

the Malaysian Actuary

Published by Actuarial Society of Malaysia

For Internal Circulation Only

Message from the President

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The Malaysian Actuary Newsletter is published three times a year, and is available on the internet at the ASM website. The editorial team warmly welcomes any feedback from members on how to improve our newsletter. Opinions on articles published, ideas and thoughts are also most welcome. Contact us at the following e-mail address: Editor@actuaries.org.my

I would like to thank all of you for electing me to be the President of ASM. Having taken over the leadership, in the past few months, I have come to realise that it is an awesome responsibility to lead ASM forward. However, the fact that this year's ASM President has been democratically elected, shows that there are still many keen members who are more than willing to ensure ASM thrives in the right direction. My wish therefore is to see more members participate in ASM activities. After all, ASM is your professional body and voice.

Many of you may not know that one of our elected EXCO members from the AGM, **Mr Mark Kaye**, has since left the country. ASM's Constitution allows the EXCO to appoint another member into the EXCO in his place. In this regard, I am pleased to announce that **Mr Ravinder Singh** has agreed to take up the challenging position of Head of Events Sub-Committee. We welcome Ravinder and look forward to his contribution.

During the past few months, many regulatory developments have kept the actuarial profession rather busy. I talk about the "Concept Paper of the Risk Based Capital Framework for Insurers"; "JPI 4/2004 - Test Exercise on Draft Guidelines on reserving for General Insurance Business" and also the ongoing discussions about the implementation of Asset Share in life insurance plans. The latter has also caught the public eye in all major dailies.

In this issue of the *Malaysian Actuary*, we have an article about the Risk Based Capital Framework which gives some brief insight of the proposed framework. The editorial team of the *Malaysian Actuary* has also secured **Mr Richard Holloway** of Watson Wyatt to write an article on the Singapore's version of RBC. It will be interesting to compare the frameworks between the two neighbour countries although the Malaysian version is currently still under the draft stage.

Turning to general insurance reserving, it is interesting to note that it is the intention of the regulator to ensure general insurers' reserves are appropriately certified by a qualified actuary. This is a major milestone and the right direction forward for the general insurance industry in Malaysia. The development will surely help elevate our profession, but actuaries must rise up to the challenge. ASM had been looking to widen its skills in general insurance, and this is a giant step forward toward realising that.



All in all, the regulatory development will definitely have a positive influence on the Malaysian actuarial profession. This will create a bright future and opportunity, and enhance the career prospect of actuaries. I urge all our members to respond positively toward enhancing actuarial technical skills and widening our scope of influence. ASM should also be proactive to create impact in wider circles. An example is the current ongoing discussion on *International Financial Reporting Standard (IFRS)*. To make our voice heard, we will need members who would participate, voluntarily, in the IFRS working group.

The insurance industry is constantly evolving, and the actuarial profession will need to adapt to the change. Changes have already occurred in the UK under the recommendations of the *Morris Review*; it is yet unclear how and what this will lead our profession into. Nonetheless, I am confident that our skill is unique and we will ride through the changes. Maybe more importantly, actuaries need to stand up and demonstrate our versatility.

Lastly, the 13th EAAC (*East Asian Actuarial Conference*) will be held in Bali, Indonesia from September 12-15. The theme of the conference is *Actuary @ Risk*, which reminds us that yes, actuaries are not risk-proof. I was told that there might be two Malaysians who will be presenting conference papers. If indeed it is so, it will spur the Malaysian actuarial profession forward. It is time that the Actuarial Society of Malaysia is seen in the world stage.

Lee Jiau Jium

Members In the News

Article featured in *The Star*, 30 April 2005

Big feat by a small kid

By *Ravinder Singh*

We came, we saw, we conquered. The view at the summit of Mt Kinabalu (4,095.2m/13,435ft) was spectacular. The weather was clear at 8.08am on 18 March 2005, and we could see all of Sabah spreading out below us.

The three generations of us – grandpa Jagjeet Singh, 71, 38-year-old me, and my son, Sanjeev Singh, stood proudly on the highest mountain in South-East Asia. A few feet away was grandma Surjeet Kaur, 64, who was speechless with emotion.

The three months of strenuous training we had undertaken, climbing Batu Caves, Bukit Kiara and Bukit Gasing, now seemed far away as we stood enveloped in the light of a new day. It wasn't our intention to include Sanjeev whom we thought was too young, but he insisted on accompanying our climb up Batu Caves' 272 steps one Sunday morning in December.

He had no problem keeping up at all, and it became a routine most Sunday mornings to exert ourselves and then rewarding all that hard work with thosai and 100-Plus at a restaurant.

On the morning of March 17, we registered our names at the Kinabalu National Park headquarters for the climb, paid the necessary climbing fees, and engaged a pair each of guides and porters, which was one more than was customary just in case the challenge got too much for little Sanjeev.

At 9am after prayers, we started the climb from Timpohon Gate (1,870m). The ascent was indeed very steep and the air grew perceptibly thinner as we climbed. Sanjeev had no problems at all managing the six hours it took to negotiate the 6km to the Laban Rata Resthouse (3,620m).

Grandpa and grandma arrived more than an hour later. By then, Sanjeev had had his French fries and was resting his head on the table. It was a beautiful afternoon, and we sat near the balcony, enjoying the warm sunrays. After the buffet dinner, we enjoyed the panoramic view of the sunset.

The room was reasonably warm when we turned in at about 8pm. However, Sanjeev struggled to get up next morning as it was the third night that he had had to rise some three to four hours earlier than usual. Morning call was, after all, at 2am! After breakfast, by about 4am, we were hitting the summit trail with about 80 other climbers, all moving slowly in a single file.



The temperature was down to freezing point. It was pitch dark, and the headtorches we wore provided the only source of light for the next few hours.

