Chapter 24 – Capital Management

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Introduction

One of the most important parts of the actuary's work within a life company relates to capital management.

APRA's capital standards play a central role in a life company's management of its capital. This chapter summarises the requirements of these standards. For greater detail, students should access the standards through APRA's website (www.apra.gov.au) in the section covering the life insurance prudential framework. The list of capital standards is:

- LPS 001 Definitions
- LPS 110 Capital Adequacy
- LPS 112 Capital Adequacy: Measurement of Capital
- LPS 114 Capital Adequacy: Asset Risk Charge
- LPS 115 Capital Adequacy: Insurance Risk Charge
- LPS 117 Capital Adequacy: Asset Concentration Risk Charge
- LPS 118 Capital Adequacy: Operational Risk Charge

LPS 110 summarises APRA's capital adequacy requirements and is the first standard that students should refer to.

What is capital for?

APRA describes capital as the cornerstone of a life company's financial strength. It supports a life company's operations by providing a buffer to absorb unanticipated losses from its activities and, in the event of such losses, enables the life company to continue to meet its obligations to policy owners and other creditors.

Life companies, like other companies, are only able to continue operating if they are solvent. A definition of solvency is given in Section 95A of the Corporations Act 2001. This definition applies to all companies including life companies. According to the Corporations Act, a company is solvent if it is able to pay all of its debts when they become due.

The Corporations Act definition of solvency is normally interpreted as being on a "best-estimate" basis. A company is solvent if, on the balance of probabilities, it is likely to be able to pay all of its debts when they become due. This is not necessarily the same as the accounting definition of solvency, whereby assets must exceed liabilities. For example a company could have assets in excess of its liabilities, however it may not be solvent in the sense of the Corporations Act if some of its assets (for example intangible assets such as deferred tax and capitalised expenses) cannot be realised before the existing liabilities become payable.

For a life company, there is often significant uncertainty with regard to the amount of liabilities and the timing of their payment. The value of the assets of a life company might currently exceed the best estimate of its liabilities, but the liabilities could turn out to have been underestimated, and by the time the liabilities become payable, the assets may have fallen in value. Policy owners could be at significant risk of not receiving the amount due to them if a life company only just satisfied the Corporations

Act definition of solvency. A significant amount of capital may be necessary if a life company is to have a strong likelihood of being able to meet its liabilities.

It is important for life companies to be well capitalised. For life insurance to be a sensible purchase, policy owners need to be reasonably certain that the life company will be able to honour its policies against claims which might not occur until many years into the future. Life companies are also an important part of the financial system – the failure of a major life company would cause instability throughout the Australian financial system.

Section 3 of the Life Insurance Act says that the principal object of the Act is to protect the interests of the owners and prospective owners of life insurance policies in a manner consistent with the continued development of a viable, competitive and innovative life insurance industry. One of the means for achieving this objective is the imposition of prudential requirements and the supervision of life companies by APRA. Section 230A of the Act allows APRA to make prudential standards for life companies, including standards for capital management.

APRA must strike a balance between protecting the interests of policy owners, protecting financial system stability in Australia and allowing the continued development of a viable, competitive and innovative life insurance industry. APRA aims to achieve this balance by targeting a very low (but not zero) failure rate for the life companies it supervises. It is not possible to guarantee a zero-failure regime, and trying to achieve such a regime would be likely to stifle the life insurance industry with excessive capital requirements.

APRA's minimum capital requirement for life companies is called the Prudential Capital Requirement (PCR). Each statutory fund and the shareholders' fund must have a capital base that exceeds the PCR of the fund at all times (note that APRA uses the term "general fund" to refer to the shareholders' fund). The capital base is the amount of capital that APRA recognises as eligible for capital adequacy purposes. The PCR is intended to provide a 99.5 per cent probability that a fund will have sufficient capital to absorb unexpected shocks or losses that may arise over a one-year period and continue to be able to meet its obligations to policy owners (in the form of the "adjusted policy liabilities") and other creditors at the end of that period. The one-year period represents a "breathing space" during which remedial action to restore capital adequacy can be taken if there is a breach of PCR. A life company will normally have a capital base in each of its funds that is well in excess of the PCR, so that the probability that the fund will be unable to meet its obligations to policy owners in one year's time is in almost all cases considerably less than 0.5%.

The PCR consists of a prescribed capital amount (PCA) calculated by the life company in accordance with prudential standards plus the supervisory adjustment (if any) that is determined by APRA.

Minimum capital requirements apply to a life company as a whole, as well as to each of its funds. Normally a breach of the minimum requirements at company level would only occur if there was also a breach within a fund, however this may not always be the case.

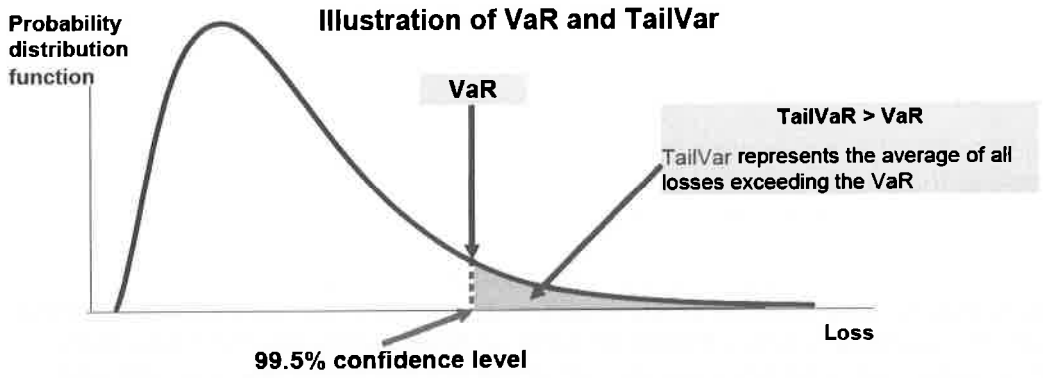
VaR and TailVaR

The PCR is intended by APRA to be set at a level such that there is only a 0.5% probability that a fund will incur a loss greater than the PCR over a 12 month period. This is an example of a "Value at Risk" or VaR method of setting capital requirements. A weakness in this method is that it ignores the size of the losses in the tail of the loss

distribution beyond the 99.5% confidence level. The tail of the loss distribution can be very skewed if the life company has exposure to rare, but potentially large, asymmetric risks. For example, non-proportional catastrophe reinsurance might protect a life company from smaller, foreseeable catastrophes, but if the treaty caps the reinsurer's liability to the life company, it will not provide protection against additional losses if a very severe but extremely rare catastrophe occurs.

An alternative risk measure to VaR is "Tail Value at Risk" or TailVaR. The TailVaR is the average value of losses in the tail of the loss distribution beyond the specified confidence level. If losses have a normal distribution, VaR at 99.5% is the same as TailVaR at 98.7%. In a sample of 10,000 scenarios, VaR would be determined using the 50th worst scenario, whereas TailVaR would be determined using an average of the 130 worst scenarios. The point of equivalence between VaR and TailVaR will change if the loss distribution is not normal. In practice, the tail of the loss distribution for life companies is unlikely to be normal.

TailVaR is used by some overseas regulators for setting minimum capital requirements. It can also be used by life companies in setting their own internal capital targets. An accurate calculation of both VaR and TailVaR requires the use of a stochastic model. However, VaR can be approximated by using a single scenario with appropriately chosen parameters (this is the approach used by APRA for calculating the prescribed capital amount according to the standard method). A weakness of TailVaR is that it depends on assumptions made about the likelihood of extremely rare events and the size of the resulting losses. These assumptions must, by their nature, be very subjective. The following graph illustrates the difference between Var and TailVaR measured at the same confidence level.



What could happen to a life company with insufficient capital?

APRA expects to be informed by a life company if a breach of PCR is imminent and will keep a close watch on life companies which are close to a breach of PCR.

The options available to a life company with a statutory fund or shareholders' fund that breaches its PCR include raising additional capital from outside the company, transfer of surplus assets from another fund, closure of the fund to new business and de-risking the fund. Closure to new business might help restore capital over time because any capital strains from new business would be eliminated, whilst any profits from existing business would be added to the existing capital. However closure to new business

would create some additional one-off costs that would reduce the capital base, for example staff involved in marketing, sales and processing of new business may need to be made redundant. De-risking strategies could involve changing the investment policy to a less risky mix of assets, purchasing derivatives to limit the size of potential future asset losses, or purchasing additional reinsurance in order to limit potential losses due to increases in claim costs.

If a fund breaches its PCR, or is coming close to a breach, and the life company cannot remedy the situation within a short time, APRA can use it powers to issue directions under Section 230B of the Life Insurance Act. The Act allows APRA to direct life companies to take actions in a broad range of circumstances, including failure to comply with a prudential standard. The range of potential actions listed in Section 230B is quite broad.

Section 157 of the Life Insurance Act allows APRA or a life company to apply to the court for an order to appoint a judicial manager. The effect of appointing a judicial manager has a broader impact that the issuing of directions by APRA. A judicial manager effectively takes over the day to day management of the company from the board and senior managers. In order to appoint a judicial manager, the court must be satisfied that there are reasonable grounds for the appointment. These are listed in Sections 158 and 159 of the Act and include a failure to comply with capital standards or the court deciding that the financial position or management of the company is unsatisfactory.

A judicial manager is required to recommend a course of action as soon as possible. Section 175 of the Life Insurance Act lists the courses of action that the judicial manager can recommend to the court. These can include recapitalisation, transfer of liabilities to another insurer or the wind-up of the life company. A recapitalisation or transfer of liabilities to another life company would be the preferred courses of action as the contractual entitlements of policy owners would be preserved. Wind-up would normally be the least desirable outcome and would only be recommended if none of the other courses of action were feasible.

Section 187 of the Life Insurance Act describes the application of statutory fund assets in a wind-up. The priority payment listed in Section 556(1) of the Corporations Act must be paid first. These include some specific wind-up costs such as employees' retrenchment payments. After the priority payments have been made, the remaining assets of the fund can be used to pay out the liabilities to policy owners. The liability on wind-up is likely to differ from the policy liability calculated for normal financial reporting purposes. For example, a policy liability on wind-up could not be less than zero even though negative policy liabilities are allowed under LPS 340. If any assets remain after policy owners have been paid, these assets can be used to pay other debtors of the statutory fund, followed by policy owners and debtors of other funds and the life company's shareholders.

