: My perspective remains unchanged. Models remain useful and important, but the underlying problem is more paramount. Model is a simplification of real world problems, for example, approximating complex risk distributions with normal distributions will lead to significant prediction errors. In any case, the risk and the principles backing risk management are very important.

From a risk management perspective to evaluate the sub-crime-crisis, financial crises are inevitable and cyclical (recurring every 10 - 15 years). Why? As we all know, product price must be higher than the underlying cost, so as to generate profits which can buffer risk. However, under market economy, a competitive market environment drives firms to take on more risk and underprice to gain business. While individually negligible, after few years of accumulation of risk, cumulative industry-wide risk escalates systemic risk. Such crises are structurally unavoidable.

Q: Regarding the risk management of insurers, China now requires insurers to submit CIRC-mandated risk assessment reports (covering underwriting, asset, credit, and operational risks). While borrowing international frameworks, do these align with domestic insurers' actual risk profiles? How do Chinese insurers differ from overseas counterparts based on your experience in Hong Kong, Taiwan, and Australia?

Luk: Significant differences exist. State-holding insurers traditionally exhibit "parental reliance" on government support - viewing the state as a backstop (a phenomenon also observed in Taiwan). However, Overseas insurers rely solely on internal resources, fostering stronger risk consciousness. Consequently, risk profiles diverge.

Regarding the risk supervision farmwork and regulations, it requires iterative refinement through international benchmarking. CIRC's limited technical capacity precludes immediate perfection, but unified standards are preferable to none.

Various guidelines and standards imposed by regulators may not be practical for real world corporate risk management. No matter how perfect the regulations are, regulations cannot prevent all risks and crises recur cyclically. The priority is to cultivate proactive risk-aware cultures in the day-to-day operation, instead of just satisfying the standards set down by the regulatory body. Simultaneously, regulators should advance "principles-based" over "rules-based" supervision.

Q: CIRC recently sanctioned actuaries and chief actuaries from three insurers, causing industry concern. Have actuaries been penalized in Hong Kong? What is the relations between appointed actuaries, auditors, and the board? What risk the company are facing? Does the Chief Actuary role mitigate conflicts and enhance the position of actuary?

Luk: The Actuarial Society enforces strict professional codes. I recall two client complaints investigated by the Society; neither resulted in penalties as no misconduct was found.

In Hong Kong, regulators, auditors, and boards heavily rely on appointed actuaries' statements. When these actuaries are company employees tasked with supervising their own boards, complex conflicts arise. Resolution hinges entirely on mediation skills of the actuary. How to gain trust and influence decisions demands the actuary to possess exceptional communication skills.

While designated as an executive, a Chief Actuary's real authority depends on individual competence. Communication remains the indispensable skill.

(Moderator reminded again: Encourage student-focused questions!)

Q: As a seasoned actuary, what core competency is most vital? What career advice do you offer students?

Luk: Communication! This is the cornerstone competency. An actuary must effectively engage with superiors, sales teams, and stakeholders to demonstrate the value of his work. Only through this can you secure buy-in for your recommendations and earn colleagues' recognition. I've encountered too many actuaries who "bury themselves in calculations" without articulating their insights to decision-makers. Your calculations are meaningless unless company executives understand their significance.

Luk: For current students, mastering English is non-negotiable - it's your passport to global collaboration. At minimum, achieve fluency in actuarial English to engage international peers. My own journey learning Mandarin mirrors this: a decade ago, I spoke none. Through persistent practice during mainland visits, I now operate at 70 to 80% proficiency—enough to converse with you today. Had I spoken only Cantonese, this dialogue would have failed. English proficiency enables you to transact with global insurers.

Q: In the UK and US, actuaries work across finance sectors. While in China, roles remain concentrated in insurance companies. Will this narrow scope change soon?

Luk: In the United States, significant demand for actuaries exists not only within insurance companies but also in the pension sector. The SOA examination system offers a dedicated pension track, though fewer candidates now pursue this specialization. In mainland China, virtually no actuarial students elect this path due to limited domestic demand. The relevance of actuaries in pensions hinges on Defined Benefit (DB) and Defined Contribution (DC) plans, because there is limited actuarial involvement in DC plans. Relatively there are greater opportunities on investment analysis, where investment banks and fund companies require actuarial skills to evaluate listed insurers' embedded values.

Regarding career options in China, other than insurance companies, there are still some actuarial roles in consulting firms and regulatory bodies in the government. While alternatives exist, actuarial employment remains concentrated in insurance. This landscape is unlikely to shift substantially in the near term.

Q: Given the future demand for actuaries in China's insurance sector, how should students position themselves academically? Should we pursue deep specialization or broader knowledge?

Luk: We believe that China possesses immense latent demand for actuaries - arguably the world's largest growth market over the next two decades. Job prospects for graduates remain robust. Regarding specialization versus breadth: Prioritize breadth. I've observed actuaries become hyper-specialized over decades. There is one UK actuary working exclusively on dividend calculations for 30 years, ultimately losing touch with broader actuarial principles. Therefore, we have to complement our actuarial skills with financial, legal and accounting knowledges. Additionally, as mentioned earlier, cross-functional collaboration is indispensable. Actuarial excellence requires communication with sales persons too.

(Moderator concluded the 3-hour session, thanking Mr. Luk.) ■

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THE THROWBACK SPECIAL

Appendix 2: How Mr. Luk Quit Smoking

Xie Zhigang
PhD, Leeds University, UK
Honorary Fellow of the
Institute & Faculty of Actuaries

Xie Zhigang, "Actuarial Communications" Volume 4, Issue 4 (December 2004)

I have heard and seen too many stories about quitting smoking - stories from family, friends, colleagues, and even celebrities and great figures. If they succeed, everyone will admire them; if they fail or make a fool of themselves, no one will be surprised. In general, quitting smoking is a personal and lonely endeavor, just like smoking itself. But there is a kind of person who can handle this personal matter in a wise way that is publicly engaging, and can mobilize collective strength, catalyze human emotions, and test everyone's IQ, EQ, and any kinds of "quotients". Such a person could only be an actuary - no one else could conceive and execute such a plan.

This story took place 20 years ago in Hong Kong, and the protagonist is a renowned Hong Kong actuary, Mr. Peter Luk. He served as the president of the Actuarial Society of Hong Kong for years and is a senior actuary who has made significant contributions to the development of the actuarial profession. In September 1999, when the China Insurance Regulatory Commission (中國保監會) held the first Chinese actuarial qualification examination, they invited him (with Li Zheng Huai (李政懷) and Danny Chung (鍾煦和)) as consultants to design and evaluate the first batch of Chinese actuarial examinations. His qualifications and reputation in the actuarial community are top-notch.

As deep as his actuarial expertise was his addiction to smoking. Actuaries have plenty of reasons to smoke, such as more workload than others, endless actuarial exams and follow-up learning, and responsibilities from actuarial professional associations. Mr. Luk was no exception. His smoking habit grew with his actuarial skills, even surpassing them. At his peak, he smoked up to four packs (80 cigarettes) a day. His secretary, who worked with him for many years, could hardly recall a moment when his fingers were without smoke.

But nothing in this world is constant. Mr. Luk decided to quit smoking, stepping back from the peak of smoking four packs per day, washing his hands of it, or perhaps he felt that as he had "smoked his way to success", it was time to take care of his health when he least needed it. The exact motive is unclear, but looking back now, after decades of dedicated smoking, Mr. Luk not only understood the meaning of smoking but also grasped the realm of quitting and was ready to put it into practice.

For now, let's call Mr. Peter Luk's method of quitting smoking the "Actuarial Quitting Method" or the "Luk's Actuarial Quitting Plan." The basic principle and goal are to make the personal matter of quitting a shared concern. One must transform his own pain into others' pain, and then into their own joy. At the same time, one should earn fair rewards and financial compensation for his quitting efforts by having others pay for the privilege of knowing about and participating in the process. Isn't this a new realm of quitting smoking?

On the first day of implementation of "Luk's Actuarial Quitting Plan", Mr. Luk announced in his department at the company, "From now on, I officially begin to quit smoking and will never smoke again! You may be tired of hearing such cliché quitting declarations and don't believe that I can do it. I have designed a quitting insurance policy for you all to supervise and help me quit. You can join my Luk's Quitting Insurance for just one dollar premium a day. Once anyone catches me smoking anywhere, every policyholder can receive a $100 insurance payout. You can join or withdraw at any time. In addition, if you pay premiums continuously for 100 days, you will no longer need to pay. You will have lifetime coverage and always have the chance to receive $100."

From an actuary's perspective, this is indeed a very cost-effective insurance policy for the clients. Can you believe that Mr. Luk will never smoke again? Without actuarial calculations, his secretary, who had been working with him for years, did not believe he could quit! Although she had always been cautious in her life, never engaged in risky gambling, she still took part in the first and only gamble by buying "Luk's Quitting Insurance."

Moreover, for Mr. Luk, who had a monthly income of only $1,000 at the time, paying out on thirty policies was enough to bankrupt him. Back then, a $100 payout was a significant amount.

