Capital requirements of Life Insurers: A risk based perspective

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Abstract

In this paper we discuss why life insurers need capital and the various risks which they are exposed to. We outline the regulatory framework for determining the capital requirements of life insurers in the UK, including a brief discussion of the Twin Peaks approach. We then consider the approach adopted in calculating an Individual Capital Assessment for an insurer, outlining the stress tests carried out and the methodology used for aggregation of risks. We outline the risk profile of Indian insurers and conclude that a risk based approach in India may require them to set aside more capital.

Keywords
Twin Peaks, Pillar One and Two capital requirements, Individual Capital Assessment, Realistic balance sheet, Stress testing

1. Introduction

The need for capital

1.1 Insurance is the mechanism of transferring risk from an individual, i.e. the policyholder, to a risk carrier, i.e. the insurer. The insurer needs to hold reserves to meet expected payments, and capital to have a cushion to withstand adverse fluctuations in the risks to which it is exposed (e.g. underwriting risk, market risk etc.).

1.2 The amount of capital held by insurers is determined by various factors, including compliance with the regulatory framework, the insurer's own risk measurement and management strategy, rating agencies and competitive forces. Overall, an insurer faces conflicting pressures in determining an appropriate level of capital to hold. Its shareholders would prefer to minimise the capital held in the entity to maximise their return on capital (although the desire to preserve the franchise value of the business, i.e. the ability to write profitable new business, works in the opposite direction). On the other hand, a higher amount of capital held would ensure customer and regulatory confidence as well as strong credit ratings.

1.3 There is an increased recognition of the fact that individual insurers need to hold capital consistent with the specific risks they are subject to.

Risks faced by insurers

Insurance risk

1.4 These are the risks inherent in the business underwritten by life insurers. Insurance risk arises due to the uncertainty surrounding the occurrence, timing and amount of insurance liabilities. These risks relate to uncertainties over mortality, morbidity, lapse rates, rates at which policies are made paid up, expenses and the take up of policy options.

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Credit Risk

1.5 Credit risk arises due to the possibility of default by a third party who has an obligation to the insurer. Third parties include companies in which the insurer has invested its assets, reinsurers as well as firms to which it has outsourced operations.

Market Risk

1.6 Market risk arises due to movements in the level of financial variables such as interest rates, equity and property prices, which changes the value of asset and is not matched by a corresponding movement in the value of liabilities. It also includes reinvestment and concentration risk and asset liability modelling risk.

Regulatory risk

1.7 This risk relate to the possible future behaviour of the market regulators, which could have significant effect on the insurer's profitability and capital requirements. Examples of regulatory risk include any future change in the valuation methods of assets and liabilities, restrictions on product design or a change in taxation policies for life insurers. Generally, these risks would be included under operational risk.

New business risk

1.8 New business risk arises when actual new business volume and mix are not as expected. Lower than expected volumes will not allow the insurer to achieve its desired economies of scale whereas very high volumes may cause excessive strain on existing capital and may also indicate that premiums are "too cheap". This risk may also be treated as an insurance risk.

Operational Risk

1.9 Operational risk as defined by the British Bankers' Association is the risk of "direct or indirect loss resulting from inadequate or failed processes, people and systems or from external events." In recent years, it has been widely accepted that operational risks are significant but are difficult to quantify. They include risks like a failure of systems; non-adherence to processes and control measures; failure to attract/retain well-trained personnel, lack of corporate governance and an inability of the management to respond to the changing environment.

Liquidity Risk

1.10 Liquidity risk arises in the event of insufficient liquid assets being available to meet policyholders' obligations as and when they fall due. This includes the risk of having to realise assets at depressed values or secure funding at excessive costs.

Group risk

1.11 When the insurer belongs to a group of companies, group risk may arise when the actions of any one company adversely affect the risk profile of the insurer.

Assessment of risk

1.12 An assessment of the risk borne by the insurer for solvency purposes is challenging for the following reasons:

- The absence of a liquid market for many types of insurance liabilities;
- The long-term nature of certain insurance contracts, which necessitates the careful consideration of extreme events as well as unforeseen risks;
- The various assumptions made while pricing and reserving for the liabilities, which may not be borne out in practice; and
- The assessment of the risk dependencies in the insurer's risks, which may be subjective.

