



Capital adequacy

for the modern financial institution

Article by Naomi Burger, with thanks to Sumit Narayanan and Peter Lee for their input. Naomi Burger investigated how capital measurement approaches have changed in recent years and a description of some of the implementation issues encountered in Asia.

“ Finding the pivot point where risk and capital required are in balance... ”

The business of life insurers is risk transfer. Using pooling and collective investment capability, the uncertain future faced by policyholders is exchanged for a set premium. The funds held to fulfill this role need to be sufficient to ensure the future continuation of the company and win the trust of the general public – without trapping excessive capital in the enterprise. Finding the pivot point where risk and capital required are in balance is the subject of this article.

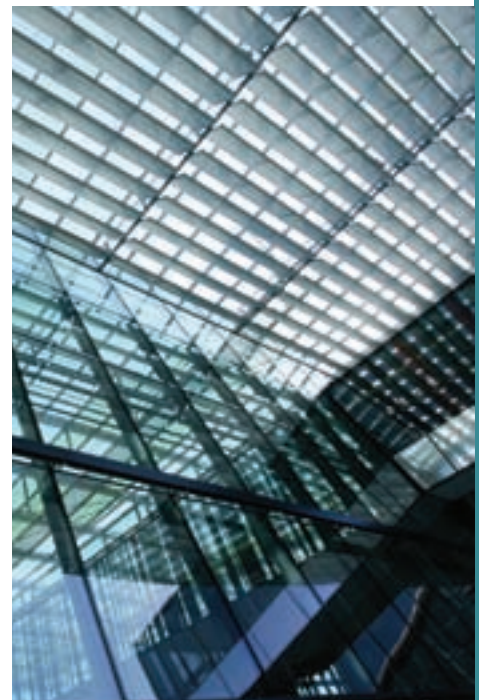
Insurance company capital is typically specified in terms of reserves and a solvency margin. An analysis of the strength or weakness of a company's capital position needs to consider both items. Traditional measurement has been formulaic and largely driven by size alone – the bigger the company the more capital required.

High profile losses, improvements in tools and techniques, increases in the complexity of risks taken on and the instruments available to help manage risk have created an atmosphere where techniques that create a direct link to the actual risks taken by the business are sought. For example, following the failure of HIH Insurance Limited (a general insurer in Australia) major reform of the regulatory framework for the general insurance industry in Australia was initiated. The then Minister for Financial Services and Regulation, the Hon. Joe Hockey, called the existing rules “highly prescriptive, blunt and unresponsive

in the face of market and regulatory developments”. The reform established stricter standards for capital adequacy, liability valuation, reinsurance and risk management. This type of shift in regulatory approach can be described as a move from rules based to principles based approaches.

As something of an intermediate step, some countries have moved away from net premium reserves to gross premium reserves with provisions for adverse deviation (PADs) on key assumptions for reserving combined with formulaic solvency margin calculations that are driven by exposures to different types of risks, although in some cases these focus on asset risks. One of the more sophisticated risk-based capital (RBC) frameworks in Asia can be found in Singapore. Under the Singapore RBC framework policy liabilities are calculated using a gross premium approach. The calculation of required capital (known as Total Risk Requirement) requires various stresses to be applied to the best estimate policy liabilities such as insurance risk (mortality, morbidity, lapse, expenses), market and credit risks (including asset risk and duration mismatch risk) and asset concentration risk.

Most modern systems, such as the Individual Capital Assessments (ICA) approach in the UK and the Solvency II regime proposed for Europe, use a market consistent



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value of liabilities for reserves and specified stress tests on particular risks to determine capital levels. Solvency II also facilitates the use of ‘internal capital models’ as an alternative to the generic (or standard) stress tests.

Similarly, regulatory proposals in Malaysia specify standard stress tests but explicitly leave room for the introduction of an internal capital model system in the future.

Internal capital models – what you need to know

The first common misconception that needs to be corrected in a discussion on internal capital models is that the ‘model’ encompasses only the financial calculations rather than the entire operational risk management system in which a risk calculation model sits. By risk management system, we mean the process of identifying risks, measuring the company’s exposure to individual risks and then aggregating those risks, monitoring exposure and responding. A useful description of such a system was described by John Tucci in the previous issue of this publication.