The trail was initially mostly wooden ladders. The lack of sleep from the

last few days, the ever thinning air and the darkness, began to take



its toll on poor Sanjeev. He now required more stops than the day before.

After a two-hour climb, we came to a rock face, which was the trickiest part of the climb. It required that we grabbed hold of the rope already tethered there; I followed Sanjeev very closely, just to be sure, and guided him all the way to the Sayat-Sayat huts. He did well and did not show any signs of fear.

The sky was getting light and we could now see more than just a few steps ahead. After another rope-climb up a rock-face, we reached the Plateau, which was really another very steep climb on barren rocky plain. The next two hours was indeed very tough for the Year One student. Even the magnificent sunrise was no comfort to him anymore.

The mountain air was now extremely thin and we had regular stops for much longer periods. Grandpa and grandma kept pace and were just a short distance behind. For the first time, I needed to push Sanjeev as he began to run out of steam. Our goal was now within sight and it would be a pity to turn back. I held Sanjeev's hand and supported his every step. It was most exhausting.

We were among the last to reach the pinnacle. However, Sanjeev was the first in our group to clamber up. He just sat down and showed little emotion, a look of total exhaustion written on his face. Later he only managed a laboured smile when we took photos. I began to worry about the descent.

However, going downhill took just over half the time, though the blazing sun sapped our energy.

We made it back to Laban Rata at about 11am and had a well-deserved meal. Sanjeev was soon glued to the TV set, watching a football match and devouring a plate of French fries and strawberry-flavoured drink. He was back to his usual enthusiastic self.

The final descent was a breeze, and the boy had no complaints whatsoever. We were back at Park headquarters after just four hours. It was just before 5pm.

The boy is now talking about climbing Mt Everest! Of the many physical challenges I had accomplished in the last two years, this was by far the most satisfying, as I was also able to share a key moment in my son's life.



We are certainly even closer now.

Ravinder Singh is Head of Life Division (South & South East Asia) of Hannover Re, Malaysian Branch

News from Abroad

Changes to the Singapore Trustee Act

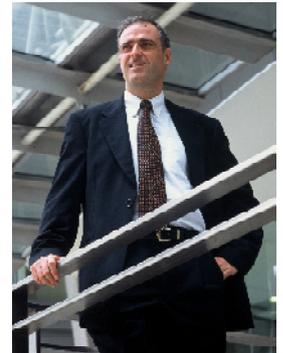
The Trustee Act in Singapore covers all trusts. Changes to the Trustee Act came into effect in December 2004. This should have a significant impact on the investment powers of more than 50 statutory bodies in Singapore. One major change to the Act is the expansion of the discretionary powers of trustees to enable them to manage trust assets in the most effective way for the benefit of the trust.

Key highlights are:

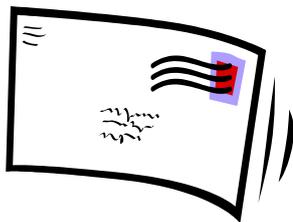
- *Trustees' discretionary powers expanded*
- *List of authorized investments repealed*
- *Reforms include the conferment of general power of investment and power to appoint agents, nominees and custodians*
- *Safeguards to help trustees adhere to minimum prudential standards*
- *Duty of care defined*
- *Requirement to obtain proper advice in making investment decisions.*

The rationale is that investment decisions should be made by suitably advised trustees.

The trend here for a more liberal set of legislation on the basis of a requirement for the trustees to exercise proper due diligence is an interesting one. It will call for better professionalism both within those who are appointed as trustees and those who advise them. This is real progress and should provide greater opportunities for the actuarial profession to be involved in delivering professional advice to institutional funds in Singapore. The extension to the Malaysian market would be natural, particularly in the retirement schemes market where there are heavy restrictions placed upon trustees of tax approved retirement funds, stifling the growth of this market.



Danny Quant



A letter from Hong Kong....

A fellow Malaysian actuary working in HK has very kindly "volunteered" me to write up a short article about the insurance industry in Hong Kong. I suspect I may disappoint him by not following exactly the intention of the original brief given to me.

You see, even though I've been living here for almost 5 years, I spend at least half my time out of this wonderfully vibrant city and probably only 15% of my time working on things related to Hong Kong. So I don't feel qualified to say much about the developments here. In this piece, I would be writing more as an actuary who happens to live in HK than making really intelligent commentaries about the direction of the industry or the profession...

Well, if you are one of those actuaries who can't live without numbers and statistics and are dying to find out about the insurance industry in HK, I recommend the Office of Insurance Commissioner website www.info.gov.hk/oci where you will find a host of information (covering both life and general insurance) going back to the early 1990s. For those interested in the pension industry, you could visit the website of the Hong Kong Retirement Schemes Association - www.hkrsa.org.hk.

The Profession in HK

This Actuarial Society of Hong Kong has been around since 1968. I was told by one of the more senior actuaries that the initial meetings were made up of less than 10 people. Bless them for carrying on

and now the membership has grown to 247 fellows, plus 140 student members.

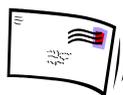
I could hear you saying "Wow, the fellow members are 76.4285714% more than the student members". Yes, this is probably one of the rare places where you can find more qualified actuaries than non-qualified ones. I guess one of the main reasons for that is the relatively large number of regional offices of insurance and reinsurance companies being set up here, where a higher proportion of qualified actuaries are hired.

Inspired To Do More?

I attended a seminar about pension reform in the Greater China region recently and heard a speaker telling us that Sweden took 83 years for its population to age (as measured by senior population growing from 10% to 20%) whereas Japan is expected to age by the same measure within 21 years and China within 16 years! The rapid aging of the population is not a new issue and has been discussed, debated for over a decade. I sat there thinking this seems like the sort of work actuaries could contribute to and should be pretty good at - projecting the population and estimating the financial burden on the society etc. Around this region, there might be the odd actuaries working in the social policy sector or act as advisers to governments or NGOs, but, at this stage, they are the exceptions.