There are no arrangements for providing compensation to policy owners for their losses if a life company fails. A Financial Claims Scheme does protect the depositors of banks and the policyholders of general insurers from potential loss due to the failure of these institutions, but the scheme does not apply to the policy owners of life companies.

APRA's Three Pillars of Supervision

APRA's approach to supervision of life companies has three pillars. These go beyond merely setting minimum capital requirements.

Pillar 1

The first pillar is the detailed quantitative requirements in relation to the capital base, the prescribed capital amount and liability valuations, which must be calculated by life companies in accordance with prudential standards.

Pillar 2

The second pillar is the supervisory review process. This includes APRA's supervision of the risk management and capital management practices of life companies.

As part of the second pillar, APRA requires life companies to have an Internal Capital Adequacy Assessment Process (ICAAP) and to provide an annual report on the ICAAP to APRA. Further detail on the ICAAP is given later in this chapter.

Also as part of Pillar 2, APRA has the ability to include a supervisory adjustment in the PCR. APRA may apply a supervisory adjustment to the prescribed capital amount in a range of circumstances including:

- the prescribed capital amount calculation does not adequately address the risks specific to the life company (e.g. strategic risk, reputation risk);
- the life company is newly licensed or has recently materially changed, or plans to materially change, its business mix;
- APRA has identified material issues with the competence or probity of responsible persons associated with the life company;
- APRA has identified material weaknesses in the life company's governance, risk management strategy or realised risk management outcomes;
- the life company has failed to comply with, or is consistently minimally compliant with, applicable prudential standards;
- the life company is using a business model, has an organisational structure or is following a business strategy that APRA regards as highly risky, or overly difficult to assess, in a way that is not captured under the calculation of the prescribed capital amount;
- the life company's ICAAP is not well-defined or documented, or its target capital policy is assessed as being inadequate, e.g. due to a lack of sufficiently rigorous stress and scenario testing;
- the life company has been unable to restore its capital position to target capital levels in accordance with its ICAAP in a timely manner.

Pillar 3

The third pillar is disclosure requirements. These are intended to encourage market discipline. Disclosure of the financial strength of life companies assists potential policy owners, financial advisors, sharemarket analysts and other interested parties in deciding which life companies they should recommend or maintain relationships with. Mandatory disclosure of their capital resources gives life companies an added incentive to maintain a strong financial position.

APRA requires that the capital base and prescribed capital amount be published at least annually for each fund and for the life company as a whole. The capital base must be broken down by the different types of capital together with regulatory

adjustments. The prescribed capital amount must be broken down into the various risk charges.

APRA does not allow life companies to disclose supervisory adjustments. The PCR must always remain confidential. APRA's view is that disclosure of the supervisory adjustment could have unintended or adverse consequences. For one thing, external observers may over-react to such an adjustment. For another, disclosing the supervisory adjustment could inhibit APRA's role as a prudential supervisor, in that it would have to consider the market reaction or over-reaction to its actions.

There are also disclosure requirements for capital in the Australian accounting standards. AASB 1038 requires life companies to disclose the regulatory capital position of each statutory fund (before supervisory adjustments). AASB 101 (Presentation of Financial Statements) requires companies to disclose information that enables users of financial statements to evaluate the company's objectives, policies and processes for managing capital.

Capital Base

The basis for measurement of the capital base is specified by APRA in LPS 112. Due to the need to ensure that the capital base of a life company provides adequate support for its activities, APRA imposes some restrictions on the composition of the capital base. It will normally differ, sometimes significantly, from the shareholders' net assets that are shown on a company's balance sheet.

Life companies can include various types of capital instruments within their capital base. Eligible capital provided by shareholders is referred to as Tier 1 Capital. Subordinated debt is referred to as Tier 2 capital. The capital base of a life company is the sum of the Tier 1 capital and the Tier 2 capital. The Tier 1 capital is subdivided into Common Equity Tier 1 (CET1) capital and Additional Tier 1 (AT1) capital.

CET1 and AT1 are only identified at life company level. Within statutory funds and the shareholders' fund, these different types of shareholder capital are not separately identified and the term "net assets" is used instead to refer to all shareholder capital.

Common Equity Tier 1 Capital

CET1 is the highest quality component of capital. It includes paid-up ordinary shares and retained earnings, and must be net of the regulatory adjustments specified by APRA. CET1 must be subordinated to all other forms of funding (meaning that it has lowest priority in the winding-up of the company). CET1 absorbs losses as and when they occur (through deduction of losses from retained earnings), has full flexibility of dividend payments and has no maturity date (i.e. never has to be repaid to shareholders).

APRA requires that CET1 be at least 60% of a life company's prescribed capital amount at all times.

APRA requires that several regulatory adjustments be made to CET1. Any assets that could have little or no value in the event of wind-up must be deducted from CET1. The deductions include intangible assets such as goodwill and capitalised expenses, and deferred tax assets. These types of assets can be recognised on a life company's balance sheet because the accounting standards use a "going concern" approach – assets can be recognised to the extent that their value would be realised if the life company continues to operate in a profitable manner. In contrast, APRA takes a "gone concern" approach to determining the capital base by considering the value of assets if the life company ceased to operate and had to be wound up.

An adjustment must also be made to bring all assets to their fair values if they are not reported at fair value on the balance sheet (this only affects the assets of the shareholders' fund).

Adjusted policy liabilities

A regulatory adjustment to CET1 must be made by adjusting the policy liabilities. Adjusted policy liabilities are defined in Attachment H of LPS 112. These adjustments allow expected reserves for future shareholder profits to be removed from policy liabilities and included in CET1, and also apply a minimum liability equal to the "termination value" of policies. Termination values are an approximation to the liabilities to policy owners in the event of the company being wound-up (in an actual wind-up these liabilities would be determined by a liquidator according to Section 186 of the Life Insurance Act 1995). The termination value of a policy is not necessarily the same as its surrender value. Termination values are defined in APRA Prudential Standard LPS 360 Termination Values, Minimum Surrender Values and Paid-up Values.

Further adjustments must be made to the liabilities for participating business and non-participating business with entitlement to discretionary additions. The aim of these adjustments is to ensure that policy owner entitlements to future bonuses and interest credits are not treated as part of the capital base.

Non participating policies without discretionary additions

The adjusted policy liabilities for the non-participating policies of a statutory fund (other than policies such as investment account policies that are entitled to discretionary additions) are defined to be the greater of the risk-free best estimate liabilities (RFBEL) and the termination values. The "greater of" is determined after summing the RFBEL and termination values for all non-participating policies that are not entitled to discretionary additions.

LPS 360 defines termination values to be the present value of annuity and disability claims in course of payment, the best estimate value of incurred but not reported (IBNR) claims and reported but not admitted (RBNA) claims, the unearned premium or contractual premium refund for other risk policies, and the surrender value for other policies. The RFBEL is calculated in the same way as the best estimate liability is calculated in a policy liability valuation, but using a risk-free discount rate. The RFBEL is calculated for both life insurance contracts and life investment contracts, even though under LPS 340 the BEL only forms part of the policy liabilities for life insurance contracts. The adjusted policy liabilities do not include any reserves for future shareholder profits.

To calculate the RFBEL, APRA specifies that the risk-free discount rate for Australian policy liabilities must be derived from the yields on Australian Commonwealth Government Securities (CGS). This definition of the risk-free discount rate is contained in LPS 001. This is a tighter definition of the risk-free discount rate than that given in LPS 340 and is also more conservative. In LPS 340 the risk-free discount rate must be based on the current observable, objective rates that relate to the nature, structure and term of the future liability cash flows. The tighter definition specified in LPS 001 and used in LPS 112 ensures much greater uniformity of discount rates between different life companies. A more conservative definition of "risk-free" is also appropriate for the purpose of determining regulatory capital.

Another difference between the RFBEL and the best estimate liability calculated according to LPS 340 is that RFBEL is always calculated using a risk-free discount rate. For the best estimate liability in LPS 340, the discount rate for benefits that are contractually linked to the performance of the assets held must reflect the expected investment earnings applicable to the assets backing the benefit being valued (i.e. it is not risk free).

For annuities and some other types of policies, APRA allows an illiquidity premium to be added to the risk-free discount rate. The rationale for allowing the illiquidity premium is that the yields obtainable on illiquid assets (i.e. assets that are traded less frequently and in smaller volumes) are usually higher than the yields on liquid assets with the same term and credit rating. Liabilities such as annuities that have very predictable cash flows can be matched to illiquid assets as there is little risk that the assets will have to be sold before they mature. If an annuity can be surrendered, the RFBEL cannot be less than the minimum termination value calculated according to LPS 360. The illiquidity premium must be calculated using a formula that depends on the credit spreads for corporate bonds. This formula is specified in Attachment H of LPS 112. Corporate bonds are less liquid than Commonwealth Government Securities and therefore the yields on corporate bonds normally include an illiquidity premium. The illiquidity premium reached levels in excess of 100 basis points during the global financial crisis in late 2008 and early 2009, but is usually much smaller than this.

The adjusted policy liabilities can be greater or less than the unadjusted policy liabilities reported on the balance sheet, depending on the types of policies referable to a statutory fund. For stepped premium risk business, termination value is usually greater than the LPS 340 policy liability. For level premium risk business, termination value is usually greater than the LPS 340 policy liability at early durations, but at longer durations the position reverses. For annuities, the termination value and RFBEL are usually the same and may be less than the LPS 340 policy liabilities as the former do not include any allowance for future profit margins. However the outcome for each type of business also depends on any differences between the discount rates used for LPS 112 and LPS 340.

Non participating policies with entitlement to discretionary additions

For non-participating business with entitlement to discretionary additions (e.g. non-participating investment account policies), the adjusted policy liabilities are determined by taking the greater of the RFBEL and the sum of the investment fluctuation reserve (if it is greater than zero) and the termination values. This adjustment prevents the investment fluctuation reserve from being included in the capital base. Note that the investment fluctuation reserve is included in the RFBEL, but it is not part of the termination value.

The 'greater of' test must be determined at sub-group level if there are any policy benefits for a sub-group of policies that are determined with reference to the performance of particular assets that the life company has allocated to the liabilities for that sub-group.