The measurement calculations broadly revolve around identifying the amount of capital needed to reach a certain level of confidence that future losses can be covered. For certain risks (for example, market, credit, longevity) this can either be obtained from a full loss distribution or an examination of the tail loss at the level of confidence required. For other risks (for example, operational risk), expert opinion and judgment are relied on. For all risks the availability of appropriate data is critical, particularly at the more unlikely end of the distribution, just where incidence and therefore relevant data are lower.

The second common misconception is that internal capital models need to be complex and comprehensive. In fact, internal capital models typically do not need to cover all risks and a combination of the standard model and internal models for significant risks is possible.

Internal capital models – why do it

Interestingly, 60 per cent of respondents to the fourth quantitative impact study run for Solvency II implementation (QIS4) said that better risk management was the reason that they might seek internal model approval whereas, 40 per cent said that it would be with the aim of achieving lower capital requirements. This is because companies can use these same risk measurement models to allocate capital and manage performance and reward to drive better risk-adjusted outcomes.

Lower capital requirements are expected from an internal model, as the standard model represents a ‘consensus view’ across an industry so is inefficient by definition. Given the cultural shift required to move Asian regulators away from micro application of rules to principles based approaches, we anticipate that implementing an internal capital model with the sole aim of achieving a lower capital requirement is unlikely to be successful, at least in the short term.



Modelling issues in Asia

There is a lot that can be said about building the models, getting them approved and documentation requirements. In this article I have chosen to focus on key modelling issues encountered when building capital models in Asia. Although 'internal models' per se are not yet used in Asia, the issues encountered are similar to those considered when undertaking market consistent valuations and building economic capital models as very similar principles apply. In this article the following four technical issues are addressed:

- the calibration of asset models
- prevalence of surrender value guarantees
- the impact of participating business

- guarantees on unit linked and variable annuity contracts.

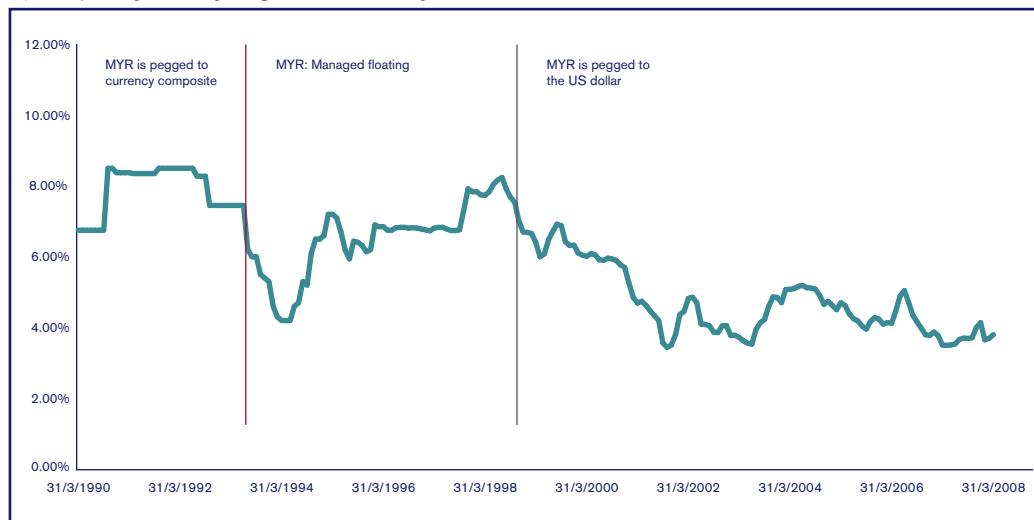
Asset model calibrations

For life insurers, financial risks are significant and complex. As described earlier, the current approach to measuring exposure to risks is to measure the required capital at a certain confidence interval. Market volatility, short historic data collections periods, changes in environment such as currency pegs and economic crisis all make determining the level of market experience that represents the confidence level required something of an art.

For example, the following graph sets out the 10-year government bond yields in Malaysia over the period 1990 to 2008.

This period can be divided into three distinct periods where, in the first period (1990 – 1993) the Malaysian Ringgit (MYR) was pegged to a basket of composite currencies, in the second period (1993 – 1998) the MYR was managed on a floating rate basis and in the third period (1998 – present) the MYR was pegged to the US Dollar. Such changes in the management of the currency reduce the amount of relevant data on which to base a calibration. Even in the most recent period a sustained downwards drift in yields can be observed. Expert opinion and local knowledge is necessary to decide whether to incorporate such a drift into a calibration or not.