Regulatory capital requirements

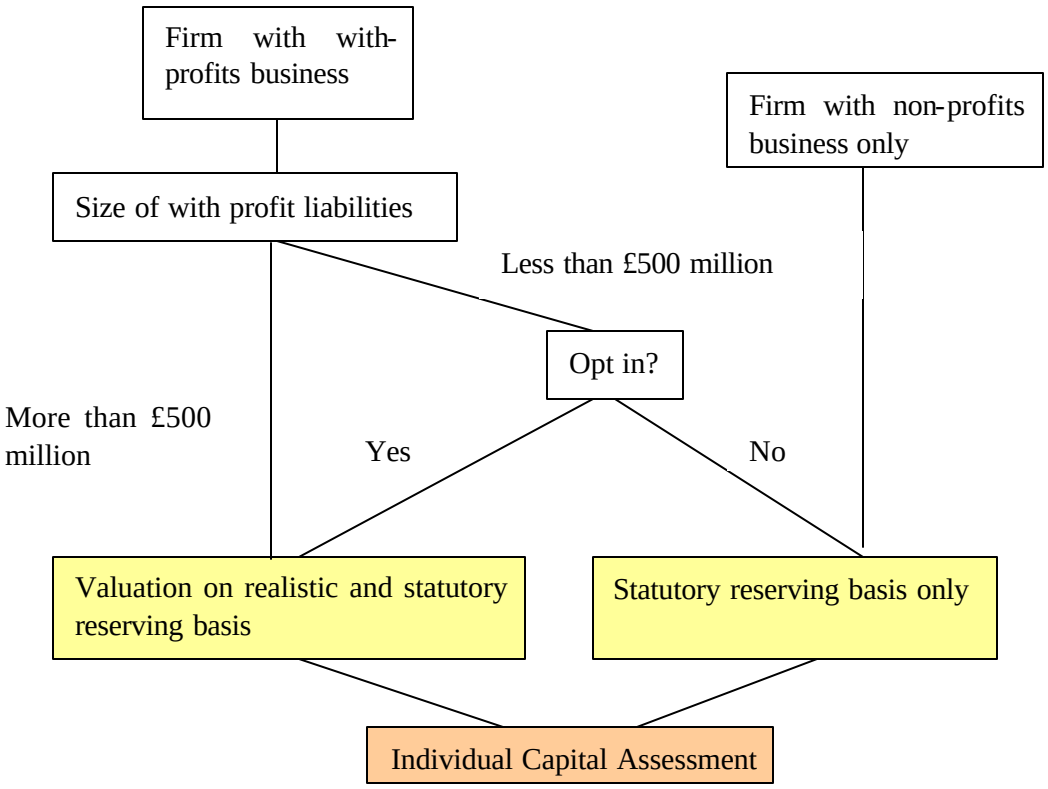
1.13 There are different approaches adopted around the world in setting regulatory capital requirements. These vary in the level of discretion given to the insurer in determining the minimum level of capital to be held.

1.14 The formulaic method is one approach where the capital requirement is determined using fixed factors applied to various balance sheet items (e.g. x% of mathematical reserves + y% of net amount at risk + z% of assets), subject to a minimum absolute amount. The risk based capital approach, in which the capital requirement is assessed based on the idiosyncratic risks faced by individual insurers, is a credible alternative. The latter approach is increasingly being adopted by regulators, as a result of higher levels of market sophistication and modelling techniques.

2. The regulatory framework in the UK

Introduction

1.15 The regulatory framework for the calculation of capital for UK life insurers has changed significantly during the last decade, and is illustrated in the diagram below.