Actuaries trust both the statistical data on smoking cessation success rates and their own professional judgment. In any case, this was a good insurance policy. Therefore, some actuaries in the company also bought Luk's Insurance, including another senior actuary, Mr. Dominic Lee (李達安). Fortunately, since they were all friends and colleagues, they only bought one policy each, unwilling to see Mr. Luk go bankrupt.

However, the influence and role model effect of actuaries were immense. With a celebrity client like Mr. Dominic Lee, "Luk's Quitting Insurance" quickly grew to about thirty policyholders within the company. Moreover, the customer base soon expanded to social circles beyond the company. The first step of "Luk's Actuarial Quitting Plan" was completed, and the show was about to begin.

Every morning, Mr. Luk began his day with a bright smile at the office, collecting the daily premiums from clients who wore complicated expressions. Each coin dropped into the recently repurposed ceramic ashtray with a crisp sound, bringing him enjoyment that seemed to completely drown out the typical discomfort and depression of a quitter. Furthermore, Mr. Luk's happiness grew as the daily premiums increased, while the expressions of the clients became increasingly unpleasant, as if each of them was bearing the full pain of Mr. Luk's quitting. Even worse, the strange behaviors normally seen in quitters seemed to have entirely shifted from the Mr. Luk himself to these clients, manifesting in even stranger ways.

Some people who never smoked or even hated smoking, including Mr. Luk's loyal secretary, would bring various good cigarettes to the office and casually place them within Mr. Luk's reach, waiting for the prey to take the bait. Smokers would often appraise some famous cigarettes in front of Mr. Luk, saying, "Hey! This is a cigarette specially made for Zhongnanhai. Peter, want one?" pretending they completely forgot that they were Mr. Luk's clients. But Mr. Luk just faced these petty tricks with an even brighter smile.

Besides the subtle approaches, there were also direct ones. Late at night, uninvited guests would often visit. These “friends” knocked urgently as if there was an emergency. Upon opening the door, they wouldn’t greet the host or say a word but would head straight to the study room or living room, sniffing rapidly like drug-sniffing dogs in training. When leaving, they would resentfully say, “You escaped again!” The next day, Mr. Luk’s face would be even more radiant at work.

This is “Luk’s Actuarial Quitting Plan”, and its key is the word “transfer”! Without transferring the pain to others, then turning others’ pain and the resulting reactions into his own motivation to quit, “Luk’s Actuarial Quitting Plan” would not have succeeded. But Mr. Luk succeeded! ■

VOICES OF THE 2024 ASHK VOLUNTEER AWARDEES

As a member organisation, ASHK's success is contingent on the participation of its members. In 2024, more than 100 members volunteered to serve the Society on committees, task forces, projects, and events.

This year volunteers were invited back to the annual ASHK Appreciation Lunch, where 11 awardees received the 2024 ASHK Volunteer Award. These members rendered exceptional service to the Society during 2024. The accolade is intended to recognise these members with a little award.

Awardee	Company/ Organisation	ASHK Committee /Special Project Team
Christopher Tam	Deloitte	AAC Special Project Team
Des Thomas	MetLife (Chariot Re)	Professional Matters Committee
Eva Yan	AIA	Professional Development Committee - Curriculum & Examination Taskforce
Greg Solomon	Eigengrey	Membership & Communications Committee - Editorial Board
Janet Yang	Guy Carpenter	General Insurance Committee; Professional Development Committee - Curriculum & Examination Taskforce
Nasir Khan	Oliver Wyman	Par Fund Special Project Team
Orchis Li	Gen Re	Innovation Committee; Health Committee; AAC Special Project Team
Sherry Du	Milliman	AAC Special Project Team
Shirley Fong	YF Life	Membership & Communications Committee - Editorial Board; Professional Development Committee - Curriculum & Examination Taskforce
Wendy Lai	Prudential Hong Kong	Membership & Communications Committee - Editorial Board
Yen Liu	HSBC	AAC Special Project Team

Christopher Tam

In ASHK, I have been the chairman of the Young Actuaries Group. I have been the organising committee of Joint Regional Seminar for multiple years. Being an ASHK volunteer means a lot to me. It is an important channel to get connected with insurance and actuarial professional in the market, not only in HK but also Asia Pacific and Global. By being an ASHK volunteer, it also serves as an effective platform to acquire knowledge around latest economic, technology trend and other innovation developments.

Des Thomas

In leading our drafting of AGN10 - General Actuarial Practice - and enhancements to the Code of Conduct, I learnt a lot about international practices in these areas. But I also enjoyed the interaction with members when participating in professional course delivery. Volunteering is essential for a flourishing Hong Kong-based professional body. It feels good to contribute to a profession that has given me so much, and it's great to interact with others.

Eva Yan

Even though I've moved into a more investment-focused role, I've stayed close to the actuarial community through volunteering with ASHK. I've been part of the examination taskforce, helping to develop content that supports actuaries in their professional journey. It's something I care about—especially expanding our skillsets beyond traditional roles. Volunteering has given me the chance to give back, stay connected and build strong relationship with passionate peers. It keeps our community vibrant and forward-looking.

Greg Solomon

I work within the Membership & Communications committee, mainly focused on ACTUZINE 精誌. I've been on various subcommittees and working parties over the years, mostly operating internationally - but I've found volunteering "locally" more satisfying, because you're working with people you meet regularly around town, and your volunteering has an immediate impact for the profession in HK. We continue to be value-added because we continue evolve - and that is only possible when people who are working in our industry are also contributing (by intellect and hours) to the profession at the same time.

Janet Yang

I have been a dedicated member of ASHK for many years, actively contributing to ASHK professional education initiatives. I have organized and spoken at prominent industry events, including the ASHK General Insurance Conference in 2023. I also lead the exam committee where I am responsible for updating the current General Insurance syllabus and preparing the exams for ASHK General Insurance exam. Through these efforts, I have helped elevate the ASHK brand and advance actuarial knowledge in Hong Kong.

Nasir Khan

I had the rewarding opportunity to volunteer with the ASHK as part of the Participating Fund special project team. This experience was deeply enriching, allowing me to collaborate with esteemed members of our profession on a critical industry topic. As part of the project team, we discussed various matters related to participating business management in Hong Kong, which culminated into publishing of AGN11 on Participating Fund Management.

Orchis Li

Last year, my volunteer work with the ASHK anchored by being the Programme Chair of the AAC in October. It was a great success, with over 1,000 participants, which I believe is a record high. We received many rave reviews on the event, so I'm very pleased that our collective effort paid off. This year, I'm part of the newly formed Public Policy Committee, and I hope we can make a difference and have a greater impact on public policies and societal matters.

Sherry Du

Throughout this journey, I have been honoured to contribute to various ASHK events, conferences, and initiatives, serving as a member of organising committees, a speaker, and/or a moderator. To be candid, while this involvement requires some commitment of time, it has provided me with invaluable opportunities to connect with others, engage in discussions about industry-wide challenges, and learn from fellow professionals. As ASHK continues to evolve and gain influence, I would like to encourage each and every one of its members to volunteer for various committees and projects within the society.

Shirley Fong

I contributed to preparing the articles for Celebrity Actuaries Interview and reviewing the articles for ACTUZINE 精誌. I was involved in the review of the syllabus, study guide and exam paper for the Life Insurance examination. I am grateful for the opportunity to volunteer at ASHK where I connect with passionate actuaries dedicated to advancing our profession. This is an invaluable experience and keeps me informed about the latest developments in the insurance industry.

