**Chapter 21 Valuation of Policy Liability**

**21.1 Introduction**

General purpose financial statement 🡺 Australian Securities and Investments Commission (ASIC)

The financial statements 🡺 APRA, used for APRA’s prudential supervision processes.

Both statements are made publicly available.

AASB 1038 / Life Insurance Act (LPS 340): valuing insurance contract policy liability

**21.3 Valuation Principles**

• The profit of a life insurance company for a particular period is:

* net cash flows (premiums and investment income less claim payments, expenses and tax)
* less increase in policy liabilities.

*The liability for future cash flows associated with policies must be calculated on a best estimate basis. They must not be deliberately over or under estimated.*

*Revenue and expenses must be recognized as services are provided to policy owners, not at the time that revenue is received or expenses paid. [Exception]: if a policy is expected to make future losses, these losses must be recognized immediately.*

**21.4 Contract Types**

• Insurance contracts include:

* participating business (traditional and investment account)
* non-participating investment account business with a discretionary participation feature
* lifetime annuities
* term insurance
* disability income insurance
* group life insurance
* group salary continuance

*Participating business and discretionary non-participating investment account business are always treated as insurance contracts, even though they may not have significant insurance risk.*

• Investment contracts include:

* investment account business without a discretionary participation feature (i.e. the life company has no discretion is setting the crediting rates)
* investment-linked business
* term annuities

*The accounting treatment for investment contracts is the same, regardless of what type of company issues them.*

**21.5 Valuation of Insurance Contract Liabilities**

**• The Margin on Service has** **the following characteristics:**

* **Objectives** of the MoS approach to reporting profits are to recognise profits as they are earned with a degree of smoothing over periods.
* Valuation method changes the timing of the release of profits not the quantum. The quantum of profit depends upon the income, expenses and claims over the life of the policies not what is assumed in the valuation basis.
* Profit margin will be expressed in terms of a profit carrier.
* If a product group becomes loss making then the future losses are capitalized at once.
* Changes in assumptions are not (other than market related changes in economic assumptions or for a product group in loss recognition) capitalized but are spread over the future by adjusting the profit margin (so that the policy liability remains unchanged).
* Smoothing of MoS profits may mean that substantial changes in the business may not be immediately apparent such as an increase in sales levels may have an immaterial impact on the MoS profits recorded. This could delay management taking timely actions to arrest a change in the profit position in the longer term especially with a new line of business.
* The profit determined may not necessarily be identical to that available to be distributed (as the local regulations may specify a different approach to be used)

**• The policy liability has the following components** *(when not in loss recognition)***:**

* **the best estimate liability**

***BEL*** *= PV of future net cash flows (claims or benefits plus expenses less premiums, with interest on CFs), but excluding future bonuses.*

*Future bonuses and shareholder profits are included in the policy liability so that profit is not recognised prematurely, before services have been provided.*

*For an in-force portfolio the best estimate liability may also include the termination values i.e. IBNR and DLR for risk business.*

* **plus the PV of future best estimate shareholder profits** (cannot be < 0)
* **plus the PV of future best estimate bonuses (for Par business only,** cannot be < 0**)**

21.5.1 Asymmetric risks (need stochastic modelling)

• Examples of asymmetries found in life insurance contracts include:

* Guaranteed minimum surrender and maturity values in participating business and discretionary non-participating business: future bonuses or interest credits can be added to policy values, but cannot subsequently be taken away if investment losses occur.
* Profit sharing formulae for group risk business: a profit share rebate will be paid to the policy owner if experience is good but the rebate cannot fall below zero if experience is bad.

21.5.2 Expense Allocation

“One-off” expenses are deducted from profits, but unlike other types of expenses they do not have to be considered when calculating the policy liabilities.

Under Section 80 of the Life Insurance Act 1995,

21.5.3 Profit Emergence

Profit carrier examples:

* Term insurance: expected death claims
* Disability or trauma insurance the expected cost of claims or premiums.

*Considerations must also be made on whether the premiums are on a stepped or level basis as for level business normally the projected premiums in the earlier years are higher than the claims (and lower in the latter years) where using premiums as a carrier may prematurely release profit;*

* Lifetime annuities: expected annuity payments;
* Participating business: future bonuses as the main service is the payment of bonuses.