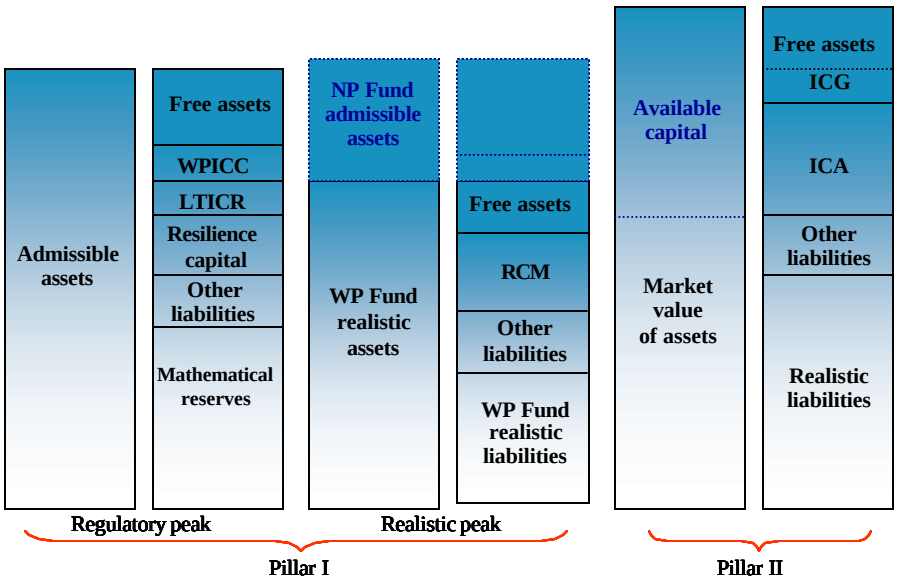


1.16 Firms that have with-profits liabilities in excess of £500 million, or firms with smaller with-profits liabilities electing to opt in, are required to carry out two valuations for each with-profits fund. The first is the regulatory valuation and the second is based on applying a stress test to a "realistic/market consistent" valuation of assets and liabilities. The reported capital requirements are based on the more onerous of the two calculations, and are referred to as Pillar One. Such firms are referred to as realistic basis life firms and this dual valuation assessment is known as the "twin peaks" approach.

1.17 The calculation of Pillar One capital requirements for life firms that are not realistic basis life firms is much simpler as the twin peaks approach does not apply. Instead, these firms are only required to carry out the regulatory peak valuation.

1.18 In addition all firms are required to carry out an Individual Capital Assessment ("ICA"), known as Pillar Two. The results of this ICA are not publicly available and are disclosed privately to the UK regulator, the Financial Services Authority ("FSA").

1.19 The various components of the Pillar One and Two requirements are shown in the diagram below, and are discussed in more detail in the following sections.



3. Pillar One capital requirements

Regulatory peak

1.20 The regulatory peak is based on a comparison of the admissible assets and liabilities. The liabilities comprise of:

- *Mathematical reserves*: The calculation of mathematical reserves is different for realistic basis firms and non realistic basis firms. Realistic basis firms are given greater freedom and are permitted to calculate their with-profit mathematical reserves using a gross premium valuation method.

- *Resilience Capital Requirement ("RCR"):* The RCR refers to the additional capital required in the event of adverse movements in asset returns. It is calculated from stress tests on returns from equities, properties and fixed interest assets. The stress tests are prescribed by the regulator from time to time and are subject to "dampeners" to reduce their impact in adverse market conditions.

- *Long term Insurance Capital Requirement ("LTICR"):* This is broadly calculated as 4% of the reserves plus 0.3% of sum at risk.

1.21 The stresses for calculating the RCR are as follows:

- An equity stress test of
  - y% such that (1-y%) x earnings yield on the equity index = 4/3 x 15 year gilt yield
  - Subject to a minimum of 10%
  - And subject to a maximum of 25% less a 90 day averaging adjustment.
- Property stress test of
  - 20% less 3 year averaging adjustment on appropriate index
  - Subject to a minimum of 10%
- Fixed interest stress test of
  - Yields for all terms +/- 20% x 15 year gilt yield
- It assumed that all stresses occur instantaneously and simultaneously

1.22 As per the revised UK regulations (prescribed in PRU7.2.8), the LTICR is broken down into

- *Insurance expense risk capital component*: Calculated as 1% of the gross reserves, multiplied by the maximum of the net/gross ratio and 85%. For linked contracts where the firm bears no investment risk, this component is calculated as 25% of net administrative expenses for the last year.
- *Insurance market risk component*: Calculated as 3% of the gross reserve, multiplied by the maximum of net/gross ratio of sum at risk and 85%. This is not required for linked contracts where the firm bears no investment risk.
- *Insurance death risk component*: Calculated as a certain percentage (which varies between 0.1% and 0.3% by the term of the business) of the gross sum at risk for classes providing death coverage, multiplied by the minimum of the net/gross (or reinsurance) ratio of the sum at risk and 50%.
- *Insurance heath risk component*: Calculated as a certain percentage of the premiums received during the last year for health business.

Realistic peak

1.23 The realistic peak, the second peak of the Pillar One requirement, is based on a realistic valuation of assets and liabilities. The assets can include some inadmissibles under the regulatory peak. The realistic liabilities comprise of a realistic valuation of policyholder liabilities, including future discretionary and terminal bonuses and an explicit cost of guarantees. The Risk Capital Margin ("RCM") is defined as the capital buffer required on top of realistic liabilities to provide some resilience for adverse experience.

1.24 The realistic balance sheet approach requires firms to value financial options and guarantees within the with-profits liabilities in a manner consistent to valuing similar options and guarantees traded on the financial markets. Non-financial assumptions

are generally taken as the best-estimate values and some limitations on the assets available to cover the realistic balance sheet liabilities are lifted. This removes most of the prudent margins from the valuation of the liabilities.