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News from Abroad



A letter from Hong Kong.... *continued*

Many of us play an active and important role within our employers (or our own enterprises for those self-employed actuaries) by providing good advice to our colleagues and/or clients. I do wonder if the profession as a whole could do more by reaching out beyond our comfort zone. (I'm just as guilty as well and do not mean to be pointing fingers.)

It is easy to raise this sort of "noble" idea about contributing to the society but when one is busy "fire-fighting" on a daily basis, it would go straight to the bottom of the to-do list. In Hong Kong, there is probably another reason for the relative apathy. Many actuaries (by my very unscientific gut feeling, at least 50%) are not locals and probably do not plan to stay here for a long time. It is therefore not surprising that there is relatively little engagement from the profession. Take me as an example, there was a period when I was more interested in issues in Taiwan than in HK, simply because I was working on projects there 80% of the time. I bet there are plenty other actuaries living here who can identify with this.

Isn't It Scary?

Recently, a few actuarial friends of mine got together and we talked about how much reliance the decision-makers place on the most inexperienced actuarial team member without realising it and how vulnerable that process can be without reasonable checking put in place.

Imagine this

The CFO needs to decide on a particular issue, so he asked his Chief Actuary for some numbers. So the Chief Actuary asked his senior manager for it and the senior manager asked the manager to do the calculations. The manager is too busy or sometimes "too important" to do technical calculations, so he asked his assistant manager. And this got passed down and down.... and the task finally landed on the desk of the junior actuarial analyst with less than 1 year experience. Nobody has the time to explain the purpose and context (which was probably lost between the senior manager and the manager anyway because the senior manager assumed that the manager could read his mind) of this piece of work to this poor soul. This young chap, desperate to impress his boss - the assistant to the assistant actuarial manager (AAAM), worked round the clock, scrambled for information among the 10 different folders with names that looked remotely like Business Plan, adding reserves to premiums, dividing 2002 sales by 2004 number of agents and finally pulled together an "answer" that was 311.685million. The AAAM passed it to his boss and his boss asked him to explain the number; the AAAM made it up as he went along "Oh, because the new business has grown by x%, the stock market picked up by y% and the HQ asked us to use a discount rate of z%, blah blah.....". The AAAM's boss did not want to appear less knowledgeable and thought to himself "with some many figures being quoted to support it, this figure must be more or less ok". So, in the same way, the number is being fed back up the chain.



Ok, ok, all I want to say is that it would do everyone good if we (especially the more experienced actuaries):

- a) take time to explain to our colleagues the purpose of a certain task
- b) put in rigorous check-points in our process - in case the "answer" was made up of one big error minus another big error
- c) try to explain our figures, both to ourselves as well as to our colleagues, from first principles rather than trying to pick and choose reasons that would fit the "answer".

The last thing I would like to share with you is that a LAKSA club has been formed in Taipei among the Malaysians and Singaporeans actuarial professionals working there. So, if any of you is heading that way, do drop me a line and I am most happy to put you in touch with the LAKSA club.



Cheers,
Esther
Chin.Esther@gmail.com

The opinions set out in this article are those of the author and do not represent the views of her employer. This article is provided for general information purposes only and must not be relied upon without seeking independent professional advice on the relevant issues.



Malaysian Risk Based Capital

Bank Negara Malaysia (BNM) issued a "Concept Paper of the Risk Based Capital Framework for Insurers" on 15 December 2004. The Concept Paper affects both the life insurers and general insurers, including reinsurers.

Objective of Change

Continuous changes in the operations of insurers, increasing complexity and volatility of the investment environment, and the diverse range of risks of varying magnitude that insurers are exposed to require insurers to set aside sufficient financial resources to withstand the losses that may arise. Hence, there is a need to change the existing solvency requirement, as it may not be relevant in today's environment.

There is already an existing solvency requirement. Very briefly, for life insurers, the solvency margin is calculated to be a percentage of the reserves plus a percentage of the sum at risk; while for general insurers, the solvency margin is calculated to be a percentage of the net liabilities and a percentage of the earned premium. However, this solvency requirement is based on a 'one-size-fit-all' approach. It may not correspond adequately to different risk profiles of individual insurers, which may vary widely in terms of assets and business mix.

Under the proposed Risk Based Capital (RBC) Framework, the amount of capital and solvency levels required to be maintained by an insurer will commensurate with the insurer's risk profile.

Computation of Required Solvency Margin

A. Life Insurers

Under the proposed Framework, the percentage of reserves will be replaced by the Required Solvency Margin (RSM), but the other computation for solvency margins remains.

The computation of the Required Solvency Margin shall be the highest of the following three methods :-

- (i) Risk Charge method ;
- (ii) Dynamic Solvency Testing method ;
- (iii) Gross Premium Valuation/Bonus Reserve Valuation method

The Risk Charge (RC) method involves applying a percentage to the value of the assets, eg. 20% for Equities; varying percentages for Fixed Income securities.

The Dynamic Solvency Testing (DST) method is similar to the earlier circular JPI 30 issued by BNM, except that only the pessimistic scenario requires a 95% confidence level that there are sufficient assets in the insurance funds to cover insurance liabilities. The DST method is the sum of the RC method above and this buffer calculated.

Under the Gross Premium Valuation/Bonus Reserve Valuation (GPV/BRV) method, the difference between the 75% and 95% confidence levels is the buffer needed to meet the current and future liabilities at respective confidence level.

B. General Insurers

For general insurers, the RSM is the aggregate of a set of prescribed asset and liability risk charges applied to an insurer's individual classes of assets and liabilities, respectively. Thus,

$$\text{RSM for General Insurers} = \text{sum of asset risk charges} + \text{sum of liabilities risk charge}$$

The above RSM together with the risk charges of all the assets in the shareholder funds form the capital required.