Wendy Lai

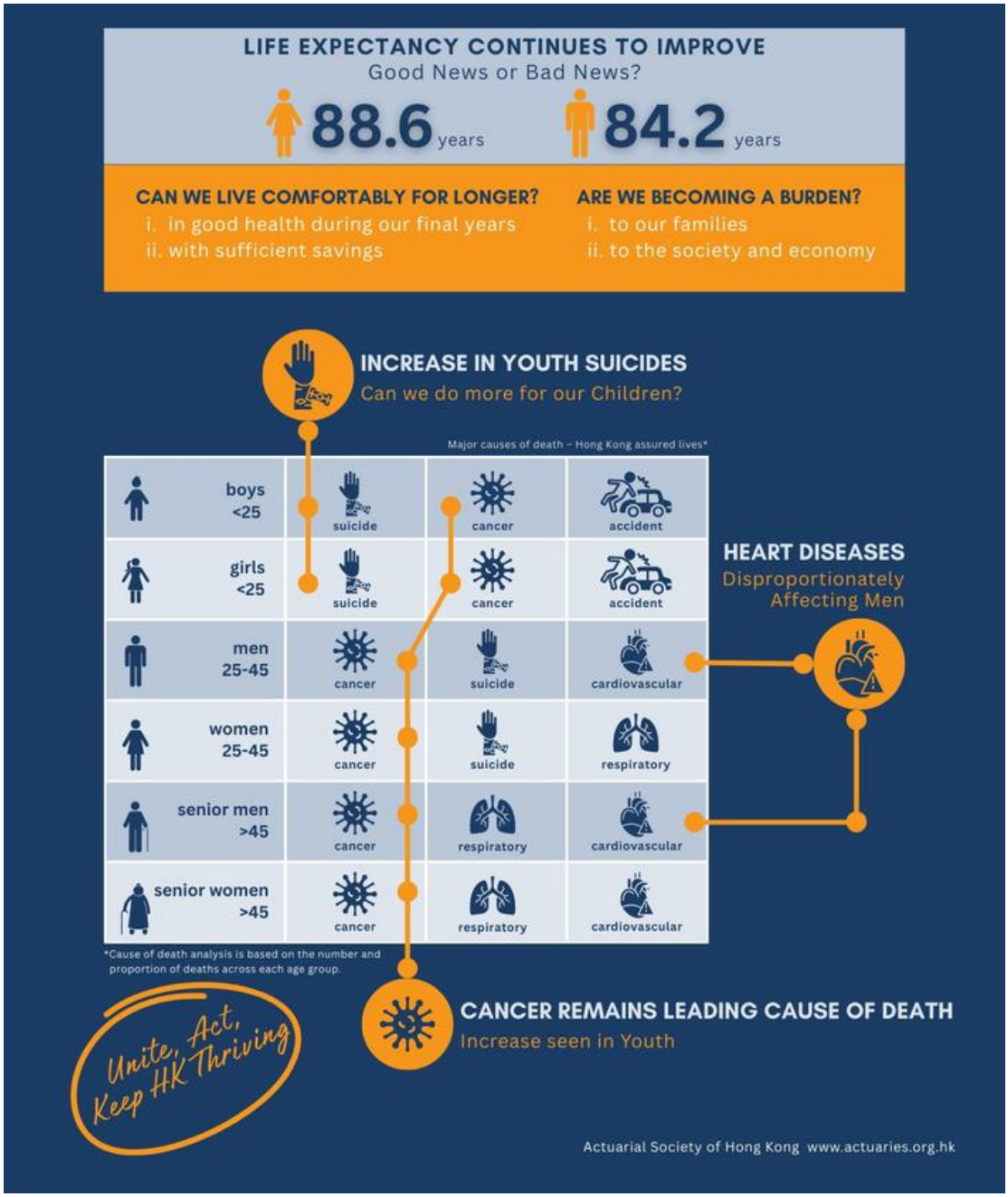
One remarkable experience this year was involving in the rebranding of the ASHK Newsletter into a Magazine. I also helped prepare the Student Corner, which is a new section in our Magazine - ACTUZINE 精誌 tailored for students and young actuaries like myself. Volunteering with ASHK is not just about giving back to the actuarial community. It's also about expanding my network and developing a deeper understanding of the ever-evolving actuarial profession.

Yen Liu

I express my heartfelt thanks for the opportunity to be part of the AAC 2024 organizing committee. The hands-on work - from budgeting and sponsor engagement to arranging excursions and hosting panel sessions and presentations - was an incredible learning journey. Above all, the greatest reward was the opportunity to collaborate with and learn from so many top actuaries from Hong Kong and around the world. It was an inspiring experience that I will carry with me throughout my career.

ASHK RELEASES NEWEST HONG KONG ASSURED LIFE MORTALITY TABLE

The ASHK recently held a press conference for our latest research study on the mortality of the insured in Hong Kong, namely, the Hong Kong Assured Lives Mortality 2022 (HKA22).



This report provides an overview of the insured experience in Hong Kong for the period from 2014 to 2021, examining how life expectancy has increased and changes in cause of death compared to the prior study. This study analyses the mortality experience of assured lives in Hong Kong, providing valuable insights into prevailing health trends, which are crucial for developing targeted health interventions and policies.

Watch this space for next steps as the ASHK moves forward our purpose by having an ever-increasing role in making a difference through positive social and economic impact for Hong Kong.

Samples of Media Coverage

am730	Link	RTHK (千禧年代)	Link
Cable TV (有線新聞)	Link	SCMP	Link
CR 881903.com	Link	Sing Tao	Link
Hong Kong Economic Journal	Link	Ta Kung Pao	Link
Macao Daily	Link	The Standard	Link
Ming Pao	Link	TVB News (有理說得清)	Link

Please click here for the press release.

The panel hosted the press conference in the ASHK office and highlighted some issues that have profound social and economic impact

(L to R) Alexander Wong, ASHK Council Member, Steve Hui, ASHK President, Orchis Li, ASHK Public Policy Committee Member, Simon Lam, ASHK Council Member

Comprehensive Industry Collaboration and Data Coverage

The HKA22 is the fifth assured life mortality table published by ASHK for the Hong Kong industry. The data were collected from 13 local insurance companies, representing 94% of the market based on the number of in-force policies as of the end of 2021. This extensive coverage enhances the credibility of the findings and offers a robust foundation for understanding mortality patterns within Hong Kong's life insurance sector. The full report can be found here.

We would like to express our heartfelt gratitude to all involved parties who contributed to the success of this project.

This mortality table project was a collaborative effort with the Hong Kong Federation of Insurers (HKFI) while General Reinsurance AG (Gen Re) was commissioned to carry out the study.

The participating insurance companies (in alphabetical order) are listed as follows:

- AIA International Limited
- AXA China Region Insurance Company Limited
- BOC Group Life Assurance Company Limited
- China Life Insurance (Overseas) Company Limited
- China Taiping Life Insurance (Hong Kong) Company Limited
- Chow Tai Fook Life Insurance Company Limited
- FWD Life Insurance Company (Bermuda) Limited
- Hang Seng Insurance Company Limited
- HSBC Life (International) Limited
- Manulife (International) Limited
- Prudential Hong Kong Limited
- Sun Life Hong Kong Limited
- YF Life Insurance International Limited

We would like to remind you that your annual membership subscription will expire on 30 Sept 2025. Please remember to a) renew your membership and b) update your personal details online starting from **1 Oct 2025**.

Renew Your Membership for a Stronger Actuarial Community

Renewing your membership means staying connected to a diverse network of actuaries which we have built up over the past few years. We have successfully worked to raise the profile of actuaries, maintain professional standards, and influence regulations and policies that shape our industry. Additionally, we offer an array of professional development opportunities to ensure you stay ahead in your career. Your continued membership not only supports these initiatives but also strengthens our collective voice of actuaries in Hong Kong.

New Subscription Fee Waiver Criterion For Retired Members

A new subscription fee waiver criterion for retired members[4] has been introduced. To recognise member's long-term loyalty towards ASHK, a fee waiver applies to members who are aged 65 or older, has continuously been a member (non-student membership) for 20 years or more, are no longer in receipt of any income from gainful employment and no longer provide actuarial services. Other criteria for the retired rate are not affected. To apply, please submit a declaration form before renewing your annual membership. More details in the "**Current Subscription**" section.

Concession Rates from Other Actuarial Bodies

As an ASHK member, if you are also a member of one of the organisations listed below, you can benefit from their concession rates (Overseas/Dual). Please apply to the respective actuarial bodies directly.

Actuaries Institute, Australia
Institute and Faculty of Actuaries, UK

Renew from 1 Oct

Kindly login to your ASHK online member portal to ensure your personal information is accurate. For step-by-step instructions on how to renew your membership, please click here. Updating your personal information is critical so that we can continue to deliver quality services to you.

If your employer will settle the subscription fee for your membership renewal, please inform your HR to send a list with the members' name, membership class, membership number and subscription fee to joannacheung@actuaries.org.hk on or before 30 Oct 2025.

2025/26 ASHK Subscription fees

Membership class	**Normal renewal** (1 - 31 Oct 2025)		**Late renewal** [1] (1 - 30 Nov 2025)	
	Full rate	**Retired rate** [4]	**Full rate**	**Retired rate** [4]
Fellow [2]	HK$2,750	HK$550	HK$2,990	HK$790
Associate [2]	HK$1,725	HK$345	HK$1,965	HK$585
Ordinary Student	HK$450	HK$90	HK$690	HK$330
University Student [3]	N/A	N/A	N/A	N/A

1 Inclusive of a late payment surcharge of HK$240.

2 Membership Advancement to Associate/Fellow:

- If you wish to change your membership class when renewing membership, you will need to submit the membership information update form as well as pay the new membership class's subscription fee. The difference in subscription fees is refundable if the application for change of membership class is unsuccessful.
- Your application for a new membership class will only be reflected upon approval at the forthcoming Council meeting. You will be notified of the application results by email after the meeting.

3 University Students: While there is no annual subscription fee due, you must still login into your ASHK online member portal to ensure your personal information is accurate and confirm renewal to maintain your membership.

4 The criteria for a "retired member" are set out on the ASHK website under the "Current Subscription" section. All retired membership application would only be valid upon ASHK Council's approval.