Participating policies

For participating business, the RFBEL is replaced by the participating policy liability (PPL). The PPL is similar to the RFBEL but includes the value of future bonuses, including distributions from policy owners' retained profits. Termination values must be increased if necessary so that the value of policy owners' retained profits that would remain after the payment of termination values is not greater than zero. These adjustments mean that future bonuses and policy owners' retained profits cannot be treated as capital. APRA believes it is appropriate to assume that all Australian policy owners' retained profits are held for the benefit of Australian policyholders and must eventually be distributed to them. If APRA did not impose this requirement, there would be an incentive for life companies to withhold distributions of policy owners' retained profits and use these retained profits as a replacement for shareholders' capital. Section 62 of Life Insurance Act says that Australian policy owners' retained profits may only be distributed to owners of Australian policies that provide for participating benefits. However there is nothing in the Life Insurance Act that requires distributions to be made.

As for non-participating policies that are entitled to discretionary additions, the adjusted policy liabilities for participating policies must be calculated at sub-group level if each sub-group has a different asset allocation for the purpose of determining its bonus rates.

Additional Tier 1 Capital (AT1)

Additional Tier 1 Capital consists of shareholder capital that has less ability to absorb losses than CET1. AT1 capital instruments must be subordinated to other forms of funding with the exception of CET1. They must have fully discretionary non-cumulative dividends, meaning that the company can decide not to pay a dividend, and missed dividends will not accumulate and be liable for payment in a subsequent period. In addition, AT1 instruments must have neither a maturity date nor an incentive for the life company to redeem them. An example of an incentive to redeem would be a dividend that was guaranteed to increase at a specified date in the future.

The most common type of AT1 instrument is perpetual preference shares. These shares typically pay shareholders a fixed rate of dividend and have priority over ordinary shareholders in the wind-up of the company. A life company normally has the right to cancel dividend payments to preference shareholders, but only if it also cancels payment of dividends to ordinary shareholders.

Perpetual preference shares can absorb losses because the life company has no obligation to pay dividends or to repay the amount invested by shareholders.

APRA requires that Tier 1 capital (CET1 plus AT1) be at least 80% of a life company's prescribed capital amount at all times.

Tier 2 Capital

Tier 2 Capital is the lowest quality form of capital that can be included in the capital base. It must be in the form of a debt that is referable to a particular statutory fund and it must be subordinated to the policy and other liabilities of that fund. The subordinated debt will appear as a liability on the fund's balance sheet. However, in assessing the capital base of the fund it is not treated as a liability.

Tier 2 Capital can be perpetual but it is far more common for it to have a maturity date. The amount of Tier 2 Capital that can be included in the capital base is scaled down over the 4 years preceding its maturity date. This means that when it comes time for the debt to be repaid, the repayment has a limited effect on the capital base. The interest payments on Tier 2 Capital instruments are normally fixed or pegged to a reference rate such as the 90 day bank bill rate.

Tier 2 Capital only absorbs losses if the statutory fund to which it is referable, or the life company, becomes non-viable or is wound-up. Losses incurred by a life company are normally borne by the Tier 1 capital. But if Tier 1 Capital becomes small or negative, further capital raisings may become impossible. Shareholders may be unwilling to commit new Tier 1 capital because the risk that the company will fail and the capital will be lost may be too high relative to potential returns on the capital. In this situation a life company would be unable to continue operating and the Tier 2 Capital could bear part or all of any further losses after the Tier 1 Capital is exhausted. The investors in Tier 2 Capital would suffer a part or full write-off of their investment.

Because of its limited loss-absorbing qualities, APRA only allows a relatively small proportion of Tier 2 Capital to be used to meet the prudential capital requirement.

Statutory funds and shareholders' funds

The previous paragraphs described the capital base and prudential capital requirement for a life company as a whole. Similar requirements apply to each statutory fund and the shareholders' fund. The key differences at fund level are that the CET1 and AT1 definitions do not apply. Instead they are replaced by "net assets". This is because share capital is raised at company level. At fund level, there is no need to identify which net assets belong to particular groups of shareholders.

The net assets of a statutory fund (before the regulatory adjustments) include shareholders' capital and shareholders' retained profits. The net assets may also include foreign currency translation reserves and any other reserves attributable to shareholders.

APRA requires the net assets of a statutory fund (after applying the same regulatory adjustments as apply to CET1) to exceed 80% of the prescribed capital amount at all times. The capital base (including any Tier 2 Capital of the fund) must exceed the prudential capital requirement of the fund at all times.

The shareholder's fund is not allowed to have Tier 2 Capital. The net assets (after regulatory adjustments) must exceed the prudential capital requirement of the shareholders' fund at all times.

The capital base of a life company will normally be equal to the sum of the capital bases for each of its funds. One situation where this will not be true is if the life company has issued share capital that does not qualify as either CET1 or AT1. Such capital would be included in the capital bases of the company's funds, but it would not be included in the capital base of the company as a whole.

One might ask why APRA specifies capital requirements at both company and fund level? The main reason is so that the CET1 and AT1 limits can be applied. The company level information is also useful for external observers in analysing the financial strength of a life company.

Prescribed Capital Amount

The standard method for calculating the prescribed capital amount (PCA) is summarised in LPS 110. The PCA must be calculated using prescribed, risk-based methods. Under the standard method, the PCA is determined separately for each statutory fund and the shareholders' fund of a life company as the sum of:

- the Insurance Risk Charge (LPS 115); plus
- the Asset Risk Charge (LPS 114); plus
- the Asset Concentration Charge (LPS 117); plus
- the Operational Risk Charge (LPS 118); less
- an aggregation benefit (specified in LPS 110); plus
- a combined stress scenario adjustment (specified in Attachment B of LPS 110).

The PCA for a life company as a whole is the sum of the PCAs for the individual funds. The PCA for a life company has a minimum of $10 million. The minimum capital requirement prevents life companies from starting up and/or continuing in business with minimal capital resources.

LPS 110 also mentions an alternative Internal-Model Based Method for determining the PCA. At the time of writing, this method was not used by any life companies. An internal model would use parameters set by the life company, instead of the standard parameters specified for each of the risk charges. It would most likely be a stochastic model. The model and its parameters would need to be approved by APRA. Internal models are used by some Australian banks and general insurers to calculate their PCA (or its banking equivalent). Internal models are also commonly used for determining regulatory capital for life companies in some foreign countries.

Insurance Risk Charge

The method for calculating the insurance risk charge is specified in LPS 115. This charge is the minimum amount of capital a statutory fund needs to hold against insurance risks. Insurance risks include mortality, morbidity, longevity, lapses, servicing expenses and other insurance contingencies such as take-up rates for guaranteed conversion options. Note that APRA distinguishes between mortality risks, where the company makes a loss if mortality rates increase, and longevity risks, where the company makes a loss if mortality rates decrease. Longevity risks would generally only be an issue for statutory funds with lifetime annuity liabilities.

The insurance risk charge is defined to be the reduction in the capital base that would occur if the adjusted policy liabilities were replaced with stressed policy liabilities. The stresses to the policy liabilities must be determined so that there is a probability of 99.5% that the stressed policy liabilities will be sufficient to provide for claims and expenses over the following 12 months together with the adjusted policy liabilities at the end of 12 months. The stressed liability should be significantly higher than the best estimate liability, which has only a 50% probability of sufficiency.

The stressed liabilities are calculated in the same way as the risk-free best estimate liability (for non-participating business) or the participating policy liability, but using stressed assumptions instead of best estimate assumptions in respect of insurance risks. There is an additional requirement that stressed liabilities must be sufficient to fund adjusted policy liabilities calculated using stressed assumptions 12 months after the reporting date. This is similar to the calculation of adjusted policy liability (greater of RFBEL and termination values) except that the "greater of" is calculated in 12 months time. This amount must then be discounted back to the reporting date, and added to the discounted value of the stressed cash flows that are projected to occur over the first 12 months.

The insurance stresses increase the RFBEL. They also increase the termination values for lifetime annuities, disability claims in course of payment, IBNR and RBNA.

The appointed actuary must determine the stressed assumptions for mortality and morbidity risks. APRA specifies 3 different types of stresses that must be applied to the best estimate assumptions – random, event and future stresses. The margins for each of these stresses must be determined at a 99.5% probability of sufficiency over a 12 month period. This means that, in the assessment of the appointed actuary, there is no more than a 0.5% probability that the actual cost of claims will exceed the stressed estimate. The stress margins must then be adjusted to allow for diversification between these risks.

Random stress

Random stresses are adverse fluctuations in experience from the best estimate, excluding the impact of single events that could cause large numbers of claims, such as pandemics, terrorist attacks and natural catastrophes. The size of the random stress will depend on factors such as the number of expected claims, the distribution of sums

insured and the impact of existing reinsurance arrangements. The random stresses are applied for 12 months from the reporting date.

If sums insured and ages attained are the same for all policies and claim incidence rates are assumed to have a binomial distribution, the extra claims at the 99.5% confidence level can be estimated using the formula $2.576 / \sqrt{(n \times p)}$, where n is the number of policies, and p is the claim incidence rate.

For example, assume the best estimate mortality rate is 0.5% and there are 100,000 lives insured. The random mortality stress margin will be 12% ($= 2.576 / \sqrt{(100{,}000 \times .5\%)}$). The best estimate number of claims will be 500 and the number of extra claims at the 99.5% confidence level will be approximately 60 (i.e. 500 claims multiplied by the stress margin).

If there were 10,000 lives insured the stress margin would be 36%. For 1,000,000 lives insured the random stress margin would only be 4%. This example highlights the importance of the number of lives insured in determining the amount of capital needed for random insurance stresses. A larger number of lives will result in smaller random claim fluctuations and therefore a lower amount of capital will be required. This is an example of the outcome of the "law of large numbers".

In practice, a life company's policies are likely to have a skewed distribution of sums insured. A small proportion of policies will have very large sums insured. In addition, best estimate mortality rates will vary by age, sex, smoking status and other rating variables. The claims costs will not have a binomial distribution and stochastic modelling may be necessary to determine the random stress margins. The random stress will decrease as the number of policies in a statutory fund increases. It will increase as the skewness of the distribution of sums insured increases. Surplus reinsurance can be used as a means of reducing the random stresses as this type of reinsurance reduces the skewness of the distribution of sums insured (i.e. the sum insured retained by the life company will be limited to the retention limit specified in the reinsurance treaty).