Capital Adequacy Requirement

Insurers are required to compute the 'Capital Adequacy Ratio' (CAR) as an indicator of its financial strength. CAR measures the adequacy of the capital fund available in the insurance and shareholders' fund of the insurer to support the total capital required.

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Focus

Malaysian Risk Based Capital *continued*

The formula to compute CAR is as follows :-

$$\text{CAR} = \frac{\text{Total Capital Fund Available}}{\text{Total Capital Required}} \times 100\%$$

An insurer whose CAR is 100% only shows that it has enough assets to cover its insurance liabilities and the required solvency margin. The proposed Framework further states that an insurer will be subject to two other levels of CARs, namely the minimum CAR (MCAR) level and the supervisory CAR (SCAR) level. MCAR is the minimum statutory capital adequacy level that an insurer needs to maintain; while SCAR is the capital adequacy level, which acts as a trigger for supervisory action. The percentages of MCAR and SCAR above CAR are not stated in the proposed Framework, and it is likely that the levels will be determined by other factors, such as size, earnings etc.

Implementation Process and Timing

There will be two phases of implementation.

Phase I is focused on implementing the risk charges for assets and liabilities, while maintaining the existing valuation basis of assets and life insurance liabilities. Phase I is scheduled to be in **2006**.

Phase II will undertake a full review of the valuation basis of assets and life liabilities in line with the international developments.

Issues in the Framework

The proposed Framework is still in the concept stage. Some of the differences between the existing Framework and the proposed Framework are :

1. The Framework states that each statutory fund must maintain its own RSM, i.e. there is no cross-subsidy. This is different from the current requirement where only one solvency margin is needed.
2. The Framework states that statutory surplus in the participating fund cannot be used as a form of capital to meet the RSM. This is again different and is it reasonable given that the statutory surplus should and can be used as a buffer.
3. RSM for the life insurance business is the highest of the three methods. While RC method is deemed to be appropriate, the DST method and the GPV/BRV method sit alongside the RC method. DST is projected under going-concern basis, and any future capital requirement may be addressed separately as a business capital. GPV/BRV method requires a projection of guaranteed and non-guaranteed benefits. While it is reasonable to expect that guaranteed benefits are obligation liability and must be met, non-guaranteed benefits, such as future bonuses/dividends, may be varied under adverse conditions, and hence should not be required in projection. In addition, the rationale of the 75% and 95% confidence levels needs further discussion.

Implication To Insurer

The impact to each insurer largely depends on whether the insurer is or is not currently sufficiently capitalised, given that there is already a minimum solvency margin as well as a minimum paid-up capital requirement.

However, under the proposed Framework, it is generally expected that, as a whole industry, the solvency margin will be raised and more capital will be required. To some extent, this is also affected by whether the minimum paid-up capital will be abolished under the RBC Framework.

The financial strength of an insurer will be measured by the MCAR and SCAR levels. Insurance companies will need to know the level of these so that they can adequately plan for the capital requirement.

The Next Step

Currently, BNM is awaiting insurance companies' feedback and computations of the CAR. As the proposed Framework is still in the concept stage, there will be few modifications before the full implementation.

Each insurer should check its product mix and see the profitability of its products given the higher capital requirement. One possible way is to look at the investment-linked business which is less capital-intensive. In addition, insurers should review their investment policy and asset mix to minimise risk and capital requirement.

One thing is certain; the next few months will continue to be very challenging to the actuarial profession.

By Lee Jian Jinn (JJ), FIA

The above comments are wholly of the author himself. They do not represent any company's view nor the views of ASM. For further details, please refer to the actual Concept Paper.

Focus



The New Risk-Based Capital Framework in Singapore

- An overview of the new reporting framework for life insurers

Richard Holloway discusses the development and implementation of the new statutory reporting framework in Singapore.

The last few years have seen the emergence of new risk-based capital ('RBC') reporting frameworks in many international markets. Progress has been slower in Asia Pacific, however, with many regulators content to continue with traditional current reporting frameworks, at least for the time being.

RBC frameworks demand that companies hold a level of capital commensurate with the risks inherent in the business they conduct. Typical RBC rules aim to calculate capital requirements following an assessment of risks that can affect the potential variability in liability and asset values. More complex frameworks also aim to capture areas more difficult to quantify, such as operational risk.

Following four years of planning, on 1 January 2005 the Monetary Authority of Singapore (MAS) required companies to follow its new RBC reporting regulations. These rules cannot be considered the first in the region, this honour going to Indonesia which introduced a risk-based solvency standard in 1999. It can, however, be considered to be one of the more complex frameworks, having been devised to cater for some of the specific features of life insurance business in Singapore, many of which are also prevalent in other countries in the region.

Motivation for change

The main driver for the Singapore Government introducing the new rules was the fast convergence of financial products and the desire to adopt common regulatory principles across different financial sectors (for example banking and insurance). The traditional 'one size fits all' solvency margin framework was seen to be outdated and the MAS sought to develop regulations that provide a clearer indication of financial strength, and a series of trigger points for regulatory action.

The challenge was to derive a framework that was acceptable to life insurance companies, while taking into account some of the features of the Singapore market such as the guaranteed nature of some business lines, volatile equity markets, and the significant durational mismatch of assets and liabilities. The MAS, working with industry representatives, analysed several RBC approaches from around the world before designing the new model for Singapore. The choice of regulatory model follows an extensive period of consultation between the MAS and the industry, involving a requirement for companies to test the impact of draft proposals along the way. The testing proved to be particularly valuable, as the industry gained a thorough understanding of the concepts and the MAS had access to actual live data that was used to 'calibrate' the final model adopted.

Traditional framework

Capital or solvency requirements cannot be examined in isolation and need to be viewed together with the reserving regime in place, amongst other things.