2025 EXAM RESULTS ANNOUNCEMENT

ASHK congratulates the below members who have passed the ASHK Exam in 2025:

2025 June diet

Core Paper

Bentley, Alison	Huang Ping	Ng Ngo Yin
Bentley, Anthony	Huang Yi Chun, Lois	Pataki, Gergely
Celichowski, Michael Richard	Lam Ching Yu, Marco	See, Richmond
Chan Cheuk Man	Lam Ting Wai	Sin Shuk Wan, Anna
Cheung Kam Wing, Aaron	Lau Chi Hang	Tam Chi Hin, Gary
Chui, Clinton	Lau Tsz Ching	Tam Man Hung
Chum Tung	Leung Chak Sum	Tse Justin Shing Him
Chung Yeung Lam	Leung Hung Kuen	Wong Wai Cheung, Brian
Gu Quan, Richard	Li Shurong	Wong Wai Ho, Michael
Guo Dan	Li Wing Tai	Yang Rong
Hasan, Md Mubin	Li Zihao	Yeo Chee Lek, Nicholas
Ho Wai Hang, Ricky	Lo Chung Hang	Yu Pok Man
Hsu Meng Shiun	Lu Pan, Louise	Zhang Ying
	Ng Ka Weng	Zhao Zichao

Life Insurance Paper

Bentley, Alison	Lu Pan, Louise	Yang Rong
Bentley, Anthony	Ng Ka Weng	Yu Pok Man
Celichowski, Michael Richard	Pataki, Gergely	Zhang Zhe
Chan Ka Chun, Kelvin	Poon Ka Hei, Anthony	Zhao Zichao
Chan Lo Yi	See, Richmond	
Cheung Kam Wing, Aaron	Shang Gang	
Cheung Ko Chi, Chadwick	Sin Shuk Wan, Anna	
Chum Tung	Tam Chi Hin, Gary	
Dookhi, Dhiran	Tse Justin Shing Him	
Guo Dan	Tse Tsz Wah, Valerie	
Ho Tung Hei, Logan	Wan Tsz Wah, Garrick	
Ho Wai Hang, Ricky	Wong Chi Chuen	
Hsu Meng Shiun	Wong Wai Cheung, Brian	
Huang Yi Chun, Lois	Wong Wai Ho, Michael	
Lam Ching Yu, Marco	Yang Rong	
Lau Chi Hang	Yu Pok Man	
Leung Chak Sum	Zhang Zhe	
Leung Hung Kuen	Zhao Zichao	

General Insurance Paper

Gu Quan, Richard	Tam Man Hung
Li Zihao	Yeo Chee Lek, Nicholas
	Zhang Ying

Passed the ASHK Examination – What's Next?

Congratulations! Once you have passed the ASHK Examination (both Core Paper and one of the Elective Papers), you may join ASHK Fellow membership right away to enjoy the privileges and benefits if you have also fulfilled all the requirements listed on the membership page here.

A fellowship certificate will be awarded to you once your membership is activated.

PENSION ELECTIVE PAPER TO DISCONTINUE

The Actuarial Society of Hong Kong wishes to inform all candidates and stakeholders that, after consultation with the ASHK Pensions and Employees Benefits Committee, the ASHK Council has decided to discontinue the **Pension elective paper of the ASHK Certificate (Certificate in Hong Kong Insurance Markets and Regulations)** from 2026.

Important Notes:

- The paper is no longer available in any future ASHK examination sessions. All other papers are not affected.
- Candidates who have already passed the Pension elective paper will retain recognition of their results under the current certification structure.
- Candidates may still choose the Life Insurance or General Insurance elective paper in future.

For further information or assistance, please contact us at info@actuaries.org.hk or visit www.actuaries.org.hk.

We appreciate your understanding and continued support as we enhance and modernise our qualification. ■

YOUNG ACTUARIES GROUP (YAG)

The Young Actuaries Group (YAG) is proud to announce that two of our young ASHK members are representing Hong Kong to join the Young Actuaries World Cup (YAWC) 2026 organized by the International Actuarial Association (IAA).

From the official guideline, the YAWC Theme this time is aligned with the ICA 2026 theme: Tradition, Diversity and Innovation. This is particularly relevant for emerging professionals who benefit from the existence of long-established skills while also addressing the challenges and opportunities afforded by global advances in technology and developments in society.

Our two members Angus Li and Wendy Lai have prepared and filmed their own videos to participate in this contest. Our Council Members, Committee Members and YAG Members have provided guidance and suggestions to them as our support.

More information can be found in the IAA Official Website (link) and YouTube Playlist (link). ■

Angus Li (Hong Kong)

Angus is a final-year student at The University of Hong Kong, pursuing a Bachelor's degree in Actuarial Science with a minor in Computer Science. He has passed several SOA exams and gained practical experience through multiple actuarial internships. During these roles, he automated financial dashboards using Power BI and SQL, analyzed sales incentives' impact on embedded value, built actuarial calculation engines in VBA, and implemented Python ETL pipelines for regulatory reporting. Proficient in Python, SQL, and actuarial software, he is fluent in English, Mandarin, and Cantonese, with strong problem-solving skills and a passion for translating data into business insights.

Wendy Pui Yi Lai (Hong Kong)

Wendy is a young actuary from Hong Kong with around three years of professional experience in the insurance industry. She is passionate about translating complex actuarial concepts into clear ideas for broader audiences. Wendy believes that Actuarial Science shouldn't only be confined to textbooks – it should empower everyone to better understand the insurance protection that we rely on. She is looking forward to use her expertise to contribute to both the actuarial community and the society that has nurtured her career.

Young Actuaries World Cup

SPORTS AND SOCIAL SERVICES GROUP (SSSG)

The Sports and Social Services Group (SSSG) has gone through a rich summertime full of member activities, including various voluntary services, bridge gathering and sport games.

In this summer, we partnered with YWCA Ching Hong Neighbourhood Mutual Help Project (香港基督教女青年會青康鄰里互助計劃) to offer community services to elderly people and children. On two weekends in June, our ASHK volunteers paid visits to the elderly in Tsing Yi to deliver materials and understand their needs. In August, we organized a campus hunt at HKU for children and their families to conclude the summer holiday with great fun!

Hong Kong Young Women's Christian Association (YWCA) Ching Hong Neighbourhood Mutual Help Projec on 21 & 22 June

Actuarial Talk & University Campus Hunt for Children on 31 August

We also helped the Lok Sin Tong Benevolent Society, Kowloon (九龍樂善堂) for a flag-selling service in July. Despite of the hot weather, our ASHK volunteers enthusiastically participated in the charity event, some even brought their children to take part in the meaningful fundraising activities together.

Kowloon Lok Sin Tong 145th Anniversary Hong Kong Flag Day on 26 July

Our partnership with the Hans Andersen Club (安徒生會) continued this summer. We co-organized an activity (小小理財家) in August, in which the children learned how to plan wisely in their grocery shopping and manage their pocket money.

安徒生會 x ASHK – 小小理財家 on 9 August

For sports activities, we organized badminton, tennis and basketball gatherings:

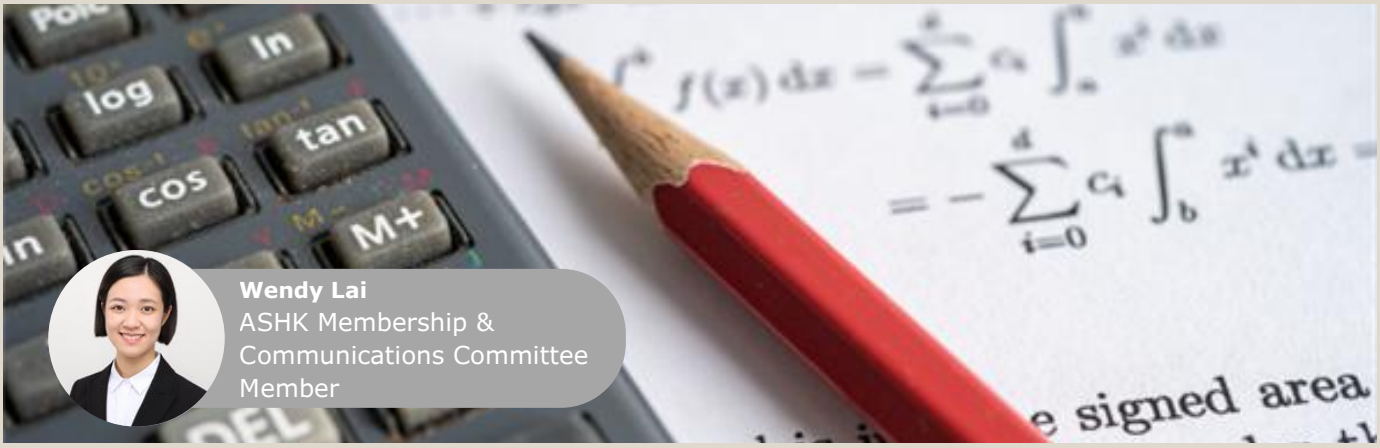
Badminton Gathering on 12 July

Tennis Gathering on 8 August

Basketball Match on 16 August

Bridge Practice Session on 7 July

ASHK Bridge Team Game Practice on 1 August



STUDENT CORNER - PREPARE FOR YOUR ACTUARIAL CAREER

Tips for Cracking Actuarial Exams

Welcome to this section which has been exclusively prepared for our student members!

In previous editions, we have discussed quite a lot of technical topics, including actuarial functions, insurance products, cash flow projections, risk-neutral vs real-world valuation, and asset-liability management. In this edition, we will shift the spotlight to something that every actuarial student must face: *Professional qualification exams* — The gateway to becoming an actuary.