Separate random stresses must be determined for mortality and morbidity risks.

Event stress

The event stress allows for the impact of a single event causing multiple claims that could commence in the 12 months following the reporting date. The event stress must reflect the worst single event that could occur with a probability of 0.5% and affecting both mortality and morbidity experience. APRA specifies a minimum event stress of a pandemic scenario where mortality rates increase by 0.5 per thousand lives insured for the 2 years following the reporting date. APRA also specifies an increase in morbidity in this scenario, with 10% of lives insured becoming temporarily disabled for up to 60 days in each of the 2 years.

For most companies the event stress is the pandemic scenario. However, the actuary needs to consider whether worse events than the pandemic scenario could happen. For example, the actuary may need to consider risks such as terrorist attacks, natural catastrophes or industrial accidents if the life company has a high proportion of lives insured who work at a single site (this might occur if the life company specialises in issuing large group risk policies).

The pandemic scenario has been set by APRA with reference to the Spanish flu pandemic that occurred over roughly a 12 month period during 1918 and 1919. This pandemic spread around the world during a fairly short period. In Australia it resulted in excess mortality of about 6 deaths per thousand people. If a similar pandemic occurred now its impact is expected to be much smaller, mainly due to advances in

health care and the advent of antiviral drugs. The impact on claim amounts for insured lives is expected to be lower than in the general population due to selection effects. These effects include the impact of underwriting and the fact that people insured for larger amounts tend to have better access to medical care than the general population. Flu pandemics are expected to recur roughly once every 30 or 40 years. Smaller flu pandemics occurred in 1957 and 1969. Another pandemic could occur at any time.

One particular feature to note is that the increases in mortality and morbidity in the pandemic scenario are the same at all ages. This means that the proportionate impact of the pandemic scenario, relative to normal mortality and morbidity rates, is much greater for younger lives. Another notable feature of the pandemic scenario is that it is the same regardless of the number of lives insured. If a pandemic with a claim rate of 0.5 per thousand over 2 years did actually occur, the claims experience of different life companies would vary due to random chance. However the specified claim rate of 0.5 per thousand is already at the 99.5% confidence level, so life companies are not required to hold capital against the risk that they may by chance experience even higher rates of claims than the industry average during a pandemic event.

The pandemic scenario is spread over 2 years. This may look inconsistent with the 12 month horizon for capital requirements, but it is as an approximation to the effect of a 12 month pandemic that commences at some point during the next 12 months.

The pandemic scenario also applies to lifetime annuities. If a statutory fund includes lifetime annuities as well as policies providing death cover, the overall impact of the pandemic scenario will be reduced.

Future Stress

The future stress margin allows for other possible causes of variations in experience and assumptions for mortality and morbidity. These include the possibility that the best estimate assumptions are incorrect or that changes to allowances for future trends in mortality and morbidity experience will have to be made.

The future stress margins must be applied from the reporting date for the remaining term of the liabilities. They must allow for the possibility that the best estimate assumptions may need to be changed in 12 month time, either because they were mis-estimated at the reporting date or because adverse trends have been identified during this period.

The size of the future stress margins will depend on the adequacy of the investigations used to determine the best-estimate assumptions and the range of adverse factors that could affect trends in claims experience.

The best estimate mortality or morbidity assumptions will usually be in the format of a factor multiplied by a standard table. The factor is usually set by comparing actual experience for the company to that expected by applying the standard table.

Statistical techniques can be used to estimate the uncertainty arising from the numbers, sizes and attained ages of the policies included in a company's experience investigations and the industry experience underlying the standard table. There is a risk that the company's adjustment factor, or the standard table, will underestimate future claims experience because, due to pure random chance, there were fewer than expected claims during the periods of investigation. The margin required for this type of error can be estimated in a similar way to the random stress margin.

There will be additional uncertainty about the best estimate assumptions because mortality and morbidity experience may have changed since the experience

investigations were carried out. An unavoidable problem with experience analyses is that they are out of date to some extent. Standard tables are usually based on industry-wide experience from many years ago. The experience of the life company will be more up to date, but will be based on a smaller number of lives than the standard tables. To get meaningful volumes of experience data and reduce the impact of random fluctuations, several years of experience data is normally required. This reduces the impact of random fluctuations on the mean, but increases the risk that recent trends in experience are missed. For example, the company may have changed its underwriting standards, claims management practices, benefit definitions or target markets since the period of the most recent experience investigation.

Other examples of trends which might cause a deterioration in experience include: diet and lifestyle factors; medical advances leading to improvements in diagnostic techniques that affect trauma claim rates; economic and social factors that affect income protection claims incidence and termination assumptions. Some allowance for adverse trends should be incorporated in the future stress margin. This size of this allowance will be fairly subjective.

Longevity stress

The longevity stress is a 20% reduction in mortality rates. This stress applies to lifetime annuities and is effectively a combination of random and future stresses.

APRA specifies the longevity stress, rather than leaving it to the appointed actuary to determine, because there is little relevant experience for annuitant mortality in Australia. Determining the longevity stress would otherwise be a very subjective exercise and the stress margin could vary significantly between life companies.

Management actions

The insurance risk stresses are intended to be extreme, but realistic. In practice, a life company would take mitigating actions in response to extreme stresses. These actions can include, but are not limited to:

- reducing bonus or crediting rates for participating business; or
- increasing premium rates for non-participating business.

APRA allows life companies to take credit for the actions it would expect to take in order to reduce their capital requirements. Any allowances for management actions which reduce capital requirements must be appropriate, justifiable and equitable. They must also be consistent with policy owners' reasonable expectations based on product disclosure documents.

Premium rate increases cannot be assumed to occur in response to the future stress within 12 months of the reporting date. This restriction recognises that it takes time for a life company to identify changes in its mortality and morbidity experience. The 12 month period must be extended to allow for the time it would take for the life company to increase premium rates in response to stresses occurring over the 12 month period.

The value of any assumed premium increases must not exceed the value of the increases in claims and expenses. This restriction means that it is not possible to assume that business currently in loss-recognition could be repriced to bring it back to profitability. Life companies must also consider the extent to which competitive pressures and policy owners' reasonable expectations might limit their ability to fully reprice their products in line with worsening experience assumptions. If a life company believes it can fully reprice its policies, a simple way of modelling the impact of repricing is to assume that premium rates remain unchanged and the future mortality

and morbidity stresses cease to apply from the date that repricing will occur. This will give the same result as maintaining the future mortality and morbidity stresses and increasing the premium rates.

Premium rate increases cannot be assumed as a response to the random or event stresses. This is because these stresses only affect claims that are expected to be incurred over the next 12 months. It would not be appropriate to assume that losses from these stresses could be recovered via subsequent long-term increases in premiums. Random and event stresses are effectively one-off occurrences, so an increase in premium rates in response to these stresses would be difficult to maintain in a competitive market.

Diversification

The stressed policy liabilities must be determined using stress margins that have been adjusted to allow for diversification between the random, event, future and longevity stresses. Each of the unadjusted stress margins was determined at 99.5% probability of sufficiency over 12 months. However the different types of stresses are not perfectly correlated. It would be overly conservative to assume that all of the unadjusted stresses would occur over the same 12 month period.

The combined impact of the stresses must be determined allowing for correlations between the stresses using a formula and correlation matrix specified by APRA in LPS 115. Most of the correlation factors in the matrix are zero (i.e. the risks are assumed to be uncorrelated). There is a low positive correlation of 0.25 between future mortality and future morbidity. This recognises that some types of trend risk, such as increases in obesity rates, can affect both mortality and morbidity experience. There is a low negative correlation of -0.25 between longevity and future mortality.

The method APRA uses to allow for correlations is an approximate method for finding the tail of a multi-variate loss distribution. The method is theoretically correct only if the individual variables are normally distributed and the dependence between the variables is linear. These conditions are not always true. For example, in life insurance the probability distribution of losses arising from single events is very skewed – the maximum loss arising from a single event will be small in most years, but very large losses may occur very occasionally from events such as pandemics. If a life company has non-proportional reinsurance arrangements, these will also affect the shape of its retained loss distributions.

One might expect the correlation between longevity and future mortality to be minus 1 because an increase in mortality rates would always improve longevity. The reason why the correlation is not minus 1 is that annuitants and insured lives are separate groups with different age profiles and different best estimate assumptions. Mis-estimation of the mean can adversely affect the best estimate assumptions for both groups at the same time. In addition, adverse trends that would increase mortality rates for younger lives insured may have little or no impact on the longevity of annuitants and vice versa.

Expense stress

The stress margin for servicing expenses is a 10% increase to the best estimate of future unit costs. If the best estimate assumption depends on a service agreement with a company that provides the services to the life company and the agreement doesn't adequately reflect the long term sustainable costs of operating the business, then a higher margin must be used to reflect the difference between the best estimate assumption and long term sustainable costs.

The expense stress margin is specified by APRA, instead of being determined by the actuary, because APRA believes it is a relatively subjective margin and there are no strong reasons why it should not be the same for all life companies and statutory funds.

Management actions, such as reductions in bonus rates or increases in fees or premium rates, can be assumed in response to the expense stress. Increases in fees or premium rates are subject to a minimum 12 month delay. There is no adjustment for diversification for the expense stress margin.

Lapse stress

The stress margin for lapses must be determined by the actuary. Lapses included all types of voluntary terminations. The lapse margin must be determined so that the insurance risk charge is at the required 99.5% probability of sufficiency over 12 months. The lapse margin cannot be set in isolation from other risks. Diversification of lapse risk with other risks can be allowed for.

The lapse margin must be set considering the potential behaviour of policy owners if other risks occur. This is likely to require considerable judgement. In particular, the actuary will need to consider what might happen to lapse experience if premium rates or fees are increased substantially in response to the mortality, morbidity and expense stresses.