1.25 The risk capital margin requirements were developed by the FSA with the intention that a capital buffer be held to cover the with-profits liabilities of an 'average' insurer, such that there is a 99.5% probability that the realistic balance sheet assets exceed the realistic balance sheet liabilities one year after the valuation date.

1.26 The stress test used to calculate the RCM incorporates the following adverse changes:

- A fall or rise in equity values
- A fall or rise in property values
- A parallel shift in all yield curves in the most onerous direction
- An increase in credit spreads (and implied default rates)
- An increase or decrease in persistency rates

All the above stresses are included in the calculation of the risk capital margin but only the first three stresses feature in the calculation of the RCR.

1.27 The process for determining the risk capital margin is similar to that for the resilience test reserve under the regulatory peak. The company must hypothecate assets from the with-profits fund, as well as additional assets if necessary, which have the same realistic value in the stress test scenario as the realistic liabilities. The risk capital margin is equal to any excess of the realistic value of these hypothecated assets over the realistic value of the liabilities at the valuation date before the stress test is applied

Simplistic representation of realistic balance sheet

Assets	***Liabilities***
Guarantee and smoothing costs	Working capital (surplus + RCM)
Planned deduction from with-profit benefit reserve	Smoothing costs
Future profits from non profit business	Financial options and cost of guarantees
Assets in excess of exposure limits	Other liabilities including current liabilities
	Planned enhancement to with-profit benefit reserve
Market value of admissible assets (excluding NP assets)	With profit benefit reserve (aggregate asset share)

1.28 The regulatory and the realistic peaks are compared to determine whether a With Profit Insurance Capital Component ("WPICC") is required to increase the capital requirements under the regulatory peak to the level under the realistic peak. The WPICC is therefore calculated as the regulatory surplus less the realistic surplus, and is subject to a minimum of zero.

1.29 For firms with more than one with-profits fund the twin peaks assessment is applied separately to each fund and the total WPICC required is the sum of the individual WPICC calculations. Surplus capital in one fund cannot be used to offset a shortfall in another, and the capital requirements for the with-profits business as a whole may therefore be greater than either the sum of the regulatory peaks for each fund or the sum of the realistic peaks for each fund.

4. Pillar Two capital requirements

Individual Capital Assessment

1.30 The Pillar Two requirement requires the calculation of the ICA. The ICA is an assessment of the adequacy of the insurer's financial resources, "using methods and processes that are proportionate to the size, complexity and nature of the insurer's activities and its financial strength". Unlike the calculation for the Pillar One capital requirement all material risks are considered explicitly and the stress tests are not prescribed but are left to the discretion of the insurer. However, the FSA reviews each insurer's ICA to ensure it is adequate. It then issues an Individual Capital Guidance ("ICG"), which may, in certain instances, require an increase in the ICA.

1.31 The FSA expects members of senior management to be engaged in the ICA process, and not just the actuarial function holder, given that the ICA is an assessment by the company of its own capital requirements. The ICA is intended to be an integral part of business planning and reporting and an important risk management tool.

1.32 The ICA has many similarities to the "economic capital" measure used by many of the larger European and North American insurance groups.

1.33 The main steps in the ICA calculation are:

- Identifying the material risks facing the business.
- The insurer decides on a probabilistic objective for the ICA. The FSA requires insurers to determine the ICA to ensure the insurer can meet its liabilities with a probability of 99.5%. However companies may choose a higher probability of ruin applied over a longer time period. For example it may choose a 97.5% probability of meeting its liabilities during the next five years.
- Firms may choose to use the realistic balance sheet value of assets and liabilities while calculating the ICA. Alternatively they can stress the mathematical reserves (the regulatory peak) instead of the realistic liabilities. This alternative is usually only adopted by smaller insurers.
- Stress and scenario tests are conducted and the results of these are defined as the extra capital requirement above the base (i.e. pre-stress) liabilities required at the end of the time period considered (e.g. one year). In re-valuing the assets and liabilities in stress conditions, realistic management actions, like changes in bonus rates and policy charges, can be reflected.
- The capital amounts in respect of the individual risks are subsequently aggregated, taking into account any correlation effects.

Stress testing

1.34 The derivation of stress tests and scenarios can be done by using stochastic scenario generators, statistical techniques or by expert opinion and judgement. The various risks for which stresses are carried out are discussed below.

Operational risk

1.35 The calculation of the capital required to be held for operational risk requires a great deal of management judgement. A few of the larger firms in the UK have started referring to external loss databases, to take account of loss events experienced by other financial services institutions, which are likely to occur only in extreme scenarios. Outsourced operations, either externally or to service companies within the same organisational group, need to carefully considered.