Professional qualification exams could be tough, and everyone who has gone through them knows that passing takes more than just brainpower. You need discipline and the right strategy. While there are plenty of techniques and study strategies available, sometimes the most valuable advice comes from people who've been through the process themselves. As a junior actuary who recently passed all requirements to attain Fellowship from SOA, exam techniques are fresh in my mind. Let me share a few study tips that I personally found useful. Hope these may give you some insight into planning ahead for your future exams.

Know the Rules of the Game Before You Play

The first thing to get right is knowing the syllabus and exam structure. Each exam body, whether it's SOA, IFoA, or any other professional organization, provides official guides, study notes, and examiner reports. These aren't just formal documents that sit on their website. They're basically a roadmap for what you'll face in the exams. The SOA, for example, publishes learning objectives and sample exams that reveal exactly how questions are typically designed. It might sound trivial, but starting your preparations by carefully reading these guides could save you from wasting hours on the wrong focus.

Study with Strategy, Not Just Hours

Once you know the structure of your exams, the next step is planning your study time. For me, I worked backwards from exam day and created a schedule with enough time for revision and practice. But it's not just about logging study hours, but about focusing on the areas that carry the most marks. If a certain topic is heavily weighted, give it priority.

At the same time, you can't completely ignore those smaller sections because exams often cover a wide range of topics. I would say stick to the "80/20 rule" - focusing on the 20% of effort that produces 80% of the results first and go with smaller sections afterward. On the other hand, to ensure sticking with my plan, I set weekly goals and break big topics into smaller chunks. It makes me feel less overwhelmed by visualizing a steady study progress.

Practice Like It's a Real Exam

When you read notes or watch video lessons, you feel like you "get it," but under exam pressure, it's an entirely different story. I believe the best preparation is timed practice. Set a countdown and work through past papers as if it's a real exam. At first, it can be uncomfortable, but it trains you to manage your time and forces you to show your workings clearly. Afterwards, spend time comparing your answers to model solutions and examiners' reports. You'll quickly see where you're losing marks: maybe you misread the question, skipped a step in your calculation, or didn't explain the reasoning well enough. Keeping an "error log" of those mistakes and reviewing it regularly was something I found especially helpful. It's painful and struggling to face your weak spots, but it's one of the fastest ways to improve.

Mastering Your Mindset

Mindset also plays a huge role. Studying for actuarial exams is a long journey, and it's easy to hit points where motivation crashes. I personally find it useful to reframe the process: rather than focusing on the pain of studying, think about the pain of regret if you don't prepare properly. Studying for exams takes a big part of your life, but it shouldn't consume it entirely. Even during my busiest study periods, I make time for rest and relaxation. Everyone is different. Relaxation could be sports, music, cooking, etc. A positive attitude can often make the difference between success and underperformance.

Bringing It All Together

Preparing for actuarial exams is not just about knowledge, but also strategy, discipline, and mindset. Understanding the exam structure and syllabus provides a clear roadmap, while strategic planning ensures time is spent on the most impactful topics. Timed practice under exam conditions highlights your weaknesses, and equally important is maintaining a positive mindset. I succeeded with these techniques, and I hope you will too. ■

SPEAKERS FOR UNIVERSITY CAREER TALKS

The Actuarial Career Talks at universities not only highlight the career opportunities for aspiring actuaries but also emphasize the broader social impact that actuaries can make, inspiring students to see beyond the numbers and formulas, encouraging them to embrace their potential to effect real change in society.

If you would like to help engaging with university students, please get in contact with the ASHK office at info@actuaries.org.hk.

2025 GENERAL INSURANCE CONFERENCE

The GI Conference 2025 was successfully held on 2 Sep 2025, bringing together professionals from diverse backgrounds and fostering an environment for meaningful discussions and lasting relationships in the General Insurance field. The structured sessions provided attendees with the opportunity to engage in deeper conversations. The conference ended with a networking drink session, offering attendees another opportunity to connect in a relaxed setting.

A big thank you to all the esteemed panelists and speakers for their outstanding presentations. We also extend our sincere appreciation to our sponsors for their support.More photos can be found here.

(From Left) David Ding, Abigail Richardson, Jessie Ren, Billy Wong

(From left) Jenny Lai, MM Lee, Trinity Pong

(From left) Stephen Dong, Jeff Yeung, Grace Yan, Ying Xiong

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Booth Sponsors

AKUR8 | SOCIETY OF ACTUARIES

Following the success of the previous Health Insurance Conference, this year's conference will be centred around the theme of "Private Healthcare Sustainability", highlighting the importance of cross-sector collaboration in driving positive change and achieving a shared vision of sustainable healthcare. The programme will consist of panels and presentations.

VHIS at the Crossroads: The Role of Private Insurance in Hong Kong's Health Ecosystem
As Hong Kong's healthcare system faces mounting pressures, the Voluntary Health Insurance Scheme (VHIS) stands at a pivotal juncture. This panel brings together leaders from government, insurance and healthcare to explore VHIS's evolving role in balancing public-private care, managing affordability, and addressing systemic challenges such as fraud and capacity constraints. The eminent panellist, who, with a focus on strategic direction, equity, and future reforms, will examine how VHIS can remain impactful and sustainable - and how actuaries can help shape its next chapter.

- Alger Fung, Chief Executive Officer, AIA Hong Kong and Macau
- Prof. Hong Fung, Professor of Practice, JC School of Public Health and Primary Care, CUHK
- Raymond Wu, JP, Official Director, The Health Bureau HKSAR
- Orchis Li *FASHK*, ASHK Health Committee Member (Moderator)

Cross-border Opportunities in Product Innovation
Five distinguished panellists will also discuss how insurers, reinsurers, and medical service providers can create a sustainable and affordable health insurance landscape. The panel's aim is to create cross-sector collaborative solutions to shape Hong Kong's sustainable healthcare future through open discourse, knowledge exchange, and innovative thinking.

- Dr. Christian Wards, Director of Group Healthcare, AIA
- Dr. Felix Lee, Co-CEO, The GBA Healthcare Group
- Fook Kong Lye, General Manager, Hannover Re Shanghai Branch
- Yuman Chan, General Manager, Bupa
- Sean Deehan *FASHK*, Head of Hong Kong & Macau, WTW (Moderator)

Fostering knowledge sharing
This one-day conference aims to foster knowledge-sharing and interaction among actuaries, healthcare providers, regulators, and insurance professionals. The speakers will present on different ideas for advancing sustainability in healthcare:

- Critical Illness Insights
- Comparison on Medical Procedure fee
- Cost Optimization of Cutting-Edge Proton Therapy Treatment in Hong Kong
- Bringing Transparency and Accountability to Private Healthcare: From Patient Voice to DRG-Adjusted Value Benchmarking
- Establishing Price and Quality Transparency of Hospital Services - Power to the Patient!
- Aging Societies & Evolving Healthcare: New Opportunities for Hong Kong Insurers in the Greater Bay Area

Due to the overwhelming response, we are glad to inform that we already have a full house. Further registrations will be placed on a waiting list.

Lastly, we would like to thank our *Gold Sponsors* - HealthMutual Group, The GBA Healthcare Group; *Booth Sponsor* – SCOR; and *Supporting Organisations* – AIA International, Deloitte, Liberty Insurance.

HEALTH INSURANCE CONFERENCE 2025

ACTUARIAL SOCIETY of HONG KONG 香港精算學會

Private Healthcare Sustainability

4 November 2025 | The Langham Hotel, Tsim Sha Tsui, Hong Kong

Meet some of our esteemed speakers

VHIS at the Crossroads: the Role of Private Insurance in Hong Kong's Health Ecosystem panellists

Raymond Wu, JP
Deputy Secretary for Health
The Health Bureau

Alger Fung
CEO
AIA HK & Macau

Prof. Hong Fung
Professor of Practice,
JC School of Public Health and Primary Care, CUHK

Orchis Li *FASHK*
General Manager
Gen Re

Healthcare Sustainability & Affordability panellists

Yuman Chan
General Manager
BUPA

Felix Lee
Co-CEO
The GBA Healthcare Group

Dr. Christian Wards
Director of Group Healthcare
AIA Group

Sheldon Yu *FASHK*
CEO
Tai Ping Reinsurance

Other speakers

Pang Chye
Principal and Consulting Actuary
Milliman

Dr Darren Poon
Associate Director, Comprehensive Oncology Center, Honorary Consultant in Clinical Oncology
Hong Kong Sanatorium & Hospital

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THE GBA HEALTHCARE GROUP 大灣區醫療集團

Booth Sponsor:

