

SYNOPSIS

COHERENT LONGEVITY CAPITAL FRAMEWORK

Kerwin Gu

Key words: Longevity risk, Bayesian forecasting, Momentum, Capital adequacy

Purpose of your paper:

This paper aims to propose a coherent framework for the capital that would be required to protect against the adverse risks over the lifetime of longevity products. By “coherent” we mean

- (i) a systematic and principle based approach to the proposed capital framework from a comprehensive and logically coherent view of longevity risk;
- (ii) the approach will be applicable to both regulatory capital and the capital buffer above the minimum regulatory requirement;
- (iii) the capital framework will consider business issues such as raising capital and tailoring the capital amount appropriate to the company's portfolio; and
- (iv) the capital amount will be determined by a coherent risk measure.

The time horizon will be extended beyond one year horizon, as the management actions that companies can take are limited for long-term annuities with guaranteed benefits.

In addition, it is difficult to distinguish whether the risk arises from a change in trend or a random fluctuation. We note that deterioration in one period may indicate further deterioration subsequently, and this is referred as the momentum effect of mortality movements. A Bayesian forecasting technique will be deployed to assess the adverse impact from continual mis-estimation of the best estimate mortality rates and trends over time.

Synopsis:

Forecasting mortality rates is critical to annuity pricing and reserving. Mortality rates during the past decades have evidenced a noticeable reduction, especially at the older ages. This was caused by a range of factors, including medical and technological advances and societal transformations.

There are many reasons why mortality may be mis-estimated over the long term. Not only may central estimates and standard errors be unreliable, but the trends of the mortality rate are likely to change over time. Short term mortality fluctuations increase the chance of mis-estimating long term projections of mortality rates as random variation can be mistaken for changes in trend and vice versa. The future trend may deviate from the past in an evolutionary or revolutionary manner.

The current regulatory capital framework LAGIC in Australia targets a one-year horizon and prescribes a simple one-off factor-based method to stress the mortality rates for longevity risk. The factor is assumed to be a permanent reduction of the mortality rates and is applied at the time of valuation date. In contrast, the approach to calibrate the mortality and morbidity stresses for other risk products is principle-based under LAGIC, as reflected in Life Prudential Standard (LPS) 115 (APRA 2013). The principles aim to address the risks arising from statistical fluctuation from the mean, the mis-estimation of the mean, adverse trends, and catastrophe events.

The capital framework proposed under Solvency II is also one-year and requires companies to shock the mortality rates with a single factor for annuity products bearing longevity risk, according to the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) Quantitative Impact Study (QIS) 5 (2010). This approach may not fully capture the increasing uncertainty of the projected mortality rates over time, nor does it address the trend of mortality improvement.

For long term annuity products, such as immediate lifetime annuities and deferred life annuities, the capital adequacy needs to target for a longer period and even for run-off if significant amount was sold with guaranteed payments, as the management actions that companies can take are limited. Internal capital methods may be adopted instead of the prescribed regulatory capital formula to cater for the specific risks to which the annuity book is exposed.

The paper proposed capital framework should also take into consideration the need to raise additional capital in event of losses. If potential capital providers approach the historical data with a more pessimistic Bayesian prior, which is likely if actual experience is worse than expected (as would have been if more capital is required), then they will value the business at a lower amount than the insurer. While this may not impact the solvency of the insurer, it reduces the value of writing annuity business if additional capital should be held to prevent the risk of future dilution.

Another issue that should be addressed is for new or fast growing companies with limited data and experience which has to rely on population and other companies' data. Conservatism is needed for the initial capital amount. For example, the initial selection factor needs to be first assumed from the population and industry information, as a prior. As experiences emerge, the prior assumptions may need to be updated. The portfolio mean is likely to be very different from the wider population, while the trend of improvement is not likely to deviate substantially from the population.

Furthermore, for an established life company the annuity book typically comprises a pool of heterogeneous lives with different ages, gender, cohorts, and socioeconomic classes. This portfolio heterogeneity must be taken into account when determining the appropriate stress margin for a company as a whole in practice. This is different from the approaches in the earlier academic papers such as Borger (2010), Plat (2011), and Richards et al (2012) that focused on the individual age modelling.

In this paper, the proposed approach to calibrate the longevity risk capital will be based on a Bayesian rationale, and the methodology's main theme is around the mortality momentum defined as "the risk of mortality mis-estimation in one period may flow on to the next" when the prior assumptions are updated.

Specifically, the risks considered in the proposed capital calculations involve:

- i. Volatility risk – the future mortality rates will fluctuate around the projected estimates.
- ii. Modelling risk – the selected model is not appropriate leading to an incorrect mortality forecast, which may also be caused by parameters not calibrated accurately.
- iii. Trend risk – the past trend may change in the future.

These are consistent with the principles under the Solvency II regime and also in line with the Australian regulatory capital framework (APRA LPS115).