1.36 As per the FSA Insurance Sector Briefing ("ISB") on ICAs, various approaches exist to calculate the capital requirement for operational risk. These include:

- Firms can estimate the additional capital required for each type of loss event and combine these using a correlation matrix.
- Firms can make assumptions regarding the statistical distribution of different loss events and derive an overall loss distribution using the Monte Carlo approach and using a point estimate at say the 99.5th percentile.
- Approximate calculations, such as a percentage loading on other ICA components. However, this approach may underestimate the capital requirement and may not lead to a full consideration of the risks involved.
- "Market average" loadings, compiled across a sample of companies, may be used. Again, these averages may not be appropriate for a particular firm, and may negate the purpose of an ICA – to quantify the unique risks.

Mortality and morbidity risk

1.37 Firms may apply mortality stresses like an instantaneous mortality shock over one year, or a long-term deterioration in mortality. Firms with significant annuity business may apply longevity stress tests and a reduction in pensioner mortality (for staff final salary pension schemes).

1.38 Catastrophe risk and the risk of epidemic outbreaks, like the Avian Flu, are usually assessed by applying a factor to the sum at risk to allow for excess mortality over a single year. It may be reasonable to apply this stress over the short-term, on the assumption that new drugs would be created in time to treat an outbreak, and disaster management plans would help in alleviating the situation.

1.39 A degree of 'natural risk hedging" of the mortality component can exist, if the insurer has a portfolio of different contract types like term assurances and annuities. This reflects the different age profiles of the two lines of business. As per the FSA ISB on ICAs, many firms have however decided to adopt a more prudent approach and take little credit for this hedging.

1.40 Morbidity stress tests need to be set allowing for the lack of morbidity data. For long term care business, stress tests on both claim inception and termination rates may need to be applied.

Expense risk

1.41 The expense stress tests take into account the changes in the ongoing level of expenses, as well as an increase in expense inflation which may arise from market related inflationary factors as well as company/industry specific factors. Fluctuations in the expense levels can arise due to various reasons e.g. changes in regulatory compliance costs, IT systems replacements, entering into new lines of business, redundancy costs as a result of the insurer downsizing or simply from costs associated with volatile levels of new business.

Market and credit risk

1.42 The FSA has observed that many approaches for calculating the capital required to allow for market risk are valid. Individual stresses for equity, property and interest rates may be applied independently, with the resulting individual capital requirements combined using a correlation matrix. Another approach is to generate combined scenarios for simultaneous stresses to equities, property and interest rates, so as to capture the impact of non-linearity of stresses.

1.43 An increase as well as a decrease in interest rates is tested, and firms can either assume parallel shifts in yield curves or a change in the shape of yield curve. Stresses for credit spread widening, requiring a revaluation of assets, are also carried out.

1.44 Firms holding overseas equities have an exposure to exchange rate risk, and firms can calculate their capital requirement by either including an additional exchange rate risk stress or strengthening their equity stress test.

Liquidity risk

1.45 Insurers are required to calculate the liquidity risk, based on the nature and liquidity of assets held as well as the nature of business written. As per the FSA ISB on ICA's, few firms have included any capital requirement for liquidity risk in their ICA's.

Other risks

1.46 Other risks to be stress tested include the risk of reinsurer default or an increase in reinsurance rates, changes in persistency rates and increases in equity and interest rate volatility.

Aggregation of capital requirements of stress tests

1.47 The results of the stress and scenario tests need to be aggregated in a manner that takes into account the interaction of the underlying risk factors. Simply adding together the individual capital amounts implies that the risks are 'perfectly correlated' – that risks occur together – and may lead to a substantial overstatement of the required capital.

1.48 Therefore, insurers need to allow for the extent to which risks are correlated. For any given pair of risks there are three possibilities- the risks are independent, are

positively correlated or are negatively correlated. Where positive or negative correlation between any two risks is expected, the degree of correlation needs to be quantified. The FSA has highlighted the need to consider the appropriateness of correlation assumptions not just in 'normal' but also in 'stressed' conditions e.g. mortality catastrophes adversely affecting equity markets.

1.49 Firms can use a single correlation matrix to aggregate the results from all the individual stress tests. Alternately they can first aggregate similar risks like insurance risk, market risk, etc using a number of matrices and then aggregate these grouped risks using another matrix. Correlations are determined based on market data as well as using general reasoning and judgement.