Figure 1 | Malaysian 10-year government bond yields 1990–2008





Similarly, due to the lack of depth and liquidity of derivative instruments, many markets, such as India, require the analysis of historic data to be combined with assumptions that have been set following discussions with local market and calibration experts. Between countries there are differences in the definition of risk-free rates and government bonds may not necessarily be AAA rated. For example, Korean government bonds are rated AA for domestic currency debt and A+ for foreign currency debt (by Fitch). This leads one to prefer swap rates as a reference for the risk free rate for Korea; swaps also being the preferred approach under the new MCEV principles and Solvency II. A lack of robust historic data also affects the derivation of reasonable assumptions for the correlation between various asset classes. A way around this would be to use the correlation matrix of an economy similar to the modelled economy and modify it to fit the specific circumstances of the modelled economy.

Prevalence of surrender value guarantees

In many markets in Asia, surrender values are guaranteed rather than remaining at the discretion of the insurer. This effectively creates a put option linked to the economic environment exercisable by the policyholder. To capture the cost of the option, the impact of policyholder behaviour on the take-up rate needs to be modelled. Very little data exist to arrive at an appropriate link and, to compound the issue, the results are often very sensitive to the mathematical function used. Our suggested approach in this situation is to first create a pragmatic algorithm and then test the sensibility of the algorithm through inspection of many scenarios, particularly extreme ones. Often a link to multiple factors for example, duration in-force, asset shares and current interest rates is required to obtain a satisfactory result in all scenarios. The presentation of sensitivity test results to illustrate the impact of the modelling approach is important.

Participating business

Participation of any form creates an asymmetry of profit emergence – policyholders share in the upside but a limit exists on downside participation so that the capital required in different circumstances is not symmetrical. For many companies in Asia, participation rules are not transparent and are often market driven. In some markets (for example, Hong Kong and Thailand) dividend rates are rarely changed after the policy has been sold. This creates a situation where, before any modelling can be undertaken, the management of the company needs to set down its bonus distribution philosophy and approach in comprehensive terms. The challenge is that the theoretical response to extreme situations that have not previously been encountered needs to be considered. The discipline is worthwhile though with additional benefits for asset liability and risk management.

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Guarantees on unit linked and variable annuities

For some companies in Asia linked products with minimum market related guarantees form a sizeable proportion of new sales. As the in-force portfolio of these products grows relative to traditional products, the level of discipline and accuracy around capturing related capital requirements will intensify.

It is our observation that the commercial imperative to participate in the variable annuity market is forcing a step change in modelling skills, particularly stochastic modelling skills, among actuaries in Asia. The concepts used to price and manage variable annuity type products have many parallels in more general financial risk management contexts and this may accelerate the early adoption of modern risk management techniques in companies with exposure to variable annuities.

Conclusion

Insurers are in the business of taking risk and moving to a system that more closely links capital required to the actual risks of a company, rather than size alone, ensures better protection for policyholders, stronger management of capital and better alignment of rewards.

Internal capital models give companies the opportunity to explore the level of risk taken based on the company's own material exposures and data. Implementation has a number of subsidiary benefits in the areas of process improvements and documentation. In Asia, risk modelling can be the catalyst for companies to consider and capture bonus distribution philosophy and strategy in a more tangible fashion. This has wider benefits for asset liability management models and investment strategy.

The link between risk and capital required is well established. For European insurers, Solvency II implementation is on track for 2012. Waiting to see how techniques, models and tools develop may be a pragmatic approach if implementation is not a requirement in your jurisdiction. We would argue, however, that identifying your key risks, thinking about how you might model them and starting to collect the data you require to do so, are more important tasks that should be assigned to a responsible professional in your organisation without delay.



Contact point

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“As the Asian markets move closer towards global best practice, Risk and Value Management (RVM) is an area that many insurers are keen to explore. However, given the diverse needs and different stages of development in the Asian countries, we believe that our service offering needs to be tailored specifically for clients in this region.” said Ms Burger in a recent interview.

Ms Burger also explained the use of the taichi inspired graphic (see [Figure 2](#) below) to present the RVM suite of services: “We find this ancient Chinese philosophy a perfect illustration of our belief in RVM. The yin and yang captures the concept of two opposing and yet simultaneously complementary forces. The belief that, in the process of striking a perfect balance, energy is generated, also resonates with RVM. RVM is precisely the process of balancing risk and capital required, two forces that, if managed properly, can inject agility and vitality into a business, maximise a company’s value and drive it forward”.



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Figure 2 | Watson Wyatt’s suite of RVM services