The results are to be compared with the current regulatory methods and applied to both immediate and deferred lifetime annuities.

SYNOPSIS

Risk Culture – Board and Trustee Perspectives

Author - Sean McGing

Key words: Risk culture, risk management, governance, board, trustee, superannuation, leadership.

Purpose of your paper: To assist delegates / readers searching for your paper on the Institute's website after the event; please enter a brief description on the purpose of your paper. Maximum: 220 characters

Synopsis:

As a profession we not only need to think differently about ourselves as actuaries, but we also need to influence others to think differently about actuaries - in particular, we need to influence those who could benefit more from the application or use of our actuarial skills. This includes corporates, government and society more widely.

This paper/presentation shares my own experiences in using my actuarial skills in recent years quite differently to the more traditional approach I used and areas I worked in, in my younger years. Much of this revolves around my taking overlapping paths into:

- Enterprise risk management
- Serving on a Not for Profit Board outside financial services
- Advising Trustee and other Boards.

Thinking differently is only the first step on a path to change. Acting differently with positive results is what matters. Change can be tough but leading your own or your organisation's change is more likely to succeed for you, than being forced in someone else's change direction.

The function of a Board is to lead. Identifying and driving change strategically is at the core of that function. Enterprise risk management leadership from the Board requires looking at every decision through the lens of opportunity and risk. At the heart of successful organisation change and risk management is having a sound and mature risk culture.

In the paper/presentation I share my experiential learnings on risk culture improving outcomes:

- As a Director and Chair of the Board Risk Management Committee in a not for profit in the education sector
- As an asset consultant / investment adviser to a not for profit long service leave fund
- As a provider of advice to Superannuation Fund Trustee Boards on multiple issues

I relate these to some of the big risk issues of today including digital disruption. I draw a number of conclusions and make recommendations to take away.

SYNOPSIS

Confluence of the Actuaries and Economists Viewpoints in the New Economic Environment

Don Johnstone, Martin Lam, Sen Nagarajan, Michael Thomas

Key words: Stress testing, macro-economic scenarios, model calibration, management actions, life insurance, general insurance, banking

Purpose of your paper: Provide viewpoints and approaches on how different financial institutions can use stress testing to understand the vulnerability of their business to macro-economic shocks.

Synopsis: Stress testing is an integral part of risk and capital assessment. It is a prerequisite for regulated financial institutions. Banks, life insurers and general insurers are required to carry out regular internal stress testing as part of their ICAAP. APRA also regularly runs industry wide stress tests. APRA's expectation is that financial institutions continue to develop and evolve their stress testing capabilities.

An integral part of stress testing is understanding where vulnerabilities to macro-economic shocks lie. This is however a challenging problem. Key challenges include

- Lack of data to calibrate models
- Changes in the business and macro-economic environment which mean that the use of historic experience may not be valid

Financial institutions must also consider how they will respond to the stress events. They need to think through the implication of an economic shock, how it will impact both their clients and suppliers (of services, liquidity and capital). The institution will need to develop a set of actions which must be feasible in this scenario.

In this presentation we look at different approaches to tackling this challenge. We take in the viewpoint of both actuaries and economists. The actuary is often tasked with translating a specific shock or adverse scenario of the world into forecasts of financial metrics. Economists can provide an important perspective on how scenarios can work itself through the segments of the economy, and the potential responses of different economic agents.

The current environment is continuing to evolve. We are in an unprecedented low interest environment. The speed of information flow is rapid amongst both other institutions as well as consumers. Further capital and liquidity flows are global and can turn on or off very rapidly. The impact of new and agile disruptors who may be service provider or competitors also needs to be considered.

This is a continuously evolving area where close cooperation between experts with different viewpoints and backgrounds can provide greater insights, and help understand the impact from macro-economic scenarios.



SYNOPSIS

FINANCIAL SERVICES, RISK CULTURE AND THE EFFECTIVE PROFESSIONAL

Tim Gorst

Key words: CPS220, risk management, ERM, risk culture, RMF, RMS

Purpose of your paper: To outline the characteristics of financial services professionals effective at managing risk, and discuss who an effective risk management strategy is built around a developing a culture where effective professionals thrive.

Synopsis:

The 2015 introduction of CPS220 (Australian Risk Management Prudential Standard) into APRA regulated entities has seen a much stronger focus by Boards on risk culture. Yet an October 2016 APRA update on the topic commented that most institutions still seem to be grappling with how to get risk culture embedded into the actions and behaviours of the people who work in these businesses. Indeed the community is increasingly demanding a renaissance of the financial services professional to address their concerns around industry conduct.

Drawing on over 20 years of financial services experience, Tim explores the characteristics of people effective at managing risk. They know their business, they collaborate, they take accountability and they lead with integrity. An effective risk management strategy will be built around people, their development into more effective professionals and creating a culture where they can thrive.