1.50 For a company which identifies four risks viz. Risk 1, Risk 2, Risk 3 and Risk 4, individual capital requirements are calculated by stressing these four risks separately. The results from the four stress tests are summarised in a vector V. By using a correlation matrix M of these risks we can calculate the aggregate capital requirement as V^T x M xV

$$\begin{pmatrix} C_1 & C_2 & C_3 & C_4 \end{pmatrix} \begin{pmatrix} r_{11} & r_{12} & r_{13} & r_{14} \\ r_{21} & r_{22} & r_{23} & r_{24} \\ r_{31} & r_{32} & r_{33} & r_{34} \\ r_{41} & r_{42} & r_{43} & r_{44} \end{pmatrix} \begin{pmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \end{pmatrix}$$

which is equivalent to

$$C_{total} = \sqrt{\sum C_i^2 + \sum r_{ij} C_i C_j}$$

Where

$C_{i\,=}$ capital requirement after stressing risk factor i , i =1 to 4

$ñ_{ij}$ = correlation between risk factor i and risk factor j

$C_{\text{total}\,=}$ Total capital requirement after aggregation of the risks

1.51 A non-linearity scaling adjustment may be required to capture the impact of the capital required if several risks crystallise together, which may exceed the ICA calculated using the correlation matrix. For example, increasing longevity may make annuitant liabilities more sensitive to a fall in interest rates and the resulting capital requirement of the combined scenario of increasing longevity and falling interest rates, may exceed the capital computed using the individual capital requirements and correlation between the two variables.

1.52 Firms may calculate this non-linearity adjustment using several approaches. One popular approach is to carry out a combined stress test with all risks occurring, say at the 94% level and scaling the ICA by the derived non-linearity scaling factor (calculated as the ratio of the capital requirement from the combined stress case

and sum of the individual 94% components). To avoid reviewing all of the individual stresses at the 94th percentile, some firms simply run a combined scenario where all risks occur at the 99.5th percentile simultaneously.

Numerical Example

1.53 The example below is a simple illustration of how a firm would calculate its capital requirement under each individual stress and combine it to arrive at a final value.

	Base	Stress Factor A
Realistic assets	1,200	1,400
Realistic liabilities	800	980

1.54 The capital requirement for stress factor A can be calculated as Stressed realistic value of liabilities * (Base realistic value of assets/ Stressed realistic value of assets) – Base realistic value of liabilities. In the above case, the capital requirement would amount to 980*(1,200/1,400) - 800=40.

1.55 The capital requirements for three stresses are shown below:

Capital requirements by stress, vector V			
	Factor A	Factor B	Factor C
Individual stresses	40.0	20.0	50.0

1.56 It is assumed that a combined stress scenario (involving the three stresses A,B and C) leads to a capital requirement of 135.

1.57 The correlations for the various factors are given below:

Correlation matrix M			
	Factor A	Factor B	Factor C
Factor A	1.00	-0.25	0.50
Factor B	-0.25	1.00	0.00
Factor C	0.50	0.00	1.00

1.58 The ICA requirement is calculated as below:

V transposed x M	60	10	70
V transposed x M x V	6,100		
Square root of (V transposed x M x V)	78.1		
ICA (post-diversification benefit)	78.1		
Capital requirement for combined stress case (Factors A, B and C simultaneously apply)	135		
Non-Linearity Scaling Adjustment	1.2	= (135/(40+20+50))	
ICA	95.8	= (78.1*1.2)	

1.59 The FSA may issue ICG expressed as a multiple of the ICA calculation, or as a fixed amount in monetary terms. For instance, the ICG may instruct the insurer to

increase its ICA by 10% i.e. to 107.35 in the above example. Typical causes for ICG above the level of the ICA are insufficient allowance for stressed conditions correlations, non-linearity adjustments or weaknesses in operational risk assessment.

5. Issues and considerations for Indian life insurers

Current regulatory framework

1.60 The reserving calculation for Indian life insurers is based on the gross premium valuation method, which incorporates an explicit projection of expense cash flows and takes lapses into account. The reserving basis is dynamic and is updated on an annual basis to reflect any change in the best estimates, adding suitable margins for adverse deviations ("MAD's"). In this way, the gross premium reserving method may be considered to be more realistic as compared to net premium reserving, which does not explicitly allow for lapses and expenses and is generally less sensitive to basis changes.

1.61 The regulatory framework in India for determining the capital requirements in India is based on a formulaic approach, subject to a minimum requirement of Rs500 million. However, the Insurance Regulatory and Development Authority ("IRDA") requires insurers to hold 150% of their required level of capital. The capital requirements are based on the sum of a certain percentage of reserves and sum at risk, which vary by class of business and are shown below.