The stress margin for lapses can be either an increase or decrease in lapse rates, depending on which gives the higher insurance risk charge. If the expected claims incurred and expenses exceed earned premiums after applying the other stresses, the lapse stress will be a reduction in lapse rates. Otherwise, the lapse stress will be an increase in lapse rates. In some circumstances, the lapse stress could be a reduction in lapse rates for the first 12 to 24 months and an increase in lapse rates thereafter. This can occur because the random stresses only apply for the first 12 months, the event stress only applies for the first 24 months and repricing can be assumed to occur at some point after 12 months. It is fairly common for stressed claims incurred and expenses to exceed earned premiums during the first 12 months, but for the position to reverse at some point during the second 12 months.

Summary of insurance risk charge calculation

The calculation of the insurance risk charge can be summarised in the following steps:

1. Determine the random and future stress margins to be applied to the best estimate mortality and morbidity assumptions
2. Determine the management actions that would be applied in response to the future mortality and morbidity stresses
3. Determine the greatest loss from a single event commencing in a 12 month period at 99.5% probability of sufficiency. The minimum event stress is the pandemic scenario specified by APRA
4. Determine the increase in RFBEL or PPL, after allowing for management actions, for the random, future, event and longevity stresses
5. Combine the dollar impacts from step 4 using an APRA specified correlation matrix. The diversification factor is equal to the combined impact divided by the sum of the dollar impacts.
6. Adjust the margins for all of the stresses in step 4 using the diversification factor from step 5 (or a modified diversification factor) to give adjusted margins that can be applied simultaneously in determining the stressed liabilities

7. Determine the management actions that would be considered appropriate after allowing for diversification
8. Determine appropriate lapse margins so that the stressed liability in step 9 will have a probability of sufficiency of 99.5% over 12 months
9. Determine the stressed liability by applying the adjusted margins and adjusted management actions simultaneously. The stressed liability must be sufficient to fund termination values calculated using stressed assumptions 12 months after the reporting date.
10. The insurance risk charge is the excess (if any) of the stressed liabilities over the adjusted liabilities.

Exercise 1

Two statutory funds both have policy liabilities consisting entirely of risk business. One statutory fund has a significant insurance risk charge, whilst the other fund has an insurance risk charge of zero. Discuss possible reasons for the difference in charges.

Asset Risk Charge

The method for calculating the asset risk charge is set out in LPS 114. The asset risk charge is the amount of capital a fund must hold against asset risks. The asset risk charge reflects the potential losses arising from such risks, including asset/liability mismatch, and it should encourage life companies to adopt an investment policy that has regard to the term and nature of their liabilities.

Asset risks include market and credit risks. They include movements in interest rates, expected inflation rates and foreign currency exchange rates. They also include the risk that counterparties, such as reinsurers, will default on their obligations. Asset risks can affect the value of liabilities, as well as the value of assets.

As for the insurance risk charge, the asset risk charge is calibrated to provide a probability of sufficiency of 99.5% over a 12 month period. However, unlike the insurance risk charge, all of the asset risk stresses are specified by APRA.

The asset risk charge is calculated by determining the fall in the capital base of the fund in seven stress tests:

- real interest rates
- expected inflation
- currency
- equity
- property
- credit spreads
- default

The first three stress tests are bi-directional. Rises and falls in real interest rates, expected inflation and foreign currency exchange rates must both be considered.

Each of the stresses is calibrated to a probability of sufficiency of 99.5% over a 12 month period. In other words there is only a 0.5% probability that a more severe stress could occur. The capital required for each of the stresses is combined using a correlation matrix, which allows for the likelihood of the seven stresses occurring simultaneously. The

correlations are intended to reflect the dependencies between the different stresses in extreme circumstances. The actual correlations observed in normal day to day circumstances would typically be lower.

The correlation between stresses depends on the sign (or direction) of the stresses. For example, a fall in the Australian dollar is assumed to be positively correlated with falls in real interest rates, expected inflation, equities and properties, and increases in credit spreads. Negative correlations have not been recognised, in order to limit the degree to which diversification benefits can be recognised.

Management actions can be allowed for in each of the stress tests. The range of potential management actions is different from those in the insurance risk charge due to the different nature of the stresses. For the asset risk charge, potential management actions include reductions to future bonus or interest credits and immediate reductions to termination values (e.g. by reducing the surrender value of terminal bonuses or unvested interest credits). The ability of a company to vary its bonus rates and termination values in response to asset stresses is very important in reducing the capital requirements for participating and discretionary investment business.

An increase in premium rates for risk business may not be a feasible or appropriate response to asset stresses. Premium rates might become uncompetitive if other life companies matched their assets to their liabilities and were immunised from asset stresses. The reasonable expectations of policy owners would also be a constraint if promotional material indicated that premium rates would only be increased in response to a worsening of claims experience.

Another type of management action that can be allowed for is altering the asset exposures of the fund after the stresses have occurred. This may reduce the value of any embedded options such as investment guarantees that are included in the post-stress liabilities.

Real interest rates are the portion of nominal risk-free interest rates that remain after deducting expected CPI inflation. Nominal risk-free rates for Australian assets and liabilities are defined by APRA to be the yields on Commonwealth government securities.

The real interest rates stress affects assets and liabilities whose value depends on a discount rate. On the assets side it affects bonds, but not property or equity assets. Liabilities whose value depends on a discount rate will be affected. Liabilities for participating business and other discretionary investment business will also be affected if there is a change in the value of supporting assets.

The expected inflation stress does not affect assets or liabilities where the cash flows are indexed to CPI inflation. A non-indexed bond or liability will be affected by both the real interest rates and expected inflation stresses, but a CPI-indexed bond or liability will only be affected by the real interest rate stress.

The currency stress measures the impact of an appreciation or depreciation of the Australian dollar against all other currencies. For funds where all liabilities are Australian and some assets are invested overseas, the appreciation of the Australian dollar will create a capital charge because the overseas assets will fall in value.

The equity and property stresses measure the impact of falls in equity and property markets. The equity stress also allows for an increase in equity volatility which will affect the value of derivatives. The equity stress differs for listed and unlisted equities. Unlisted equities have a higher capital charge as APRA considers these assets to have higher risk and less liquidity than listed equities.

The equity and property stresses are defined by reference to increases in dividend and rental yields rather than falls in asset values. Dividend and rental yields increase when asset values fall. Higher yields result in a lower stress and therefore a lower capital

requirement. One of these reasons for applying the stresses in this way is to make it less likely that life companies will seek to reduce their capital requirements by selling assets into a falling market. There have been instances in the past in overseas countries, where falls in asset markets have been exacerbated when life companies and other institutional investors were forced to sell assets so that they could reduce their regulatory capital requirements.

Example

> *If the current dividend yield for the ASX 200 is 4%, the stressed yield for listed equities would be 6.5%, which is equivalent to a fall of 38.5% in equity values (= 1 – 4%/6.5%).*
>
> *If the current dividend yield is 7% (a level reached in early 2009 during the global financial crisis following severe fall in equity markets), the stressed yield would be 9.5%. This is equivalent to a fall of 26.3% in equity values.*

The credit spreads stress affects interest bearing assets. A credit spread is the difference in yield between an asset that is subject to credit risk (such as a corporate bond) and a similar risk-free asset (such as an Australian government bond). Credit spreads can vary significantly over time, both for individual securities and for securities markets as a whole. The credit spreads stress increases the prevailing yields on these assets. In addition to the risk of an increase in credit spreads for the particular counterparty grade, the stresses also allow for the risk of migration of individual assets to lower credit ratings, which will result in the assets having a higher credit spread. There is a separate factor that allows for losses through default over the following 12 months. The default factors allow for both the probability of default and the loss given default (i.e. the proportion of the value of the defaulted asset that will not be recovered).

The credit spreads stresses vary depending on the counterparty grade of the asset. The mapping of rating agency ratings to counterparty grades is set out in LPS 001. Higher stresses apply to securitised and re-securitised assets, reflecting the complexity and the difficulties associated with rating and assessing the inherent risk of these types of assets. An example of a securitised asset is a residential mortgage backed security.

Part of the credit spread stress is assumed to be due to an increase in the illiquidity premium. This means that annuities and other illiquid liabilities will reduce in value when the credit spreads stress is applied.

The default stress applies to reinsurance assets, over-the-counter (OTC) derivatives, unpaid premiums and any other credit exposures that are not considered in the credit spreads stress.

One feature of the asset risk charge that should be noted is that the stress tests are applied to all of the assets of a fund, including those that back surplus capital. This has the result that if a distribution of surplus capital is made from a fund, the asset risk charge and the PCR will reduce (unless the distribution was funded by selling or transferring assets that do not have an asset risk charge). The fall in the amount of surplus capital will be less than the amount of surplus capital that was distributed.

Asset Concentration Risk Charge

The method for calculating the asset concentration risk charge is specified in LPS 117.

The asset risk charge specified in LPS 114 is calibrated to be appropriate for funds whose investments in each asset class are well diversified. Additional capital is therefore required, in the form of the asset concentration risk charge, if there are excessive

concentrations of investments in individual assets or in exposures to single counterparties.

The concentration limits in LPS 117 vary depending on the type of asset. Note the higher limits for reinsurance arrangements with life companies registered in Australia. There are also special limits for specialist reinsurers that allow them to retrocede a significant portion of their business to their overseas parent. Global sharing of risk is a key part of the business model of reinsurers. Policies issued by specialist reinsurers must all be owned by other life companies, rather than directly by individual policy owners. This limits the risks to individual policy owners from any concentrated exposures of specialist reinsurers to their overseas parents.

The asset concentration risk charge is normally zero in practice because one of the consideration of life companies when setting their investment policy and reinsurance arrangements is to minimise the capital requirements that could result from excessive asset concentrations.

Although APRA nominally uses a VaR method for setting minimum capital requirements, the asset concentration risk charge shows the influence of TailVaR methodology. For example, historical records show that the probability of default over 12 months for a AAA-rated (counterparty grade 1) corporate bond is extremely low – much less than 0.5%. A life company could theoretically hold all of its assets in a single corporate bond maturing in 12 months time and have a probability of insolvency of less than 0.5%. The problem with this strategy is that if the bond did default, there might be a total loss of all assets. A catastrophic loss of this type would be picked up in a TailVaR measure of losses, but not in a VaR measure. This helps explain why the asset concentration limit for high quality corporate bonds is relatively low, being the greater of 5% of total assets or 25% of capital base.