21.5.4 Loss Recognition

**•** A policy will be loss-making if the BEL at commencement (before any cash flows occur) is greater than zero. (i.e. PV of claims and expenses will exceed the PV of premiums.)

In this circumstance the PL at commencement will be set to equal the BEL as the value of future profits is zero.

In practice, this adjustment is done for a **Related Product Group** rather than an individual policy.

**•** For participating business, the value of future profits can be less than 0, but cannot be less than the difference between the BEL calculated using a risk-free discount rate and the actual BEL. In other words, Policy Liability (= actual BEL + the value of future profits) must larger than the BEL @ RFR.

21.5.5 No Profit at Commencement

**• PL at commencement (before any cash flows occur) must be zero**. This means that the value of future shareholder profits and bonuses must equal the absolute value of the best estimate liability. 🡺 ***BEL + PV S/h profits (+ PV bonuses) = 0 if BEL is negative.***

**•** The profit margin is the value of best estimate shareholder profits divided by the value of the profit carrier. After the policy commences, the value of future shareholder profits will be the profit margin multiplied by the value of the profit carrier.

***• Profit = NCF + Release of PL + Interest (on PL and CFs),*** *OR*

***= Profit Margin \* Profit Carrier***

*Gross Profit = Profit + interest on DAC (i.e. negative PL < 0) (see 2015 S2 2b)*

• If in loss recognition, **need to write off all the DAC in reported profit**.

Profit can be from the release of capital and the interest on it.

***• Distributable Profit = Profit + Release of PCR & Target Surplus + Interest (****on PCR&TS****)***

**21.5.6 Assumption Changes** 🡺 PL should not be changed unless discount rate changes

**•** In order for the policy liability to be kept constant when assumptions are changed, the value of future profits and bonuses must be adjusted. This is achieved by recalculating the profit margins.

***Steps for recalculating the profit*** ***margins***

*1) PL = old BEL + old PV of future profits and bonuses, both using new discount rate*

*2) Calculate the new NCF and BEL based on the new BE & economic assumptions*

*3) Calculate the new PV of future profits and bonuses = PL – new BEL as PL should remain unchanged.*

*4) Calculate the new profit margin = new PV S/h profits and bonuses / (new) PV Carrier*

***Exceptions***

* *An exception is made for market-related changes to the discount rate and other economic assumptions such as inflation rates. Policy liabilities must change to reflect changes to discount rates.*
* *There is also an exception for policies that are already in loss-recognition. If a policy has recognised losses, the value of future shareholder profits included in the policy liability is zero.*
* *It is acceptable for changes to assumptions affecting incurred but not reported claims (IBNR reserves) and disability claims in course of payment (CICP or DLR reserves) to result in an immediate change to the policy liabilities. The rationale for allowing these assumption changes to affect policy liabilities is that the profit margins for these policies were released at the time that claims were incurred (or if premiums are the profit carrier, when premiums were paid).*

**21.6 Discount Rates**

• If the policy benefits depend on the performance of the assets (e.g. participating business and discretionary non-participating business), the discount rate must reflect the expected investment returns. This allows profit to emerge in line with investment returns. The policy liability cannot be less than if it was calculated using a risk-free discount rate.

• For policies, whose benefits do not depend on investment performance, the discount rate must be a risk-free rate. The risk-free discount rate measures the time value of money. Use of a risk-free rate, rather than an expected investment return, ensures that the value of the liabilities is independent of the assets held.

21.6.1 Related Product Groups

• LPS 340 allows profit margins to be calculated at “related product group” level.

• **RPG** is a group of products with **similar benefit characteristics** and **pricing structures.**

• Records of cumulative capitalised losses must be kept for each RPG. Sales of profitable new business can reduce existing cumulative capitalised losses.

21.6.2. Accumulation Methods

• LPS 340 allows life companies to use a simpler method for calculating policy liabilities if the results will not be materially different from those obtained under the projection method.

• LPS 340 does not specify in detail how an accumulation method should work.

• The accumulation method is commonly used for valuing the policy liabilities for group risk. This business is typically short-term with low acquisition costs, in contrast to individual risk business, which is typically long-term with high acquisition costs.