Types of Business		Portfolio	% of Reserves	% of Sum at Risk
Non-linked	Individual	Life	4%	0.3%
		General annuity	4%	0%
		Pension	4%	0%
		Health	4%	0%
	Group	Life premiums guaranteed for more than one year	1%	0.2%
		Group life premiums guaranteed for more than one year	3%	0.3%
		General annuity	4%	0%
		Pension	4%	0%
		Health premiums guarantees for not more than year	1%	0%
		Health premiums guarantees for more than one year	3%	0%
Linked	Individual	Life business with guarantees	2%	0.2%
		Life business without guarantees	1%	0.3%
		General annuity with guarantees	2%	0%
		General annuity without guarantees	1%	0%
		Pension with guarantees	2%	0%
		Pension without guarantees	1%	0%
		Health business with guarantees	2%	0%
		Health business without	1%	0%

	guarantees		
Group	Life business with guarantees	2%	0.3%
	Life business without guarantees	1%	0.2%
	General annuity with guarantees	2%	0%
	General annuity without guarantees	1%	0%
	Pension with guarantees	2%	0%
	Pension without guarantees	1%	0%
	Health business linked with guarantees	2%	0%
	Health business linked without guarantees	1%	0%

Source: IRDA (Actuarial Report and Abstract) Regulations 2000

1.62 The capital requirement is calculated as 4% reserves and 0.3% sum at risk for traditional life business, and 1% reserves and 0.3% for unit-linked products without guarantees. This capital requirement is similar to the LTICR discussed under the regulatory peak of Pillar One requirements for UK life insurers.

1.63 The above mentioned formulaic approach does not fully account for the levels of risks undertaken by individual insurers. It does not recognise that different insurers may be subject to different risks based on their product mix and volumes, asset allocations, exposure to re insurers etc

Risk profiles of Indian insurers

1.64 The following section discusses some of the key risks and issues facing Indian life insurers. Given the indications by the Insurance Regulatory and Development Authority ("IRDA") of the possibility of moving towards a risk-based capital approach towards determining capital requirements, insurers may need to consider ways of identifying, evaluating and quantifying the risks they face and their potential impact on capital in the future. This may be especially so if it is left to the insurer's discretion to carry out stress/scenario tests (that are specific to their circumstances) to assess capital requirements.

1.65 The ICA process adopted in the UK is not purely about deriving a capital buffer, but has the over-arching aim of improving risk management. The FSA has stated that holding capital may not be the best remedy for all risks, for some risks companies may need to concentrate on aspects like documentation, monitoring and mitigation. Taking the stress testing guidelines in the UK as an example, we discuss below some of the risks facing Indian insurers which may require additional capital to be set aside.

1.66 Given the early years of operations of all private Indian insurers and the initial management focus of getting operations off the ground, some companies may be subjected to large operational risks. These risks may arise due to the following reasons:

- *Human risk:* the lack of qualified insurance personnel and the difficulty in training and retaining skilled staff;

- *Management control risk:* the risk of internal processes and controls not being rigorously followed, inadequate documentation and version control, insufficient monitoring;
- *Systems risk:* the risk associated with systems or IT failure, implementation of new software, inability of systems to cope with changing regulatory requirements, lack of controls to prevent data error etc. In the initial years, insurers may focus on setting up their sales and underwriting platforms, paying less attention to systems for processing renewals and claims which may lead to inconsistencies later on;
- *Strategic risk:* the risk that the management may not be able to alter its business plan and allocate resources to respond to the dynamic market environment;
- *Reputational risk:* the risk of mis-selling of an insurer's products by an inadequately training sales force, resulting in bad publicity for the insurer and loss of public confidence;
- *Regulatory non-compliance risk:* the risk of an insurer not complying with regulations due to failed systems or disciplines; and
- *Governance risk:* lower levels of public disclosure given the unlisted nature of all Indian insurers.

1.67 There is, apparently, a regulatory risk in India, given that the insurance market is still in its early stages. A change in taxation policies for life insurers and their products or restrictions on target markets for specific products, can have a huge impact on the profitability of life insurers. For example the recently introduced Fringe Benefit Tax reduced the levels of group superannuation business written. Revised regulations on areas like product design (as evidenced recently on unit linked policies) may necessitate the re-design of existing products, change in expectations of new business volumes, higher costs associated with setting up models, systems and trained personnel in place to ensue regulatory compliance. Similarly, introduction of new solvency levels or higher minimum capital requirements may also involve a cost. There is also the risk that insurers may be unable to proceed as per their business plan, due to delays in getting their products passed by the regulator.