Under the previous regulations, a life insurance company had to demonstrate that it met a certain minimum level of solvency. The solvency margin was calculated to be a percentage of the reserves plus a percentage of the sum at risk. The formula was the same for all companies (in other words 'one size fits all') and, as such, did not reflect the specific characteristics of a particular company's business.

Such a system sat alongside the traditional 'net premium' valuation reserving approach, with assets valued at the lower of book and market value.

New framework

The new framework evaluates assets and liabilities on a more realistic basis. Assets are taken at market value and policy liabilities are calculated using a gross premium valuation methodology.

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Focus



The New Risk-Based Capital Framework in Singapore *continued*

Policy liabilities

Guarantees are valued using a risk-free rate of interest based on the government bond yield curve. In essence, this means that liabilities in the non-participating fund are discounted using risk-free rates. Liabilities (including future bonuses) in the participating fund are valued using best estimate assumptions, but the total liability in the participating fund must be at least as great as the value of guaranteed benefits (including declared bonuses), discounted using risk-free rates.

Capital requirements

Capital requirements are then assessed through a separate series of calculations that capture specific risks inherent in the company. Capital charges are calculated for the following categories of risk:

C 1	Insurance risks which are calculated by applying specific risk charges to key parameters that affect policy liabilities, such as mortality, expenses, lapses, and so on. Many of the assumptions to be adopted are prescribed (for example, mortality risk is computed with respect to a specific mortality table).
C 2	Risks inherent in the asset portfolio. This includes credit risk, foreign currency risk and mismatching risk.
C 3	Concentration risks of certain assets.

The Total Risk Requirement (TRR) is defined to be the sum of the various capital requirements, namely:

$$TRR = C_1 + C_2 + C_3.$$

Fund Solvency Requirements and Capital Adequacy Requirements

A company has to demonstrate that it has sufficient capital at both a fund level and a company level. The Fund Solvency Requirement (FSR) is applied to each fund (for example the participating fund or the non-participating fund). The Capital Adequacy Requirement (CAR) applies to the entire company.

To meet the FSR, an insurer must have sufficient Financial Resources (FR) in excess of the TRR for each fund. For a non-participating fund, the FR is simply the excess of assets over liabilities. For a participating fund, the FR is made up of 50 per cent of the provision for future bonuses or non-guaranteed benefits (with the detail prescribed in the legislation).

At a company level, an insurer must have a CAR of at least 100 per cent. There should be sufficient financial resources to cover the TRR across the entire company, satisfying a minimum level of S\$10 million.

The definition of FR is included in the regulations. It comprises various items, including the aggregated surpluses in the various insurance funds, but can also include paid-up ordinary share capital, surplus outside insurance funds, shareholders' surplus within the participating fund and the provision for non-guaranteed benefits.

One of the MAS's main objectives was to define certain 'trigger points' for regulatory action. An initial 'warning event' will occur if the CAR falls below 120 per cent, in which case an insurer will be asked to submit a plan for rectification. The MAS also has the power to change the level of capital, based on an assessment of other risks that it sees in a specific insurer.

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Focus



The New Risk-Based Capital Framework in Singapore *continued*

Implications

It will be interesting to see how the new RBC framework will impact on the way companies manage their businesses. The MAS hopes that companies will gain a greater understanding of the risks inherent within their portfolios and force them to manage these risks appropriately. Specific issues that companies may need to consider in the near future are:

- The re-assessment of an appropriate investment strategy for each fund having regard to capital charges on various asset classes and the inherent level of durational mismatching. We expect to see insurers focusing more on asset liability modelling to help understand the financial and capital implications of various investment strategies.
- The merits and cost of providing guarantees. The future of traditional annuity business in Singapore has been the subject of discussion for some time and the increased costs of RBC charges will not improve the attractiveness of this line of business.
- The impact of RBC on pricing in general, with companies assessing the impact of different reserving bases and the opportunity to re-examine the allocation of capital between various product lines. We are already seeing evidence of re-pricing, particularly for protection products.
- Companies' preferred product mix having regard to the implied profitability of various product lines. Although RBC frameworks have led to the emergence of a greater proportion of investment-linked business in some markets, it may not be the case in Singapore where the new framework does not unduly penalise participating business.

In anticipation of the new framework, the MAS announced a reduction in the minimum level of paid up capital from S\$25 million to S\$5 million for an insurer writing either solely investment linked or short-term accident and health business, and S\$10 million for any other direct insurer. The rationale is that the ongoing capital for a company will be based on its own underlying risks, making the minimum capital requirement less important.

Other countries

In summary, the new framework has been well thought through and captures some of the unique features of the Singapore environment. One could argue that certain aspects of the new framework are still 'formulaic', and that it is not as complex as the new frameworks that have been introduced in other markets such as the UK, but overall, it can be considered a significant enhancement to the previous approach. Although regulators in other countries may take time to move to a risk-based framework, the convergence of 'risk-based' principles is likely to happen across the major insurance markets in the not too distant future.

Regulators in Malaysia and India have publicly announced that they are looking to introduce RBC, and initial details of the proposed framework in Malaysia have been released. In Taiwan, the Minister of Finance finally confirmed the formal introduction of a new risk-based solvency margin system in 2003 after a lengthy consultation period. Insurers are now required to report their solvency ratio and meet the stipulated requirement on a yearly basis.

In the People's Republic of China, the China Insurance Regulatory Commission (CIRC) is currently examining a number of solvency regimes around the world. It appears that the US-style approach to RBC is preferred and a new regime could be introduced in 2006.

Although risk-based capital frameworks are likely to differ across markets, they are all likely to capture the common risks that exist in most countries in Asia Pacific, namely the provision of significant guarantees and the mismatched nature of portfolios.

Risk-based reporting frameworks will be common in Asia in the years to come; in our opinion it is not a question of 'if', but, 'when'. In those countries where the regulator has been slower to introduce them, there is clearly merit in companies identifying and assessing the risks that they are taking with a view to reflecting these in the pricing and level of capital that is being held, even prior to the regulators making their moves.