SCOR The Art & Science of Risk

MEMBERSHIP UPDATE

NEW MEMBERS

Name	Company/University	Membership
Chen Ingrid	KPMG	Associate Member
Chu Pang Kwok	AIA	Associate Member
Chun Hyuck Woo	Peak Re	Associate Member
Huang Wenjun	China Taiping Life Insurance(Hong Kong)	Associate Member
Kong Kai Cho	KPMG	Associate Member
Lee Dongjun	PwC	Associate Member
Li Mingze	AIA	Associate Member
Li Shuang	China Taiping Life Insurance(Hong Kong)	Associate Member
Li Yilong	AIA	Associate Member
Liang Jiajing	Deloitte	Associate Member
Logo, Setor	RGA	Associate Member
Lok Jane	nil	Associate Member
Ng Lup Yin, Lilian	nil	Associate Member
Puah, Shiryeeh	AIA	Associate Member
Sun Xinyao	Deloitte Advisory HK Ltd	Associate Member
Wang Kan	PeakRe	Associate Member
Wong Hon Wing	AIA	Associate Member
Chan Chun Wai	The Hong Kong University of Science and Technology	Ordinary Student Member
Chan Shing Him	The Chinese University of Hong Kong	Ordinary Student Member
Han Zhe	London School of Economics and Political Science	University Student Member
Hung Tsz Ho	University of Toronto	University Student Member
Lam Chi Ho	The Hong Kong University of Science and Technology	University Student Member
Lau Cheuk Hang	The Chinese University of Hong Kong	University Student Member
Leung Hung Kuen	The University of Hong Kong	University Student Member
Leung Yi Ching	The Chinese University of Hong Kong	University Student Member
Li Peixi, Angus	The University of Hong Kong	University Student Member
Chan Chun Wai	The Hong Kong University of Science and Technology	University Student Member
Chan Shing Him	The Chinese University of Hong Kong	University Student Member

NEW MEMBERS

Name	Company/University	Membership
Tsz Ho Hung	University of Toronto	University Student Member
Wai Shing Yip	The Chinese University of Hong Kong	University Student Member
Xiaohan Zhang	The Chinese University of Hong Kong	University Student Member
Yi Ching Leung	The Chinese University of Hong Kong	University Student Member
Zhe Han	London School of Economics and Political Science	University Student Member
Zhengxuan Zhong	The Hong Kong University of Science and Technology	University Student Member
Zihao Yang	The University of Hong Kong	University Student Member

MEMBERSHIP ADVANCEMENT

Name	Company/University	Membership
Bentley, Alison	-	Fellow Member
Bentley, Anthony	Deloitte	Fellow Member
Celichowski, Michael Richard	RGA	Fellow Member
Chan Lo Yi	AIA	Fellow Member
Cheung Kam Wing, Aaron	AIA	Fellow Member
Cheung Ko Chi, Chadwick	Oliver Wyman	Fellow Member
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2025 SOA Board Election Results






The Society of Actuaries (SOA) announces the results of the 2025 Board of Directors Elections. Five Board members and one President-Elect and Vice-Chair have been elected to serve starting with the 2025–2026 term. Thank you to all SOA members who voted in the 2025 election.

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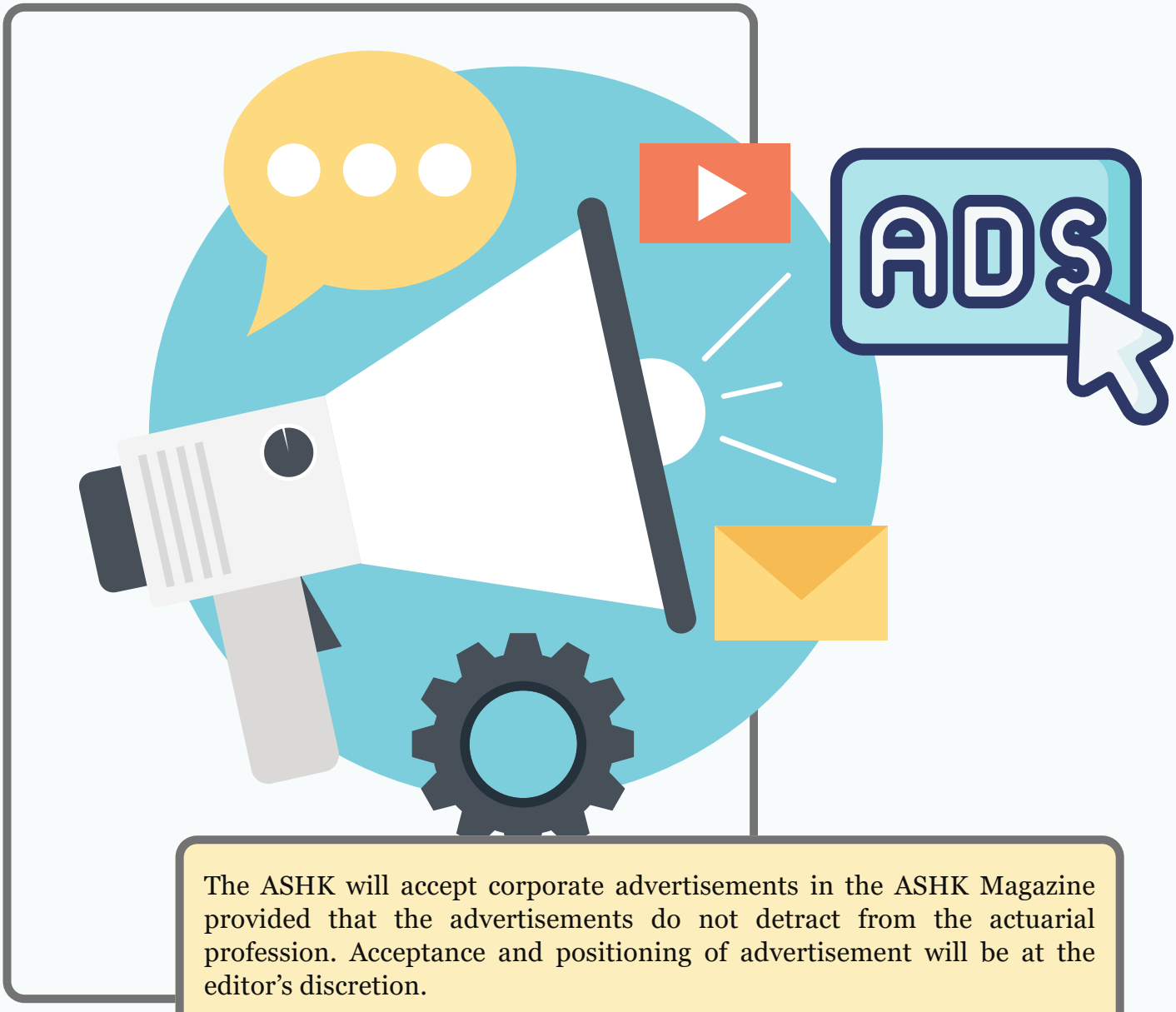

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懷舊特輯

附錄1： 聽陸健瑜先生講保險和精算

楊寶華
上海師範大學商學院
金融學專業副教授

原載於《精算通訊》第七卷第1期（2009年6月），楊寶華記錄整理。

編者按：陸健瑜先生是本刊各位編輯最敬重的朋友之一。 不僅敬重他極其豐富的職業經驗和專業水準，更敬重他作為一名精算職業人士所表現出的職業道德水準和操守，以及作為一個普通人的真誠和平實。 因此，本刊總是抓住陸先生每次來上海的機會，給他準備一大堆來自精算同學、老師和業內朋友的問題，以各種方式與他交流，目的就是要把他寶貴的經驗挖掘出來，使更多的人受益。

2009年4月中旬，陸健瑜先生參加完中國人保股份董事會後，來上海小住幾天，本刊於4月23日下午在上海財大組織了一次小型座談會，有精算方向的十餘位研究生和包括精算、保險、會計專業的幾名教師參加，討論非常熱烈和有趣。 會後，研究生楊寶華同學將座談內容以問答方式整理成文，記錄中，不區分是誰提問，回答者就是陸健瑜先生。 本文經陸先生過目後，刪除了少數他認為不合適公開發表的內容。

（主持人謝志剛教授介紹陸健瑜先生，強調討論主題和規則，宣佈提問開始。）

問： 陸先生，我們很多同學都聽說過您戒煙的故事，知道您為自己設計的“戒煙保單”。我想先問您一個問題，您最終戒煙成功，到底是靠自身毅力，還是靠保單帶來的外部監督力量?

陸： 單靠自己的毅力是很難成功的，這是經驗，也是我的同事和朋友願意買這份保險的重要理由。 而那份保單對我的約束作用可是不小的！ 你們謝老師的文字裡沒有寫清楚，不僅僅是被發現抽煙就每人賠100塊錢，是每抽一支煙就要賠100塊錢，抽一包煙就得賠每一個客戶2千塊錢，我怎麼抽得起、賠得起喲！

問： 再問一個相關的問題。 您賣出去的“戒煙保單”，保額蠻大的，對應的“償付能力風險”也就很高，但當時大家有沒有考慮您是否持有與業務規模和特徵相對應的“風險資本”呢?

陸： 我們那時候沒有你現在的覺悟和水平高，沒有把它當作是“保險”，是開玩笑，實質上是“賭博”，沒有考慮償付能力和風險資本。 但你指出了問題的實質，沒有考慮償付能力資本的“保險”就不是保險，就是賭博。

這次金融危機的主要原因之一，就是沒有限制出售金融衍生產品對應的資本要求。

問： 關於償付能力資本，再接著問一個問題。我國現行《保險法》中規定（注2009版102條），經營財產保險業務的保險公司當年自留保險費，不得超過其實有資本金加公積金總和的四倍。 這相當於規定了保險公司償付能力資本的最低額度是當年保費的25%。 而中國保監會從2000年沿用到現在的計算最低償付能力資本的計算方法，借鑒了歐盟的老規定，大約為當年自留保費的16%多一點點，相當於為6倍。 這說明“規”與“法”不夠協調麼?