1.68 There is a significant risk surrounding pricing and product design, due to the lack of appropriate industry and company data in India. Particular aspects of insurance risk (although many could explicitly be classified as operational risks) include

- *Underwriting risk:* The risk of fraudulent or incorrect information being given, both at the proposal and claims underwriting stage. For products sold in rural areas, there is a risk of policyholders being unable to supply information like age details and medical history due to ignorance or a lack of understanding.
- *Mortality and morbidity risk:* There is a mortality risk while pricing and reserving due to the unavailability of updated mortality tables, the absence of sufficient internal experience and inadequate reserving for extreme events like epidemics. There are no India specific morbidity tables to price riders/products.
- *Lapse risk:* Given the low levels of surrender values in initial policy years, some products may be lapse-supported, leading to significant risk surrounding policyholder behaviour. On the other hand, higher lapses may lead to smaller portfolio of business and extend the expense overrun period.

- *Expense risk:* Given that most insurers are in the expense-overrun stage, there is a risk that companies may not be able to achieve economies of scale as expected in their business plan.

1.69 The main source of market risk arises from the risk of interest rate movements and the absence of sufficiently long dated and zero coupon bonds to match the insurance liabilities leading to mis-matching and reinvestment risks. The derivatives market in India is relatively small and there is a lack of derivative instruments to hedge portfolio risk. There is also a lack of index-linked bonds in India to hedge against expense inflation. Although a low proportion of assets are invested in equities by insurers, the recent popularity of unit-linked business may lead to an equity risk for insurers who have given guarantees on unit linked business.

1.70 Indian insurers differ in terms of diversification by geographical area and type and mix of business. Firms writing only one type of business may have concentrated risk levels with respect to their product mix. In such cases even a minor stress on the risk can lead to significant losses. For example if a firm is writing only unit-linked business, it runs the risk that poor publicity surrounding unit-linked business, depressed equity markets or changes in taxation treatment of unit-linked benefits may trigger lapses and lead to lower business volumes.

Challenges in quantifying risk

1.71 Indian insurers may face a number of constraints while trying to identify the degree of risk they are subject to, and quantifying the capital to be set aside for such risks.

- *Lack of historical data:* There is an absence of adequate and good quality industry data relating to insurance and operational risk. Only the Life Insurance Corporation ("LIC") has access to a sufficiently large database, but this may not have captured the impact of all risk factors.

- *Modelling of asset returns:* At present, most insurers do not have access to a robust and uniform asset return model, which is tailored to the Indian market. Although a few theoretical models exist, they are calibrated from insufficient data. The Indian equity market is relatively new and has seen manipulations in the past. It is difficult to trim out such manipulative effects while calibrating the model from historical data.

- *Lack of technical expertise*: Insurers may lack the technical expertise and skilled human resource required to model the risks faced by them. While adopting the models and methodologies from other regulatory regimes, country specific factors will need careful consideration.

- *High cost:* There are high costs associated with setting up and implementing risk measurement and modelling techniques. Furthermore, most insurers have small books of business and have not yet achieved break even.

Conclusion

1.72 The Indian insurance market has seen a tremendous growth in the last few years, and is experiencing a constant evolution in the regulatory regime. The current formulaic approach of determining capital requirements may eventually be replaced by a more dynamic framework, in tune with the risks faced by individual insurers. Insurers may gradually move towards better integrating their capital and risk management strategies, and setting aside capital for extreme risk events.

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Before joining Watson Wyatt, Siddhartha worked for AMP Sanmar Life Insurance Company based in Chennai, India. In this role Siddhartha was involved in statutory valuation, and the pricing of individual unit linked products and group products. He was also responsible for the experience analysis and statutory financial reporting of the life insurer. Siddhartha was instrumental in developing the benefit illustrations of the company's products and played an active role in the actuarial department's liaison with other departments.

While at Watson Wyatt, Siddhartha has worked on the valuation of term products for a Hong Kong based insurance company and is involved in statutory valuation of an UK based life insurance company. He is regularly involved in the publication of the Asia Life Insurance Market Update and Indian quarterly newsletter. More recently, Siddhartha has been involved in the preparation of market entry reports and business planning for new entrants to the Indian financial services industry.

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Amrita joined Watson Wyatt in September 2003 after graduating in commerce from Delhi University. She is currently pursuing ST series exams of the Institute of Actuaries, UK.

Amrita has undergone life and non-life insurance training on product pricing and reserving. She has been involved in the preparation of market reports for potential new entrants to the Indian market, as well as analysis of the Indian financial services industry. She has done projects involving product pricing for Indian products and has knowledge of filing products with the local regulatory authority. Other projects include financial projections for new entrants into the Indian market, involving projecting forward capital requirements and embedded value. She also has some experience on the Watson Wyatt proprietary non-life software, Pretium.

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