By Richard Holloway



For further information please contact

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Education

The Institute of Actuaries (England), the Faculty of Actuaries (Scotland) and the Institute of Actuaries of Australia (IAAust) revised their education systems in 2005. We summarise these changes below.

Written by Bharat Raj



Institute of Actuaries



FACULTY OF ACTUARIES

The Institute of Actuaries and the Faculty of Actuaries, which have a common education system, recently gave their system a major facelift. The impetus for the change is the ongoing effort to harmonise the actuarial profession internationally; naturally education systems are a major target for integration. The changes were effective from 2005.

Previously, in order to qualify, all one needed to do is survive the 100, 200, 300 and 400 series stages. The new education strategy has somewhat fancier names for these stages i.e. the Core Technical (CT), Core Applications (CA), Specialist Technical (ST) and the Specialist Applications (SA) stages. See the table below for a comparison between the education strategies.

Pre-2005	Exam Duration (hours)	2005 and onwards	Exam Duration (hours)
100 Series Nine passes from: - 100 series (101 to 109)	3 each	Core Technical Nine passes from: - Core Technical 1 to 9	3 each (except for CT9)
200 Series - Communications One passes from: - 201 or 211 (Chinese)	1.5	Core Applications Three passes from: - CA1 (Papers 1 & 2) - CA2 - CA3	3 + 3 n/a 2.5
300 Series Four passes from: - 300 series (301 to 305)	3 each	Specialist Technical Two passes from: - ST1 to ST6	3 each
400 Series - Papers 1 & 2 One passes from: - 400 series (401 to 405)	3 + 3 each	Specialist Applications One passes from: - SA1 to SA6	3 each
		UK Practice Module One passes from (for practice in the UK): - P1 to P6	3 each
Practical Experience Requirements and Professionalism Course			

The Core Technical (CT) stage is basically the 100 series (with some adjustments)

The CT stage comprises nine papers CT1 - CT9. This stage introduces the theoretical groundwork for the later stages. Passes in all nine papers are required for a fellowship.

Papers 103 (Stochastic Mathematics) and 104 (Survival Models) have been combined as CT4 (Models). Also, a business awareness module has been introduced, namely CT9. The business awareness module is a two-day residential course followed by an examination. CT9 is only compulsory to students who enrolled with the Institute/Faculty later than 1 July 2004.

The rest of the papers are unchanged (save their reference numbers).

continued on next page

Education

The Core Applications (CA) stage

The CA stage comprises three papers CA1 - CA3. This stage aims to evaluate if the candidate is able to apply his/her knowledge of the CT stage in real life areas of actuarial practice. Passes in all three papers are required for a fellowship.

CA1 comes in two parts, namely Assets (CA11) and Liabilities (CA12). CA11 is something like paper 301 (Investments and Asset Management) under the previous system. That is it is just as large and difficult to pass. CA12 touches on pensions, life insurance, general insurance etc.

CA2 - Modeling. This is an entirely new paper. It is a two-day residential course followed by an examination. CA2 is only compulsory to students who had not yet obtained passes in a 300 series paper following the September 2004 sitting.

CA3 - Communications. This paper is very similar to paper 201 under the previous education strategy. It aims to assess the candidate's ability to communicate to various audiences (e.g. lay, semi-technical, technical) over various mediums (e.g. email, letter, memo, PowerPoint presentation). The CA3 is available in both English and Chinese.

The Specialist Technical (ST) stage

The ST stage comprises six papers ST1 - ST6. This stage introduces the specialist areas within actuarial practice. Passes in two of the six papers are required for a fellowship.

As the 300 series papers before, the ST stage provides the candidate the traditional actuarial specialist options, namely: Life, General, Pensions and Investments. However, there are two newcomers in this list, namely Health and Care (ST1) and Finance and Investments B (ST6).

The Specialist Application (SA) stage

The SA stage mirrors and builds upon the ST stage. It comprises six papers SA1 - SA6. A pass in any one paper is required for a fellowship.

The SA stage is like the 400 series Paper 2 under the previous education strategy. Paper 1 of the 400 series (UK practice modules under the new strategy) is no longer compulsory for fellowship. However, a pass is necessary in order to practice in the UK.



Institute of Actuaries of Australia (IAAust)

Extracted and Compiled from the IAAust website by Puan Ser Sze

The following is extracted and compiled from the IAAust website. The path towards becoming a qualified actuary is:

Pre-2005	Exam Duration (hours)	2005 and onwards	Exam Duration (hours)
Part I: Nine passes from: - 100 series (101 to 109)	3 each	Part I: Nine passes from: - Core Technical 1 to 9	3 each (except for CT9)
Part II: - Actuarial Control Cycle I - Actuarial Control Cycle II	3 + C 3 + C	Part II: - Actuarial Control Cycle I - Actuarial Control Cycle II	3 + C 3 + C
Part III: - Specialist I* - Specialist II*	6 + A 6 + A	Part III: - Module 1: Investment [#] - Module 2: Specific Practice Area** - Module 3: Specific Practice Area** - Module 4: Commercial Actuarial Practice [#]	3 + A 3 + A 3 + A 2 + CS
Practical Experience Requirements and Professionalism Course			

[#]Compulsory

CS - Case Study

C - Coursework (assignments, projects and, where applicable, class presentations)

A - Assignments (Assignments do not count towards the Part III specialist marks pre-2005. From 2005 onwards, however, students are required to submit two assignments per Course. These assignments are worth 10% each of the total mark for the Course.)

* Two of Investment, Finance, Life Insurance, General Insurance, Superannuation & Planned Savings

** Life Insurance; General Insurance; Superannuation & Planned Savings; and Investment Management & Finance

Education

Part I

The Institute does not directly examine its Part I subjects. However, it relies on an exemption process for students enrolled in accredited Australian university undergraduate actuarial studies. For those students not enrolled in an accredited undergraduate actuarial program, the Institute has arranged for its students to sit the Institute of Actuaries (IoA) (London) examinations twice yearly, in April and September.