• For group risk business, the policy liabilities determined under an accumulation method must have the following components in order to give similar results to the projection method:

* **unearned premium reserve or UPR** (this is the portion of the last premium payment that represents payment for insurance risks after the calculation date)
* plus ***claim reserves = IBNR + RBNA + CICP*** (incurred but not reported claims, reported but not admitted claims and disability claims in course of payment)
* less **deferred acquisition recovery cost component** .

***i.e. PL = UPR + claim reserves – DAC*** *(when not in loss recognition)*

• LPS 340 requires that **DAC** be run-off in line with the acquisition cost recovery carrier. The carrier must reflect the method the company uses to recover acquisition costs. For group risk business, the acquisition cost recovery carrier will most likely be premiums as part of each premium will, in effect, include an allowance for the recovery of the acquisition costs.

**\**N.B.*** *the value of the acquisition expense carrier at any point in time includes UPR.*

• DAC recoverability test (P19)

21.6.3 Claims Reserves

• Must be included in the PL under both the projection and accumulation methods. If the projection method is used, these claims reserves will form part of the best estimate liability.

• **Claims reserves** include reserves for:

* incurred but not reported claims (IBNR)
* reported but not admitted claims (RBNA or pending)
* disability income claims in course of payment (CICP or DLR).

*\*Detailed explanations in P21.*

**21.6.4 Participating Business**

• The policy liabilities for participating business include an additional component for the value of future best estimate bonuses, which are the portion of future profits that will be allocated to participating policy owners.

• For participating business, actual investment experience is retained within the PL, rather than being allowed to emerge as an experience profit 🡺 *otherwise profit may be volatile*.

• Adequacy threshold: the policy liability equals the best estimate liability calculated using a risk-free discount rate.

• The PL at the end of the year is calculated as:

* value of supporting assets (VSA)
* less the cost of the current year best estimate bonus (for the policies still in force)
* less the shareholder profit margin on that bonus

***i.e. PL = VSA – Cost of Bonus – S/h profit margin on that bonus*** *(when not in loss recognition), where*

***VSA = BEL(****excluding future bonus****) + PV of future & current period BE bonuses + PV of future & current period shareholder profits (****25% PV of future cost of bonus****)***

• The **VSA** at a reporting date is calculated as: (P22)

* *PL at the end of the previous reporting period*
* *plus the cost of declared bonuses at the end of the previous period*
* *plus the actual policy related cash flows and investment experience1*
* *less the expected shareholder profits emerging over the period (on interim and terminal bonuses for policies terminating during the year)*
* *less the non-investment experience profit2*

1) Investment experience (**Investment experience profit or loss, absorbed in VSA**)

▲ The VSA incorporates actual investment returns. Differences between actual and expected investment returns affect the current year best estimate bonus and the value of the future best estimate bonuses within the policy liabilities.

▲ Investment experience does not emerge as an experience profit in the current year.

2) Non-investment experience

▲ The non-investment experience profit includes differences between actual and expected experience for expenses, mortality and withdrawals.

▲ The non-investment experience profit is deducted from the VSA and therefore emerges as an experience profit in the reporting year whereas investment experience is retained within the VSA.

▲ Non-investment experience does **not** directly affect best estimate bonuses and shareholder profits whereas investment experience does.

▲ However, all experience (investment and non-investment) will flow through the bonus declaration mechanism and impact future declared bonuses and distributions of shareholder profits.

• For participating business, current year best estimate bonuses and shareholder profit can be determined using:

* *either* the best estimates of future experience as at the current reporting date
* *or* the best estimates at the previous reporting date
* *or* the actual investment return for the current year, rather than the expected return.

• For non-participating business, assumptions changes (other than the discount rate and related economic assumptions) have no impact on profit emerging from existing business in the current year, other than through loss recognition or reversal.

• A practical method of determining best estimate bonuses is to assume the latest declared terminal bonus rates remain unchanged and solve for the best estimate reversionary bonus rates that equate the present values of future cash flows (including future reversionary and terminal bonuses) to the policy liability. See in excel examples <Ex3-Par Liability>.