Operational Risk Charge

The method for calculating the operational risk charge is specified in LPS 118. It relates to the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. Examples of operational risk include losses due to:

- fraud, either by staff or from external sources;
- failures in computer systems and administrative processes, whether from in-house or outsourced delivery;
- legal risk (excluding strategic risk and reputation risk);
- mis-selling of products;
- lack of effective management of distributors and other third parties, where they are integral to the insurer;
- manipulation or concealment of financial information;
- poor performance by the management team;
- unit pricing and other administrative errors;
- failure to provide customers with sufficient product information; and
- external events causing damage to the life company's premises, equipment or people – e.g. terrorism, vandalism, earthquakes, fires, floods and pandemics. These types of events can cause major disruption to an insurer's operations.

Recent international and Australian experience has shown the potential for operational risk exposures to result in severe and unexpected losses. There is also evidence that operational risk is continuing to increase in its size and complexity due to factors such as the increasing reliance on advanced technology, legacy and IT system issues, outsourcing and agency distribution channels and mergers and acquisitions activity.

The formulae for the operation risk charge include a base component to reflect the scale of a life company's operations plus a change component to recognise significant increases or decreases in that scale. A significant increase in the scale of operations (either by organic growth or the acquisition of another life company) is an indicator of increased operational risk. If the scale of operations decreases, the formulae have the effect of delaying the decrease in the operational risk charge for 12 months. Losses arising from operational risks can take some time to become apparent – for example, mis-selling and unit-pricing errors may not become apparent until well after they have occurred.

For risk business, the base component depends on premiums or liabilities and the change component measures the change in premium income over the last 12 months. For non-risk business, the base component depends on liabilities and the change component compares premium income and claims for the last 12 months with the liabilities at the start of that period. The operational risk charge would typically be 3% of premiums (gross of reinsurance) for risk business and 0.25% of adjusted policy liabilities (net of reinsurance) for non-risk business, but it can vary depending on the particular circumstances of each statutory fund.

In theory, the amount of capital required for operational risks should depend on the complexity of an insurer's operations and the strength of its management and control processes. These things are inherently difficult to measure in an objective way. The operational risk charge formulae are intended to be broadly appropriate for a well-managed insurer. To the extent that APRA assesses a life company to have a higher operational risk profile or an inadequate approach to operational risk management, APRA can increase the company's PCR by applying a supervisory adjustment.

Aggregation Benefit

The aggregation benefit is an explicit allowance for diversification between asset and insurance risks. The formula for the aggregation benefit is specified in LPS 110.

A correlation factor of 0.2 is assumed between asset and insurance risks. In normal circumstances, asset and insurance risks are largely independent. However, the correlation factor is not zero because extreme insurance risks, such as natural catastrophes and pandemics, can have adverse impacts on both claims experience and asset values. There is also some evidence to suggest that disability claims experience tends to worsen during times of economic stress.

APRA does not include the operational risk capital charge in the calculation of the aggregation benefit because operational risk is linked to both asset risk and insurance risk and these correlations become stronger in times of extreme stress. Operational risk can be a significant factor in company failures because of these linkages. Operational risks can manifest in the form of poor management of investment policy, underwriting and claims administration.

The asset concentration risk charge is designed to address excessive concentrations of assets and APRA does not consider it appropriate to include this charge in the aggregation benefit.

Combined Stress Scenario Adjustment

The combined stress scenario is a single scenario where all of the insurance and asset risk stresses are applied simultaneously after modifying the stresses by multiplying them by diversification factors. The specifications for this scenario are set out in Attachment B of LPS 110.

The stressed scenarios used for the Insurance Risk Charge and the Asset Risk Charge will give rise to tax benefits (i.e. a reduction in future tax liabilities). These tax benefits are recognised in full in each charge and will reduce both capital charges. The combined stress scenario tests the extent to which these tax benefits are recoverable. The limit to the recoverability of tax benefits is the point at which future tax liabilities reduce to zero.

The combined stress scenario also tests the extent to which management actions can reduce capital charges. For example, reductions to bonus rates can be assumed in determining the Insurance Risk Charge and in each of the stress tests for the Asset Risk Charge. However it is possible that the combination of all these bonus rate reductions would produce negative bonus rates. The bonus rates assumed in the combined stress scenario must be consistent with policy documents, promotional material and policy owners' reasonable expectations.

Exercise 2

Explain why a merger of two statutory funds could reduce the PCR for a life company.

Worked example

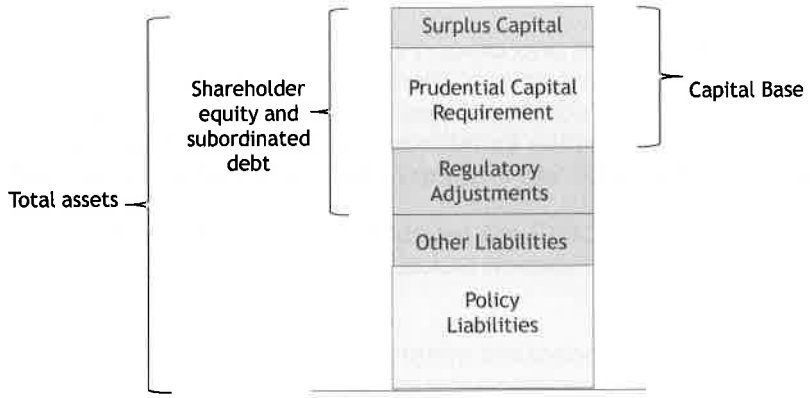
You have been asked to calculate the prescribed capital amount for a statutory fund containing only term insurance policies that expire in 10 years time.

The information required for this example is in the spreadsheet provided with this chapter. Input cells for assumptions are shaded.

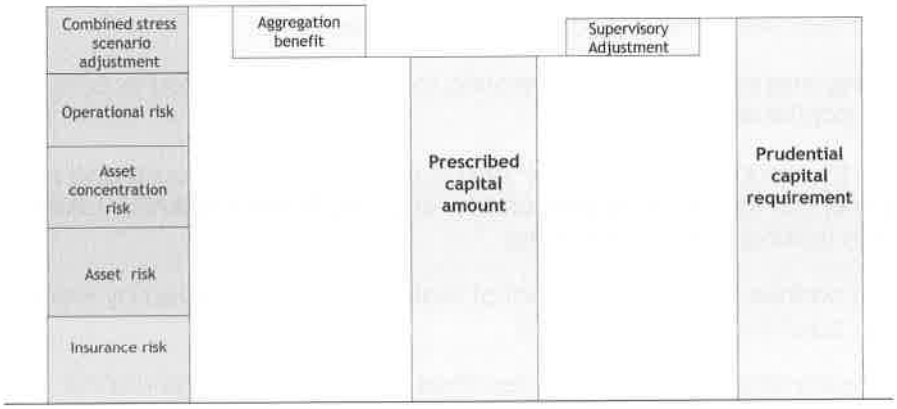
To keep the example simple, it has been assumed that there is no taxation, no reinsurance, premiums are paid at the beginning of the year and expenses and claims are paid at the end of the year. The claim, expense and lapse assumptions are set as a percentage of premiums.

Capital diagrams

Components of balance sheet



Components of PCR



Internal Capital Adequacy Assessment Process

The previous sections of this chapter focused on the capital base, the prescribed capital amount and the prudential capital requirement. As part of its prudential standards for capital management, APRA requires life companies to have an Internal Capital Adequacy Assessment Process (ICAAP). An ICAAP involves an integrated approach to capital and risk management, aimed at ensuring that the capital held is adequate in the context of the risk profile and risk appetite of the life company.

Risk appetite refers to the types and amounts of risk that the life company is willing to accept. APRA expects life companies to clearly define their risk appetite in the form of a risk appetite statement. This statement must be approved by the Board of the company. It provides a foundation for risk management throughout the company. In particular, it sets boundaries for risks that the company is unwilling to accept.

APRA's requirements for the ICAAP are set out in LPS 110. Further advice on the ICAAP is included in APRA's Prudential Practice Guide CPG 110. At a minimum, the ICAAP must include:

- adequate policies, procedures, systems, controls and personnel to identify, measure, monitor and manage the risks arising from the life company's activities on a continuous basis, and the capital held against such risks;
- a strategy for ensuring adequate capital is maintained over time, including specific capital targets set in the context of the life company's risk profile, the Board's risk appetite and regulatory capital requirements. This includes plans for how target levels of capital are to be met and the means available for sourcing additional capital where required;
- actions and procedures for monitoring the life company's compliance with its regulatory capital requirements and capital targets. This includes the setting of triggers to alert management to, and specified actions to avert and rectify, potential breaches of the regulatory capital requirements;
- stress testing and scenario analysis relating to potential risk exposures and available capital resources;
- processes for reporting on the ICAAP and its outcomes to the Board and senior management of the life company, and for ensuring that the ICAAP is taken into account in making business decisions;
- policies to address the capital impact of material risks not covered by explicit regulatory capital requirements; and
- an ICAAP summary statement that describes and summarises the capital assessment and management processes of the life company.

A life company must, on an annual basis, provide a report on the implementation of its ICAAP to APRA. The ICAAP report must include:

- detailed information on current and three-year projected capital levels relative to minimum regulatory capital requirements and target levels for each fund and the life company as a whole;
- detailed information on the actual outcomes of applying the ICAAP over the period, relative to the planned outcomes in the previous ICAAP report (including analysis of the life company's actual capital position relative to

minimum capital requirements and capital targets and actual-versus-planned capital management actions);

- description of material changes to the ICAAP since the previous ICAAP report; and
- detail and outcomes of stress testing and scenario analysis used in undertaking the ICAAP;
- a breakdown of capital usage over the planning horizon, as relevant, by material:
  - i. business activity;
  - ii. geographic spread of exposures; and
  - iii. risk types;
- an assessment of anticipated changes in the life company's risk profile or capital management processes over the planning horizon;
- details of any review of the ICAAP since the previous ICAAP report, including any recommendations for change and how those recommendations have been, or are being, addressed; and
- references to supporting documentation and analysis as relevant

Preparing the three-year projection can be a very complex task and sophisticated models may be required. In addition to the best estimate assumptions used for calculating policy liabilities, assumptions will also be required for future levels of new business and future capital distributions and raisings. It may be necessary to make allowance for changes to best estimate assumptions during the projection – for example best estimate maintenance expenses must be sufficient to cover forecast costs for the following year. Best estimate maintenance costs are therefore likely to change each year throughout the three-year projection, necessitating a recalculation of profit margins each year. Any planned changes to product pricing, reinsurance arrangements or investment policy would add more complexity to the task of making the projection. The projection model also needs to be capable of performing stress testing and scenario analysis, where actual experience in any or all of the three years differs from the best estimates.