Various study paths are available to candidates in order for them to gain exemptions from Part I:

i) Upon achieving a certain grade/mark at accredited undergraduate and postgraduate actuarial studies courses offered by:

- Australian National University (ANU);
- Macquarie University;
- the University of Melbourne and
- the University of New South Wales (UNSW)

ii) IoA (London) examinations for Part I Subjects CT1 - CT8

iii) Non-accredited undergraduate and postgraduate courses in Australia and New Zealand can be assessed by the Institute Exemptions Committee for certain Part I exemptions

Core Reading for the Part I subjects (CT1 - CT8) is produced by the IoA (London). IoA (London) examination results for IAAust candidates are posted on the members' section of the Institute website (www.actuaries.asn.au).

Candidates must pass the Part I IoA (London) examinations in (or obtain exemption from) all 9 subjects in order to complete Part I.

Part II

The four accredited universities teach and examine Part II (Actuarial Control Cycle) of the syllabus.

Extracted from the University of Melbourne website:

“The Actuarial Control Cycle I topics include insurance markets and products; underwriting and risk assessment; policy design; actuarial modelling; actuarial assumptions and feedback; reserving methods. The assessment is a 3-hour end-of-semester examination (70%) and assignments totalling not more than 4500 words (30%).

The Actuarial Control Cycle II topics include investments for different types of liabilities; assessment of solvency; analysis of experience; analysis of surplus; actuarial techniques in the wider fields; and an introduction to professionalism. The assessment is a 3-hour end-of-semester examination (70%) and assignments totalling not more than 4500 words (30%).

The University of Melbourne offers a choice of two delivery methods. The first comprises classes held on two evenings per week at 4.15pm, with assignments. The second is distance education by video streaming on the Internet, with assignments. (Classes held at the university are video-recorded and the lectures made available on the Internet the following day).”

Part III

There are four Modules that make up Part III. The Institute teaches, manages and examines all four Modules:

- **Module 1** Investments (compulsory)

- **Module 2 & 3** Specific Practice Area - **either**

- Life Insurance (Part A) and Life Insurance (Part B) **or**
- General Insurance (Part A) and General Insurance (Part B) **or**
- Superannuation & Planned Savings (Part A) and Superannuation & Planned Savings (Part B) **or**
- Investment Management & Finance (Part A) and Investment Management & Finance (Part B)

- **Module 4** Commercial Actuarial Practice (compulsory).

This is a 6-day residential course. Attendance is compulsory for this module. There are two assessments:

- a one-day case study based report to be completed on the sixth day or the residential course, and
- a two-hour exam to be completed several weeks after the residential course.

For the case study, very significant background material including financials, data, strategy etc. will be provided. The case study will be selected by the student from one of the defined traditional practice areas.

For the two-hour exam, each student must attempt questions from two of a selection of five non-traditional practice areas (banking, health financing, infrastructure funding, energy markets, ageing populations, education funding, environment).

Part III Transition Arrangements

The transition period for the Part III structure will be for 2005 and 2006. Continuing students will have the option to attempt to pass two specialist subjects under the existing system by the end of the transition period (end of 2006) i.e. they will not be required to complete the two new compulsory Modules 1 and 4, or alternatively complete the equivalent of Modules 1 to 4 (with no time constraints).

From 2007 onwards, all students will be required to pass Modules 1 to 4 to complete Part III, i.e. they will have to pass Modules 1 and 4, as these will be compulsory.

Where previously the exams were held once a year, all modules will be offered twice a year with examinations, consisting of a single paper, being held in May and November.



Institute of Actuaries of Australia

For more information, go to www.actuaries.asn.au and click on Education.

Research

Ratemaking Analysis in General Insurance

By Noriszura Ismail and Abdul Aziz Jemain
 University Kebangsaan Malaysia



Recently, our research paper entitled *Bridging Minimum Bias and Maximum Likelihood Methods through Weighted Equation* appeared in the *Forum of the Casualty Actuarial Society, USA*. For those interested, the paper can be downloaded from the following address, <http://www.casact.org/pubs/forum/05spforum>. Even though our initial target was to submit a paper for the 2005 Winter Forum which specifically focused on *Ratemaking Issues*, unfortunately, we missed the dateline by a few days. The good thing is, the CAS Committee was still kind enough to reconsider our paper submission and reviewed the paper for their next forum, i.e. the 2005 Spring Forum, which concentrates on *Reinsurance Issues*. We received a surprisingly good review and many encouraging comments for the paper, and after some minor modifications, the paper was finally published in the *Reinsurance Issues* and placed under *Additional Papers*. We will now briefly summarize what the paper is about, and provide some information regarding our previous, current and future works on our Ratemaking research project.

One of the main issues in the Malaysian general insurance industry, specifically motor insurance business, is the determination of premium rates suitable for each client's need. The determination of premium rates must fulfill four basic principles which are generally agreed among the actuaries: to calculate "fair" premium rates whereby high risk insureds should pay higher premium and vice versa; to provide sufficient funds for paying expected insured losses and expenses; to maintain adequate margin for adverse deviation; and to produce a reasonable return to the insurer.

A number of insurance companies in the Malaysian practice disagree with the idea of implementing ratemaking analyses for their motor insurance business. They have two rationales behind this stand. Firstly, the end result of ratemaking analyses is practically irrelevant when the motor rates are governed by a tariff. And secondly, if the motor rates are tariffed, the market would likely move rather slowly, hence, enabling an experienced underwriter to make a reasonable guess at rates which make profits. Both rationales can be countered though. For the former, even though actuarial rates may differ from those specified in the tariff, the management is still given the freedom to alter the rates so long as they are within reasonable range or above the minimum level required. If decisions on premium rates were made without having all relevant facts available, "poor" management decisions would eventually be reflected. As for the latter, even though it is accepted that judgments on premium rates could often be made without in-depth investigation, they can only be made largely by trial and error. Thus, a more liberalized approach which considers ratemaking analyses based on real claims experience should be undertaken by insurance companies. This approach will allow the clients freedom to choose the best rates and services that are in accordance with their needs.