陸： 我間接地提供兩點意見供你參考。 首先，現代保險監管越來越強調“原則導向”而非“規則導向”，過於剛性的法律條款可能會逐步被修訂。 第二，針對你說的6倍與4倍的矛盾，我注意到保監會最新（08年）的《保險公司償付能力管理規定》中，將償付能力充足率達到150%歸入償付能力充足II類公司，也就是說，如果將最低標準定為150%，就與保險法幾乎一致了，因為4倍的150%就是6倍。 當然，究竟要幾倍才是合理的，需要你們去認真研究。

問： 現在，全世界的保險業都在關注歐盟的Solvency II專案，據說是2012年就會實施Solvency II，您的看法如何呢?

陸： 我不太樂觀。 Solvency II 的理念是對的，採用“原則導向”的監管模式，實行主動的、全面的風險管理理念，這都很對。 但是，我不相信其計算資本要求（SCR）的所謂“內部模型”（Internal Model），這將導致各公司都使用適合自己公司情況的模型，關於這一點，Gillian Tett在金融時報上題為“Fool's Gold”的文章中講得很有道理，我完全同意他的觀點。

類似的問題還與保險負債的評估密切關聯，就是所謂mark to model，我在去年在第九屆中國精算年會上也說過，除非你收集了長期和完整的數據，否則，你的模擬計算就是自欺欺人。 總之，我本人對歐盟所說的要在2012年就實施Solvency II持懷疑態度。

陸： 經過這次金融危機之後，人們一定會對金融風險更為謹慎和小心，無論有沒有Solvency II，短時期內發生下一次金融危機的概率都會比較小。 但隨著時間的推移，人們又會一點一點的逐步變得更冒險，而Solvency II現在的框架是否能對那時候的風險進行有效控制，現在怎麼能知道呢，我看至少需要十年時間。

（主持人提醒，太過於技術和專門的問題，應與一般問題交叉與平衡！）

問： 陸先生，我們確實比較關心大陸保險業的事情，特別想聽聽您的見解和意見。 比如，中國保監會在2009年3月就出台了一系列鼓勵保險投資的新政策，包括《保險資金債權投資計劃設立指引》、《保險機構設立基礎設施債權計劃通知》、《關於調整債券投資政策的通知》、《保險機構信用風險管理能力標準》、《保險公司股票管理能力標準》等等。 其中，《保險公司股票管理能力標準》的主要內容，是允許有能力的中小保險公司直接投資股票市場。 行業主管部門在這時候鼓勵保險公司投資，如果發生損失怎麼辦? 誰承擔責任呢?

陸： 大陸方面的事，應該是我來問你們才對。你們比我應該更瞭解，我不能亂說。 我的角色，是與你們分享一些海外市場的經驗。 針對你的問題，我還是講一個國外的真實故事，供你參考。

上世紀九十年代初期，1990-1991年，韓國股市下跌得非常厲害，你們可以上網查看韓國股指的歷史走勢就清楚了。 為了維護股市穩定，韓國政府下了一道指令，要求所有的（韓資和外資）保險公司都要買股票，還具體下達了購買額度指標。 韓資的保險公司倒是沒有表達不滿，但外資公司可不幹了，說哪有這樣幹的，政府怎麼可以這樣干預公司的投資決策行為呢? 美國公司通過美國商會與韓國政府交涉，但韓國政府非常強硬，說一不二，外資公司

陸： 沒辦法，只好硬著頭皮按政府規定買了股票。滑稽的是，之後股票居然真的大漲，大家都賺了不少錢，這事終於以喜劇方式收場。

問： 我們注意到，目前國內的很多保險公司為了提高償付能力資本充足率，都採用了發行次級債的方式。 想問問您，這種通過“借錢”來表明“不差錢”的方式，對保險公司自身而言存在哪些風險？ 如果金融機構間都普遍地相互持有次級債，是否虛增彼此監管資本，並存在系統風險？

陸： 發行次級債來提高資本充足率是近10年來國際上較為普遍的一種做法。 關鍵在於對發債公司的監管，包括提高發債過程的透明度。 風險主要表現為發債公司是否有能力償還到期債務，監管重點是考核發債公司未來幾年的現金流狀況，如果公司不能證明未來的現金流具備足夠的償債能力，就不可能獲得監管機構的發債許可。

問： 您去年曾經給我們作過一次講座，好像您在去年的中國精算年會上也講過，內容是關於精算模型與風險管理的關係，影響很大。 想問問，您現在的觀點有沒有什麼改變，或是補充？

陸： 我的觀點沒有改變。 模型仍然是有用和重要的，但比模型更重要和更複雜的，是問題本身。 模型是對現實問題的簡化，比如我們常常將許多實際的風險分佈簡化為正態分佈模型，導致我們對風險的預測發生很大的偏差。 總之，最重要的是風險和風險管理的理念。

以風險管理的理念來看待這次金融危機，可以看到，這樣的危機遲早都要發生，而且還會不斷發生，每隔十年或十幾年就會有一次重複，不可避免。 為什麼呢？ 我們都知道，產品的價格不可能等於實際成本，一定要有利潤，利潤可以用於抵禦風險。 但是，在自由競爭的市場經濟體制下，激烈競爭的市場環境促使各家公司通

陸： 過多冒一點風險，也就是降低價格來得到更多的業務，對於某一家公司來說，今天多冒一點風險，看上去影響不大，而其它公司會很快跟進，又會比別的公司更多冒一點點風險，經過若干年的積累後，從全行業的視角看，風險爆發的概率越來越大，危機就會爆發。 這種情況無論採取怎樣的防範措施都很難避免。

問： 關於對保險公司的風險管理，中國保險業已經開始實施風險評估報告制度，保險公司需要就承保風險、資產風險、信用風險、操作風險向保監會定期提交評估報告。 但我們感覺好像主要是借鑒國外的制度和方法，不知道這些指定的風險專案是否與保險公司真實的風險狀況相匹配。 以您在香港、臺灣和澳洲等海外市場的經驗，國內的保險公司與國外的有什麼不一樣呢？

陸： 當然不一樣啦，有很多不一樣的地方。 其中之一，就是國有控股公司傳統上對政府有一定的依賴心理，國家是公司的“好爸爸”，一旦公司自身出了什麼問題，可以向“爸爸”要求說明。 不僅大陸，連台灣地區的保險公司也有這種情況。 但是國外的保險公司，相對就只能靠自身力量，危機意識相對較強。 這樣一來，風險狀況也就不會一樣。

至於風險監管的具體措施和標準，肯定需要有一個學習和借鑒國際經驗過程，不可能一開始就十全十美，畢竟保監會只有很有限的人員在做相關的技術工作。 有一個統一標準比完全沒有標準要好。

監管機構制定的各種制度、措施和標準，其實是很難符合公司風險管理實踐的。 監管無論做得多好，現實中很多風險依然是要發生的。 就像金融危機，肯定是隔些時間就要出現。 因此，最重要的是逐步樹立風險管理的意識和管理理念，保險公司不光是要考慮如何滿足保監會的監管要求，更要主動地在日常經營管理中樹立風險防

陸： 範意識。 而保險監管則要逐漸實行“原則導向”而非“規則導向”的監管模式。

問： 中國保監會最近連續處罰了三家公司的精算責任人和總精算師，在精算界影響蠻大的。 想問問，在香港有過這種處罰精算師的案例嗎？ 國外的指定精算師與審計師和董事是什麼關係，會面臨什麼風險？ 總精算師制度是否提升了精算師的地位，對解決利益衝突是否有幫助?

陸： 精算學會有嚴格的職業準則來約束精算師。 我記憶中，有過兩次精算師受到客戶投訴的案例，後來經過精算學會的調查，發現精算師並沒有違反職業準則，所以後來沒有受到處罰。

在香港，監管機構、審計師和董事會都完全依賴指定精算師的精算聲明，所以指定精算師如果是公司僱員，又要代表監管機構去監督公司董事會的決策，面臨的利益衝突是非常複雜的。 如何解決呢，只能依靠精算師的協調能力。 如何讓董事會和總經理信任你，聽取你的建議，這是需要很高的溝通技巧。

總精算師雖然被監管機構認定為公司的高管人員，但現實生活中，他在公司中的實際地位，還是需要依靠本人的能力。 總之，溝通是精算師最需要具備的能力。

（主持人再次提示，精算學生可以問一些與精算學習有關的問題。）

問： 作為一名資深精算師，您認為精算師應該具備的最重要的能力是什麼？ 能不能請您對我們這些精算學生將來的職業規劃提一些建議?