The analysis of actual to planned outcomes over the previous year can also be a complex task. This analysis will need to explain the reasons for movements in the capital base and the prescribed capital amount.

Target Capital

Target capital is the amount of capital that a life insurance company aims to hold over the medium to long term. The actual amount of capital will vary from the target, depending on whether recent experience of the company has been better or worse than expected. Actual capital will also be affected by capital raisings and distributions.

Due to the serious nature of breaching the PCR, life companies must have target capital that exceeds the PCR by a significant margin. The excess of target capital over the PCR is referred to as target surplus.

APRA does not set detailed requirements for target capital. It must be determined by a life company having regard to its risk profile, the Board's risk appetite and the regulatory capital requirements. In setting its target capital policy, a life company may also consider:

- the amount of risk-based (or economic) capital that is required to meet the company's objectives;
- the amount of capital required to support a specific financial strength rating by external rating agencies;
- the likelihood of breaching the PCR and the consequences of such a breach; and
- the cost of capital.

A life company may take the view that the amount of risk-based (or economic) capital that it requires is greater than its PCR. For example, it may consider that a higher probability of sufficiency than 99.5% or a longer time horizon than 12 months is appropriate. It may also take a different view from APRA on the amount of capital required for particular risks.

A life company might target a specific financial strength rating from ratings agencies such as Standard and Poor's, Moody's and Fitch. The financial strength rating can be important to a company as it may be one of the factors used by financial advisers in making recommendations to potential policy owners. It will also be important if the company intends to borrow funds. The ratings agencies each have their own method for assessing the amount of capital a company needs to hold in order to achieve specific ratings.

Target capital is often set by companies at a level that provides a desired level of sufficiency with regard to a breach of PCR over the following 12 months. The probability of breaching PCR might range from as much as a 10% to as little as 0.5%. The lower the probability of breaching PCR, the higher the target capital needs to be. A company might be satisfied with a lower level of target capital if its cost of capital is high, it is confident that it could rapidly rectify any breach of PCR and the consequences of a temporary breach would not be too severe.

An alternative would be to set target capital as a multiple of the PCR, for example 150% of PCR. However, a target of this nature is less useful as it does not indicate the likelihood of a breach of PCR. Target capital may also be defined as a range rather than a single number. A target range is a useful concept for managing capital as it recognises that actual capital is volatile, but management action only needs to be taken if it moves outside the target range.

The cost of capital is the return shareholders seek to earn on their invested capital less the investment return (net of tax) on the assets that the capital is invested in. The return shareholders seek to earn will depend on the risks that the capital is exposed to. The cost of capital will limit the amount of capital that shareholders will be willing to commit to a life company. On the other hand, if surplus capital is too low and a breach of PCR occurs, the adverse publicity is likely to be damaging to the value of the company. There is also the possibility that APRA will take actions which damage the value of the shareholders' interests in the business – for example, by closing the company to new business. A balance must be struck between having too much or too little surplus capital.

Life companies may consider the position of other companies when setting their own target capital policy. A life company will probably not want to be the weakest in the industry. Weak companies may have difficulties attracting new business and retaining existing business and will be the first to breach PCR in a crisis that affects the entire industry. On the other hand, a life company may not see any need to be the strongest company in the industry. There is likely to be little benefit in terms of higher sales or improved retention for a life company that is excessively well capitalised.

For further information and discussion on this topic, students are expected to read the Information Note on target surplus/capital which can be found in the information and knowledge section on the Actuaries Institute website.

Example A: Target Surplus Policy

TXX is a wholly owned subsidiary of a listed holding company. Target surplus is TXX's principal tool for determining the appropriate amount of capital to hold within its statutory funds. Its aim is to ensure that under a range of adverse scenarios, TXX can continue to meet the PCRs of all funds in the short to medium term.

The target surplus level is the amount of capital "sufficient to reduce the risk of breaching the PCR of TXX over the next 12 months to 2.5%". This equates to a probability of once in forty years.

The key components of the target surplus calculations are:

- Insurance, Asset and Operational Risk stresses: Stress margins and correlations between risks are estimated at a 97.5% probability of sufficiency over 12 months. Target surplus is calculated so that the PCRs of all funds can still be met in 12 months time after stresses at the 97.5% level of sufficiency have been applied. For the purpose of calculating target surplus, the company decides it is appropriate to assume there is a zero correlation between insurance, asset and operational risks.

- Diversification between funds: The PCR is calculated separately for each statutory fund. Surplus capital can be moved between funds, so it is appropriate to allow for diversification between funds. The target surplus is calculated at company level and then allocated to funds in proportion to their prescribed capital amounts.

- Capital projections: The PCR does not allow for the capital requirements of new business, or the release of capital from existing business. Capital projections are necessary to determine whether an addition or reduction to target surplus should be made to allow for these effects.

Example B: Target Capital Policy

SWW is an Australian subsidiary of a foreign mutual life company. It has a single statutory fund consisting mostly of participating business. The parent expects to receive a regular dividend from its subsidiary, but has no intention of ever injecting additional capital. Target capital is SWW's principal tool for determining the appropriate amount of dividends and retained capital.

The target capital level is the amount of capital sufficient to reduce the risk of failing to meet policy owners' reasonable expectations to 0.5% if the company ceases to sell new business and goes into run-off in 12 months time.

The company calculates target capital using a stochastic model that uses probability distributions for each of the insurance, asset and operational risks. The model also allows for correlations between risks and for appropriate management actions to be taken in response to each risk. Target capital is calculated so that default occurs in no more than 1 in every 200 scenarios. Default is defined as the inability to pay claims as and when they fall due. A scenario is deemed to end in default if the company's assets fall to zero.

The target capital is subject to a minimum of 150% of PCR in order to provide a reasonable buffer against breaches of PCR.

Exercise 3

You are the Appointed Actuary for a medium sized listed Australian life company. APRA has just announced a significant strengthening of its capital standards following a period of severe turmoil in financial markets. The impact of this will be that your company still meets its PCR, but falls short of target capital by a significant margin. What actions could the company take in response to this situation and what factors would you consider in making a recommendation to senior management?

Exercise 4

In exercise 3, why might the cost of additional reinsurance be lower than the cost of holding additional capital for insurance risks.

Allocation of capital to business lines

Larger life companies are usually subdivided by business lines for management purposes. Each business line will be given an allocation of capital and be expected to achieve a target return on new investments of capital. If the target return cannot be achieved, the business line would be expected to return capital to a central unallocated pool. It may not always be obvious how capital should be allocated to business lines. In particular, where multiple business lines give rise to diversification benefits, the allocation of these benefits can be fairly subjective.

Distributions of capital and capital raising

A life company will normally have a dividend policy, which specifies how much dividend it expects to pay to shareholders each year. An example of a dividend policy would be an aim of paying a dividend of between 70% and 80% of profits over the medium to long term. A rapidly growing company might aim to pay a lower dividend and retain a higher proportion of its profits in order to fund its future capital requirements. However, if dividends are too low relative to earnings, a life company may not be able to distribute all of its franking credits. Franking credits are valuable to Australian shareholders, but they can only be distributed via franked dividends.

A dividend policy would normally have regard to the position of the life company's capital base relative to its PCR and target capital. If the capital base is less than target capital, but still well above PCR, dividends might be reduced. If the shortfall relative to target capital becomes serious, there would be a point at which payment of dividends should be suspended.

LPS 110 requires a life company to obtain APRA approval for any reduction in its capital base. This includes the payment of a dividend that exceeds after-tax earnings. This requirement applies even if a life company is in a very strong financial position, although in this situation APRA is unlikely to withhold its approval.

If a life company is growing rapidly, it may need to raise additional capital. As part of its ICAAP, a life company should estimate its future capital needs and plan for future capital raisings if there is a possibility they will be necessary.

A life company will also need to regularly review the capital positions of each of its funds. Transfers would be made from funds with excess capital to funds that have less than their target capital.

Sections 62 and 63 of the Life Insurance Act prevent a distribution of shareholders' retained profits or capital from being made if a statutory fund would fail to meet its PCR following the distribution. It is because of this restriction that APRA requires PCRs to be calculated separately for each statutory fund as if they were stand-alone entities. Diversification benefits between funds cannot be recognised as it would not be possible to transfer assets between two funds if both funds had capital bases equal to their PCRs.

There is a further regulatory restriction on distributions which does not relate to capital requirements. LPS 600 prevents a distribution of shareholders' retained profits (Australian participating) if there is not at the same time a distribution of Australian policy owners' retained profits and the remaining shareholders' retained profits (Australian participating) is less than 25% of the remaining Australian policy owners' retained profits. The aim of this requirement is to maintain the ratio of shareholders' to policy owners' retained profits at the appropriate level, which cannot be less than 20:80. If the ratio was less than this, shareholders' could be allocated an excessive proportion of the investment earnings on the assets backing retained profits.

Stress testing

APRA expects stress and scenario testing to be used both in setting a life company's risk appetite and in developing target capital levels. It should form part of the life company's ICAAP. It should also play a key role in determining a life company's reinsurance strategy and investment policy.

A scenario would typically combine several different types of risk, such as an increase in claims, a fall in equity and property markets, adverse movements in interest rates and foreign currency exchange rates and a reduction in new business volumes. Actual scenarios that have happened in the past can be a useful guide.

It can also be a useful exercise to devise scenarios that would lead to a breach of PCR or the insolvency of a life company. These scenarios can help management and boards to gain an understanding of the severity of events that would lead to these outcomes and plan their response should such scenarios actually occur.

Regulation of holding companies

Most life companies operating in Australia today are wholly-owned by holding companies. The financial strength of the holding company can affect the financial strength of the life company, as the holding company is often the only readily available source of new share capital.

Section 28A of the Life Insurance Act gives APRA the power to register non-operating holding companies (NOHCs). Section 21 of the Act allows APRA to refuse to register a life company if it has a NOHC that is not also registered under the Act. These sections give APRA the ability to regulate the NOHCs of life companies. The prudential standards for life insurance NOHCs currently extend to governance and fit and proper, but not to capital requirements.