In determining premium rates that are compatible with the basic principles, ratemaking analysis should be carried out consistently so that effective strategies that match the competitive market requirements can be structured and employed. With these

strategies in mind, every company should at least have their own database that is organized, reliable, consistently upgraded, and contains adequate information on personal background and the vehicle characteristics of each client in addition to their claim experience. Implementation of this task requires the company to cooperate with an actuary who is not only skillful in data analysis, but also knowledgeable in determining the kinds of data that should be collected.

Research on ratemaking analyses in actuarial literature is continuing to develop. In particular, a model which was introduced by Bailey and Simon and published in the *ASTIN Bulletin (1960)* is widely used by actuaries. Nevertheless, studies on this model are still being carried out to enhance the development of current knowledge in the areas of statistics, information technology, management and economy. For example, Mildenhall successfully merged the Bailey-Simon model with Generalized Linear Models (GLMs) and his article was published in the *Proceedings of the Casualty Actuarial Society (1999)*. His effort not only provides strong statistical justifications for the Bailey-Simon model which was based originally on a non-parametric approach, but also offers a variety of parametric models, i.e. the GLMs, which can be matched with available data. Therefore, Mildenhall's effort allows the most appropriate parametric model to be suitably chosen for the strategy planned by the company.

However, according to Fu and Peter Wu in their paper which was published in the *Winter Forum of the Casualty Actuarial Society (2005)*, the models offered by GLMs which were proposed by Mildenhall are rather limited. They argued that the models offered are not only restricted to statistical distributions, but also require the analyst to at least have a strong background in statistics. Therefore, Fu and Peter Wu tried to develop the Simon-Bailey model by using the same approach which was created by Simon and Bailey, i.e. using the non-parametric approach. Fu and Peter Wu's attempt proved to be successful: Their results offer a wider range of non-parametric models to be created and applied.

Our research which was published in the *Spring Forum of the Casualty Actuarial Society (2005)* has different objectives though. When we carried out the research, we outlined two main targets: Firstly, to provide strong basic statistical justifications for the available models, and secondly, to search for a match point that can merge the available parametric and non-parametric models into a more generalized form. We hope that a more friendly and efficient computation approach can be created through both of these targets. As a result, our efforts managed to not only offer more models which include both parametric and non-parametric models, but also a friendlier computation method.

Our models also offer an answer to Fu and Peter Wu's argument that their distribution-free models offer a wider range of selection compared to the GLMs proposed by Mildenhall. Even though our approach was based on statistical parametric theory, the theory can be matched with non-parametric theory as well. For our models,

continued on next page

Research



Ratemaking Analysis in General Insurance *continued*

the analyst does not really have to determine the statistical distribution appropriate for the available data; all he needs to do is just determines the weight. Therefore, the main principle that we applied in our approach is the selection of an appropriate weight suitable for the available data. We felt that our proposed models are more flexible and at the same time, able to attend both streams of thought in statistics - parametric and non-parametric.

Besides the modeling aspects, we also believe that our approach has built a base for efficient computation as well as analysis. The reason is that we applied the regression approach in the computation of our models. Therefore, the data can be analyzed, interpreted and predicted in a similar manner to the data analysis, interpretation and prediction of the regression analysis.

Further research on our ratemaking project is still being carried out. In fact, we have recently sent a proposal to the 2007 CAS Committee on Ratemaking for our next research paper which will focus on "overdispersion" that often occurs in insurance claims frequency or count data. The good news is we got more than what we bargained for! In addition to the acceptance of our proposal, the CAS Committee has also assigned sub-committee members to work with us for over the next 18 months. We are really looking forward to work with the CAS sub-committee members and feel so honored to be given the chance to share and work with them. The assigned CAS sub-committee consists of three notable members:

Mr. John Lewandowski (FCAS, MAAA, Senior Vice President and Actuary of ACE USA), Dr. Keith Holler (FCAS, ASA, ARM, MAAA, Associate Vice President of The Hartford), and Mr. Jonathan White (FCAS, Assistant Vice President and Actuary of The Hartford). We hope that the end result of our next research paper will produce models that can be written in a generalized form similar to those that we have published in the *Spring Forum of the Casualty Actuarial Society (2005)*. In addition, we also hope that the computation of the "overdispersion" models can be carried out in an efficient manner.

The scope of our ratemaking research is not limited to the items discussed above. Right now we are preparing a basic framework for premium rating which includes issues on inflation, surplus and profitability analysis as well. The profitability analysis will be based on secondary data which can be obtained from the financial reports of the general insurance companies. This approach will help the companies to assess their competitive ness compared to their peers. In addition, we are also working on the determination of premium scores. When a client comes and requests for a premium quotation from a company, the score can easily be calculated based on the client's personal background, vehicle characteristic and claims experience. The score would be converted to monetary value before it is quoted to the client. We personally hope that our research paper on premium scores will also be published in a journal.

Biographies of Authors



Noriszura Ismail is a lecturer in Universiti Kebangsaan Malaysia since July 1993, teaching in the Actuarial Science Department. She received her MSc. (1993) and BSc. (1991) in Actuarial Science from the University of Iowa, and is now currently pursuing her PhD in Statistics, in the School of Mathematical Sciences, Universiti Kebangsaan Malaysia. She has presented several papers in Seminars, including those locally and in South East Asia, and published several papers in local and Asian Journals. Further details of her curriculum vitae can be accessed from the following website address, <http://pkukmweb.ukm.my/~PSA/noriszura.html>.



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