**• Allocation of Profits**

The total profit emerging during a reporting period comprises:

* *cost of best estimate bonus*
* *best estimate shareholder profit*
* *experience profits*
* *investment return on assets in excess of PL (capital and retained profits)*

The maximum allocation to shareholders is 20% of total profit or 25% of the profit allocated to policy owners. The declaration of a bonus is treated as a distribution from policy owners’ retained profits.

**•** The cost of bonuses is the surrender value of a reversionary bonus, or the actual amount paid to terminating policy owners for interim and terminal bonuses. This will differ from the PV of the bonus (i.e. the value of the increase in future benefit payments on a BE basis).

• Policy owners’ retained profits (P24)

Life Insurance Act (LPS 340): can become negative

AASB 1038: cannot become negative, recognised as an expense (loss)

21.6.5 Non-participating Business Entitled to Discretionary Additions

• The most common example of this type of business is **investment account policies** where the assets backing the policies are very short-term fixed interest assets. These policies are classified as non-participating according to APRA prudential standard LPS 600 because the account balances will never be less than 95% or more than 103% of the value of the assets backing the policies.

• Valued in the same way as participating business. However, because they are non-participating there is no allocation of profit to policy owners and no distribution of profit to policies.

• PL for this type of business are usually determined using an accumulation approach as:

* *total investment account balances*
* *plus investment fluctuation reserve*
* *less deferred acquisition costs*

***i.e. PL = Account Balance + Investment Fluctuation Reserve – DAC*** *(if not in loss recognition)*

• **Investment Fluctuation Reserve:**The difference between the actual investment return (net of fees and tax) and the crediting rate for a period is added to the investment fluctuation reserve. The difference can be positive or negative.

• A change to the crediting rate does not affect profit, unless the business is in loss recognition.

21.6.6 Reinsurance

PL is measured gross of reinsurance. If a company reinsures some of its business, the reinsurance is measured as if it were a negative policy liability, which consists of a reinsured best estimate liability and value of reinsured best estimate shareholder profits.

The negative reinsured policy liability is shown as a positive reinsurance asset in the company’s financial statements.

21.6.7 Sources of Profit

Profit under Margin on Services emerges from 3 sources:

* *release of profit margins included in PL*
* *investment earnings on assets in excess of policy liabilities (policy owners’ retained profits, shareholders’ capital and shareholders’ retained profits)*
* *experience gains and losses arising from experience differing from the valuation assumptions*

**21.7 Valuation of Investment Contract Liabilities**

• LPS 340 defines the policy liability for a life investment contract to be the sum of (*P26*):

* *the life investment contract liability (must be determined at “fair value”)*
* *the management services element*

***i.e. PL = LICL + MSE*** *(if in loss recognition, say future expense outflows exceed fee inflows,* ***PL******= Account Balance + Future Loss****, which is the negative PV of fee less expense)*

• **DAC**: The amount of acquisition expenses that can be deferred is restricted to incremental expenses: expenses that would be avoided if policy had not been sold (e.g. commission).

It is different for life insurance contracts where all acquisition costs are deferred. As a consequence, a loss can be reported for life investment contracts at commencement, even though the contract may be expected to be profitable in subsequent periods.

21.7.1 Investment-linked and Investment Account Business

• **LICL** = **value of units** for investment-linked policies **= premium + investment return - fees**

*or* **the account balance** for investment account policies

• **MSE** = the value of deferred entry fee revenue *-* DAC

• A limited form of projection may be required in order to amortise any deferred entry fee revenue or deferred acquisition costs. This projection may **not** need to be done at individual policy level.

• If assumptions are changed, the amount of deferred acquisition costs or deferred fee revenue stays the same (unless the contract becomes onerous) but the rate of future amortization will change. This is analogous to the way assumption changes are treated for life insurance contracts.

21.7.2 Term Annuities

• **LICL** = PV of the annuity payments.

• **MSE** = the value of future maintenance expenses and a profit margin in respect of services not yet provided.

• Individual policy projections are needed to calculate policy liabilities for term annuities.

21.7.3 Discount Rates for Life Investment Contracts

• Discount rates for life investment contracts are not required to be risk-free. Instead, they must be consistent with the determination of liabilities at fair value. This means the discount rate could be higher or lower than the risk-free rate.