陸： 溝通！ 精算師應該具備的最重要的能力是交流能力。 作為一名精算師，需要和他的上司進行交流，需要與銷售人員以及其他相關人員做好溝通，才能更好地完成精算工作，才能讓老闆採納你的意見，讓同事認可你的工作價值。 我見過很多精算師，

陸： 只知道“埋頭苦算”而不懂得與人溝通，精算師不只是要算，更重要的是你要讓公司高層認識到你算出來的東西的價值。

對你們現在的情況來說，學好英語也是為了更好的交流。 至少要能夠掌握精算方面的英文，能和別人進行溝通。 就像我學國語一樣，十年前我也不會說國語，但是因為經常來內地，我慢慢學慢慢練，雖然現在還不能說我的國語說的有多好，至少百分之七八十能夠說，能夠和你們交流。 不然今天我坐在這說粵語，你們聽不懂，我們就不能交流了。 因此你們學好英語很重要，這樣才能跟那些國外的保險公司交流、做生意。

問： 精算師的就業領域或職業選擇，在英、美等國相對比較寬泛，可以到保險公司以外的其它金融類企業就業。 而在中國，精算師的工作似乎主要局限於保險公司。 請問您怎樣看待這個問題，這種情況在短期內會不會有所改變呢?

陸： 在美國，除了保險公司對精算師有需求外，與退休金有關的領域也對精算人員需求較大。 SOA考試體系中也可以選擇這個方向進行考試，不過現在考這個方向的人越來越少了，國內的精算考生基本上沒人考了，這與國內對這方面的需求很少有關。 精算在養老金領域是否有用，主要取決於選擇DB還是選擇DC模式，在DC模式下，精算師可以發揮作用的空間不大。 相對來說，對投資那部分的需求會更大一點，包括投行和基金公司分析上市保險公司的投資價值等等。

關於國內精算師的就業選擇，除了保險公司，還有一些精算諮詢公司，這部分主要都是國外的諮詢公司在做。 還可以去政府工作，說明政府做一些監管或者其它類型的工作。 總的來說，目前在國內，精算師的就業選擇確實也不是很多，這種情況在短期內不會有太大改變。

問： 針對國內相關行業對精算人員的未來需求狀況，我們在校精算學生應如何定位自己學習呢？是將精算做得更“精”還是將知識面鋪得更廣些好？

陸： 我們相信，中國對精算師的潛在需求還是很大的，可以說是潛在需求最大的國家和市場，特別是未來十年、二十年內，精算學生畢業後應該是不缺工作做的。 關於自身的定位，那是個人的選擇問題。 如果非要我選的話，我覺得還是將知識面鋪廣些好。 有許多精算師在做自己負責的那塊業務，一做就是幾十年，到最後可能連精算是什麼也忘了。 英國有個精算師，就是做紅利做了三十多年，最後就只會做紅利了。 所以做精算工作還是要多瞭解些相關的知識，如金融、法律、會計等方面的知識。 另外，如前面提到的，就是多跟相關的業務人員溝通，這樣才能將精算工作做好。

(主持人宣佈這場近3個多小時的對話結束，非常感謝陸健瑜先生的辛苦！）■

附錄2：陸健瑜戒煙

謝志剛
英國利茲大學博士
英國精算師協會榮譽會員

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聽過、見過太多的戒煙故事，有家人、朋友和同事的故事，也有名人、明星甚至偉人的故事。若真正戒掉了，大家都說佩服、佩服；若戒不掉或整出點笑話，大家也覺得是預料中的事。總的說來，戒煙是一件比較個人的事，比較孤獨的事，就像抽煙本身一樣孤獨。但有一種人，他能夠把戒煙這件個人的事做得如此智慧和如此牽涉公眾利益，能夠如此調動集體力量、催化人情冷暖，如此鍛煉和考驗大家的智商、情商和其他五顏六色商，這種人不會是別人，只有精算師才想得出、才做得到。

本故事發生在20年前的香港，故事的主人公是香港著名的華人精算師陸健瑜先生。Peter Luk，他擔任香港精算師協會主席多年，是一位資深的精算師，為推動精算職業的發展作了很多貢獻。中國保監會1999年9月舉行的第一次中國精算師資格考試，就請他（和李政懷、鍾煦和共三人）做顧問，負責第一批中國精算師考試的設計和評選工作，他在精算圈中的資歷和口碑都是一流的。

和他的精算功底同樣深厚的，是他的煙癮。精算師有很充足的抽煙理由，工作本來就比別人重，還要參加沒完沒了的精算考試和後續教育學習，更要承擔許多精算師職業協會的工作。陸先生也不例外，他的煙癮伴隨着他的精算技能一起成長，甚至還略勝一籌，最多的時候，他每天要抽4包（80支），他的秘書跟他工作的很多年，幾乎沒有看到他手指上有不冒煙的情況

但這世界上就沒有不變的事。陸先生決定要戒煙了，要從每天4包煙的顛峰上激流勇退、金盆洗手了，或是覺得自己「煙成名就」，在最不需要身體的時候卻要愛惜身體了。

具體動機不詳，但現在回頭來看，陸先生在幾十年兢兢業業的抽煙生涯中，不僅悟出了抽煙的意義，更悟出了戒煙的境界，並且要將其付諸實踐了。

我們現在姑且把陸健瑜先生的戒煙辦法稱為“「精算戒煙法」或「陸氏精算戒煙方案」。其基本原則和目標是：要把戒煙這件自己個人的事弄成別人的事；要把自己戒煙的痛苦轉化為別人的痛苦，再把別人的痛苦轉化為自己的快樂；要為自己的戒煙工作獲得相當的回報和經濟補償，更要讓別人因為獲得了知道和參與自己的戒煙活動的權力而支付必須的費用。你說這算不算戒煙的新境界?

實施「陸氏精算戒煙方案」的第一天，陸先生在自己公司本部門宣布：「本人從今天此時此刻起正式開始戒煙，從此不再抽煙！」大家可能聽慣了這種老掉牙的戒煙宣言，也不相信我能戒煙。為了請大家來監督和幫助我戒煙，我設計了一份戒煙保單，你只要每天付一塊錢的保費，就參加了我的陸氏戒煙保險，一旦任何人在任何地方發現我抽煙，每一位保單持有人都可以獲得100塊錢保險給付。你可以隨時參與，隨時退出。並且，如果連續交滿了100天的保費，就不需要再交保費，你已獲得終身保險，隨時都可以獲得拿回100塊錢的機會。

從精算師的經驗來看，這確實是一份對客戶來說很合算的保險，你能相信陸先生從此不再抽煙嗎？用不着精算，跟了陸先生多年的秘書就不相信他能戒煙！雖然她這輩子做事做人一直小心謹慎，從來不做冒險賭博之類的事，但還是參與了這她輩子第一次、也是最後一次冒險，買了陸氏戒煙保險。

還有，對當時月收入只有一千元的陸先生來說，三十份保單的賠付足以讓他破產。100元的賠付在當時也是個不小的數目。

精算師既相信戒煙成功率的統計數據，也相信自己的職業判斷，無論如何，這是一份不錯的保險單。因此，公司裡的一些精算師也買了陸氏保險，包括另一位資深精算師李達安先生也成為了陸先生的客户，好在大家都是朋友和同事，只買一份，不忍心看到陸先生破產。但精算師的號召力和榜樣作用是巨大的，有李達安先生這樣的名人客戶，陸氏戒煙保險在公司裡很快發展到了三十來位保單持有人。而且，客戶還很快從公司內部擴大到外面的朋友圈子。陸氏戒煙方案的第一步完成了，好戲開始上演。

每天到公司上班的第一件事，陸先生帶着滿臉燦爛的笑容，向各位表情複雜的客户收取當天的保險費，每一粒硬幣投入剛剛轉變職能的陶瓷煙灰缸中，發出一聲聲清脆的響聲，它帶給主人的享受，似乎完全淹沒了戒煙者通常表現出的種種的不適和難過。而且，隨著每天收取的保費在不斷增加，陸先生的愉快也似乎在不斷增加，而這三十多位客户的表情卻越來越複雜，越來越難看，好像他們各自都在分別承擔著陸先生戒煙的全部痛苦。更要命的是，普通戒煙者在戒煙過程中發生的種種怪異行為，似乎也從戒煙者本人完全轉移到了這批客戶身上，並且以更加怪異的方式表現出來。

一些從不抽煙、甚至特別討厭抽煙的人，包括陸先生忠實的秘書，也會帶各種好煙到公司來，不經意地隨便放在陸先生隨手可及的地方，等待著獵物自己上鉤。抽煙者則會經常在陸先生面前品評一些名煙，「咳！這是為中南海特製的香煙。Peter，來一支吧？」裝得好像完全忘記了自己是陸先生的客户這事。而陸先生只是帶著更加燦爛的微笑，面對著這種雕蟲小技。

除了文的，還有武的。晚上，很晚了，還經常會有不速之客登門造訪，這些朋友也真夠「朋友」，敲門聲急促得像有急事，開門後即不向主人打招呼也不說話，直奔書房或客廳，不停地用鼻子快速吸氣，像是緝毒警察正訓練的緝毒警犬，臨走時恨恨地丟下一句話：「又讓你逃過一次！」。第二天，陸先生上班時的臉色更加燦爛了。

這就是陸氏精算戒煙方案，其要害就是「轉移」二字！要是沒有將自己的痛苦轉移給別人，再把別人的痛苦和由痛苦所導致的種種不良反應轉移為戒煙者自己的戒煙動力，陸氏精算戒煙法是不會成功的。但陸先生成功了！