In APRA's regulatory framework, Level 1 refers to individual operating entities authorised by APRA, such as life companies, general insurers and banks. Level 2 refers to groups of companies that operate primarily within a single industry, including life companies and their NOHCs.

APRA's prudential supervision framework extends to conglomerate groups that have material operations in more than one APRA-regulated industry and/or have one or more material unregulated entities. These are known as "Level 3 groups". Examples of conglomerate groups containing life companies include the groups headed by the major Australian banks.

The contagion effects of a possible weakness of a member of a group may threaten the position of APRA-regulated entities within the group, even if these entities are prudentially sound. As group structures become larger, more complex and sometimes opaque, the risk of contagion within a group increases, as does the systemic impact of a failure of the group. The lessons of the global financial crisis, particularly the difficulties of the American International Group (AIG) and a number of European bancassurance groups, demonstrate that a failure to adequately regulate conglomerate groups can have serious consequences.

Details of APRA's Level 3 capital standards are beyond the scope of this course, however students need to be aware of the existence of these standards.

Example of a life company failure

On 28 September 1990, a fraudulent transaction was completed whereby $65 million was removed from the statutory funds of the Occidental and Regal life companies. The fraudulent transaction was in relation to an attempted sale of both life companies by their parent. Both life companies were already in a weak position. The parent company was also in some financial difficulty and could not continue to support the life companies with sufficient capital.

Both life companies had grown rapidly during the late 1980's and were subject to financial pressures on a number of fronts. These included:

- large exposures to unlisted assets such as properties and loans;
- expense overruns, low profitability and high growth of new business; and
- excessive distributions to participating policy owners in order to grow market share.

These problems were inter-related. Adequate profits could only be achieved if unit costs were kept down. Low unit costs could only be achieved through high new business growth. High new business growth could only be achieved if crediting and bonus rates were kept competitive. High crediting rates could only be afforded if high investment returns were achieved by investing in risky assets.

The reasons for the expense overruns included:

- too many products for efficient management. New products had been developed at frequent intervals and in multiple versions. While there were substantial volumes of business written for some products, there were many other products with non-viable volumes. The products were generally not designed in a manner which permitted later merger and upgrades of old products;
- continuing difficulties in maintaining and upgrading computer systems;

- products were sold via independent agents who received generous remuneration, including attendance at high cost conventions and other non-commission benefits;
- the head office accommodation of both companies was particularly lavish.

The acquisition of both companies by the same parent in the late 1980s had achieved little in the way of expense savings because the two companies had very different computer systems, products, commission bases and market segments.

On 25 October 1990, the Deputy Commissioner of Life Insurance in the ISC (the predecessor of APRA) was appointed as an Inspector to both companies. Immediately the ISC issued the following directives to the companies using its powers under the Life Insurance Act 1945:

- cease issue of new business;
- no board meetings without ISC presence;
- bank account signatories to be ISC authorised;
- persons investing funds to be ISC authorised;
- all new business premiums received to be refunded; and
- payment of surrender values to be suspended

On 31 October the ISC applied for the appointment of a Judicial Manager under the Life Act, and on 7 November a Judicial Manager was appointed by the Federal Court.

The Judicial Manager arranged the sale and transfer of the risk business of both companies to another life company in February 1991. Prior to this transfer occurring, there was a significant amount of "twisting" of risk business to other life insurers. This made the situation of the two life companies worse.

The payment of surrender values for investment policies continued to be suspended until after these policies were eventually sold and transferred to another life company in October 1992. A major effort was required during the period of the judicial management to correct the basic policy data records to the point where they could be transferred to another company.

Ultimately, most policyholders received the full value of their policies, and many reforms were included in the Life Insurance Act 1995 in response to the Occidental and Regal failures.

The Australian government enacted legislation in early 1992 which gave it the power to raise a levy from the life insurance industry to compensate Occidental and Regal policy owners for their losses. A levy was not ultimately needed and the act allowing it was repealed in 1994.

Historical background

Capital requirements for Australian life companies have evolved over many years in response to financial crises, the introduction of new types of products, developments in the regulation of overseas life insurance markets and a trend towards increasing sophistication in financial reporting and capital management.

Each financial crisis tends to have different features. For example, one of the most notable features of the global financial crisis which commenced in 2007 was the extreme increase in credit spreads for fixed interest assets. Increases of this magnitude

had not been seen previously. If earlier versions of capital standards had included credit spread stresses of this size, the standards would have been criticised as being unrealistically severe. It is difficult to anticipate what might happen during future crises, so capital standards tend to evolve in response to actual events.

APRA's current capital standards became effective on 1 January 2013. The previous capital standards that applied from 1995 to 2012 were known as the solvency and capital adequacy requirements. The capital adequacy requirement was the higher of the two. Life companies were expected to comply with both requirements at all times. The consequences of a breach of the solvency requirement were more severe than for a breach of the capital adequacy requirements. The dual requirements created significant additional reporting work for actuaries and life companies. This was one of the reasons why APRA replaced the solvency and capital adequacy requirements with a single requirement in the form of the PCR.

The solvency and capital adequacy requirements were also less risk-sensitive than the current capital standards. For example, APRA did not have the ability to apply a supervisory adjustment, and there were no explicit capital charges for operational risks (except for investment-linked business), inflation risk or pandemic risk. Prior to 1995, the capital standards for life companies were far less sophisticated, relying on the use of a conservative net premium valuation basis for traditional participating business and simple margins added to the liabilities for other types of business. The problem with simple but conservative methods for measuring capital adequacy is that they may not adequately recognise all material risks and they do not give an accurate measure of the overall financial strength of a life company.

Solutions to the Exercises

Exercise 1

The size of the insurance risk charge will depend on a number of factors. The random stress will depend on the number of lives insured and the distribution of sums insured (net of reinsurance). The future stress will depend on the adequacy of experience investigations and the potential for changes in trends. The relative impact of the event stress will depend on the age distribution of the lives insured.

A fund with exposure to both mortality and morbidity risks will gain diversification benefits that are not available to a fund with exposure to a single type of risk.

If products can be repriced at short notice, the insurance risk charge may be reduced. Some products might only allow for premium rates to be changed on a policy anniversary, and a notice period may have to be given to policy owners. Some products may have a guarantee that premiums will never be increased.

If there is a substantial margin between premium rates and best estimate claims and servicing expenses, it is possible that premiums will exceed the stressed claims and expenses for the first 12 months as well as in following periods. A net cash inflow to the company from active lives during the first 12 months can be offset against the stresses to termination values for IBNR, RBNA and disability claims in course of payment. This may lead to the insurance risk charge being zero. This outcome is more likely for individual risk business than for group risk business. Individual business typically has greater margins built into the premium rates due to the need to recover the higher acquisition costs. A zero insurance risk charge is also more likely for mortality risks than for morbidity risks as termination values tend to be less significant for policies with mortality risks – there are no claims in course of payment, and death claims are reported and settled much faster than disability claims.

Students should experiment with the example in the spreadsheet to see how varying the assumptions can result in a zero insurance risk charge.

Exercise 2

A larger pool of insured lives would reduce the random and future stresses for the insurance risk charge, and also possibly the lapse stress. If the insurance risk charge was negative for one fund (before applying the minimum of zero), it could be offset against a positive insurance risk charge for the other fund.

Combining statutory funds might produce a greater diversification of asset risks. In particular, if the two funds are at risk from movements in opposing directions for real interest rates, expected inflation or currency, combining the two funds will allow risks to be offset.

Combining statutory funds might increase the overall aggregation benefit.

The asset concentration risk charge is likely to be smaller (if it is not already zero) as the limits will be based on the assets of the combined statutory funds.

The "change component" of the operational risk charge will increase for the first 12 months following the merger due to the increase in premiums and/or policy liabilities in the merged fund (although APRA might give relief to the life company from this requirement if there was no real increase in operational risks as a result of the merger). Subsequently, the volatility of the "change component" of the operational risk charge should be reduced by combining statutory funds. If one of the original funds was growing rapidly, whilst the other was declining, the combined fund would be more stable and the "change component" would be more likely to be zero.

Exercise 3

You will use models to project the future capital position of the company under different scenarios. You will also need to investigate the impact on profits and appraisal value of different courses of action.

Possible actions include:

- do nothing, but recognise that there will be an increased risk of breaching PCR in the short to medium term. There may also be consequences for sales of new business and persistency of existing business if the company is recognised as being weakly capitalised by market participants. The risk and consequences of a downgrade by ratings agencies would need to be considered.
- raise additional capital. Further investigation would be required as to the best way of raising capital – there are different types of Tier 1 and Tier 2 capital instruments that could be issued and they have differing costs.
- dividends could be reduced over the short to medium term. However, this may disappoint investors and lead to weakness in the company's share price.
- new business targets could be scaled back, or the company could reduce its capital utilisation by selling less capital intensive products.
- profitability could be enhanced by increasing premium rates and fees. The feasibility of this option will depend on the company's competitive position. It is more likely to be feasible if other companies also raise their premium rates and fees in response to APRA's changes.
- increase the company's use of reinsurance. The company will need to balance the cost of holding additional capital with the cost of reinsurance. It might be

possible to design a reinsurance program so that the cost of reinsurance is lower than the cost of holding additional capital.

- change investment policy with the aim of reducing the asset risk charge. This is likely to reduce expected profits, but is also likely to reduce the volatility of profits. Policy owners' reasonable expectations would need to be considered if any changes to investment policy affected participating or discretionary investment business.
- if the company would have an asset concentration risk charge, changes to asset exposures should be made so that this charge is eliminated.

Exercise 4

A reinsurer might have lower stress margins than a direct insurer in respect of the random and future stresses because these stress margins are partly dependent on the number of lives insured. Australian reinsurers retrocede a significant portion of their business to their overseas parents. These global reinsurance groups could have proportionately lower capital requirements than Australian direct insurers simply because of their greater size. It is also possible that foreign regulatory capital requirements could be lower than those applying in Australia. If reinsurers have a lower cost of capital than Australian direct insurers, they might choose to pass these savings on through lower reinsurance premiums. This is more likely to occur at times when the reinsurance market is competitive and price sensitive.