• A potential method for setting the discount rate for term annuities would be to use the market yields for highly rated corporate bonds of similar maturity.

**21.9 Worked Examples**

Assumption change 🡺 PL doesn't change unless discount rate changes

***Steps:***

1) Revaluate BEL1, PV of future profit1, by using old profit margin, profit carrier and new discount rate

2) Calculate BEL2 under new assumptions

3) Calculate PV of future profit2 = BEL1 + PV of future profit1 - BEL2

4) Calculate the new profit margin = PV of future profit2 / value pf profit carrier2

**Chapter 22 Liability Valuation Methods**

**22.8 Other Valuation Methods**

The differences between methods generally revolve around the following key issues:

* *timing of profit recognition*
* *degree of conservatism*
* *deferral of acquisition costs*
* *treatment of assumption changes*
* *treatment of participating business*

**IFRS 17 vs Current Australian standards**

**Chapter 23 Valuation and Investment of Assets**

**23.3 Valuing Assets in Statutory Funds**

For APRA reporting purposes, all changes in fair values must be reported through profit and loss.

For most assets that back insurance liabilities, the accounting standards require changes in fair value to be included in profit or loss. There are some exceptions, such as owner-occupied property, where increases in value must be reported as “other comprehensive income” which does not form part of the reported profit.

This can result in discrepancies between the profit reported to APRA and profit reported under the accounting standards.

23.3.1 Fair value

• The fair value of an asset is the amount for which an asset could be exchanged between knowledgeable, willing parties in an arm’s length transaction.

• Fair value is determined after allowing for any transaction costs incurred in purchasing the assets, but before any transaction costs that would be incurred on sale.

• If the market for an asset is not active, fair value must be determined by using a valuation technique, which includes consideration of:

* *recent arm’s length market transactions between knowledgeable, willing parties for identical assets*
* *fair values at the reporting date of other assets that are substantially the same*
* *discounted cash flow analysis*
* *option pricing models*

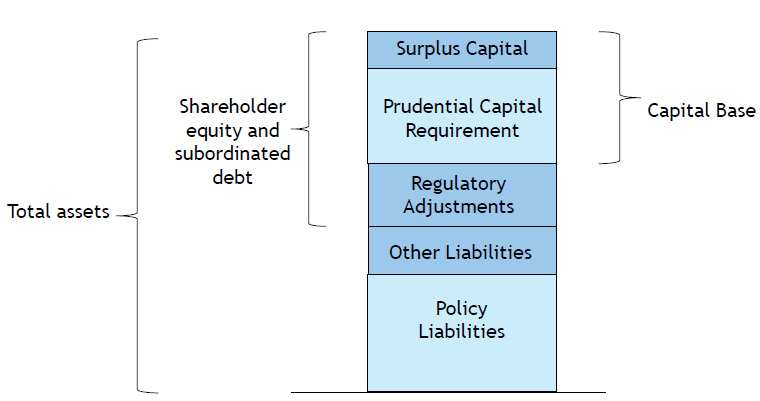
**23.4 Valuing assets in the Shareholders’ Fund**

• Fair value is the most common method of valuing assets in the shareholders’ fund, but some exceptions are allowed under the accounting standards for the general purpose financial statements and for the financial statements prepared for APRA.

• The following types of assets can be valued either at fair value or at cost:

* *investment property*
* *property, plant and equipment (including owner-occupied property)*
* *investments in subsidiaries, associates and joint ventures*

• Fixed interest assets which the company intends to hold (rather than trade) must be normally be valued at amortised cost. However, companies are allowed to use fair value instead of amortised cost if doing so would reduce the potential for accounting mismatches to occur between their assets and liabilities.

**• Assets whose fair value cannot be reasonably measured must be valued at cost.

23.4.1 Cost Method

• The asset value is the purchase price (net of transaction costs) less any subsequent depreciation and impairment charges.

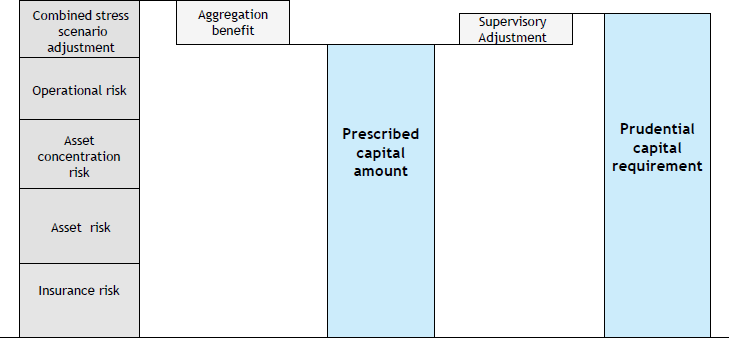
• An impairment charge must be made if fair value subsequently falls below purchase price.

23.4.2 Amortized Cost Method

• The discount rate that equates future cash flows (interest payments and maturity value) to the purchase price is determined at the date of purchase. The same discount rate is then used to measure the value of the asset at all times subsequent to the date of purchase.

• Amortised cost is a useful method for companies whose liabilities are **not** interest sensitive.

***Reason****: By using amortised cost instead of fair value, reported profit is much less sensitive to variation in market interest rates.*

 ***Issue****: However, the balance sheet is less useful as a measure of solvency as the values placed on assets may not reflect their current realisable values.*

• It would **not** be appropriate for the amortised cost method to be used for assets backing insurance liabilities as the value of insurance liabilities depends on prevailing interest rates.

**23.5 Deferred Tax Assets (DTA)**

Each asset has a deferred tax asset or deferred tax liability associated with it, depending on whether the reported value of the asset is lower or higher than its tax base.

**23.6 The Relationship between Assets and Liabilities**

23.6.1 Allocation of Assets to Liabilities

• Assets must be identified as backing specific liabilities in the following circumstances:

* *assets in the Complying Superannuation Pool (i.e. those backing complying superannuation products) and Segregated Exempt Assets (e.g. those backing immediate annuities and other retirement income products) must be identified for taxation purposes*
* *assets backing investment-linked business must be identified for unit pricing purposes*
* *assets backing participating business must be identified so that the investment income can be added to the VSA (Value of Supporting Assets) and profit apportioned between shareholders and policy owners*
* *assets backing other discretionary investment business must be identified so that the investment income can be allocated to policy owner accounts (by means of a crediting rate) and to/from the investment fluctuation reserve*

• It may be useful to identify separate pools of assets for term and lifetime annuities. This will allow investment income to be allocated appropriately and allow profit to be analysed separately for each product.

23.6.2 Investment Policy

Consideration/financial objectives when choosing assets:

* *minimising regulatory capital requirements;*
* *maximising appraisal value*
* *maximising expected return on capital (i.e. profit divided by capital)*
* *minimising profit volatility*
* *chosen with regard to policy owner reasonable expectations*

23.6.3 Matching Assets and Liabilities

|  |  |
| --- | --- |
| **Product** | **Matching Assets** |
| Term annuity | A portfolio of high quality fixed interest assets with cash flows that match the annuity cash flows. |
| Participating business with future best estimate bonuses and shareholder profits at the adequacy threshold | High quality fixed interest assets with cash flows that match the expected payments of the sums insured and reversionary bonuses.  Other assets could be chosen to match the additional liability if the adequacy threshold is exceeded. |

23.6.4 Other Assets

**Traditional asset classes**:

* *Australian/international shares,*
* *direct property*
* *listed property trusts*
* *government bonds*
* *corporate bonds*

**Other investments**:

* *residential and commercial mortgages*
* *infrastructure*
* *private equity*
* *hedge funds*
* *joint ventures/subsidiary companies*

• **Mismatching** should increase the expected amount of future investment experience profits. However it will also increase the company’s capital requirements and the volatility of future profits.

23.6.5 Replicating Portfolios (P61) – market variables & non-market variables

**Chapter 24 Capital Management**

**24.3 Minimum Capital Requirements**

24.3.1 Introduction

• **Prudential Capital Requirement (PCR):** APRA’s minimum capital requirement for life companies. Each statutory fund and the shareholders’ fund must have a capital base that exceeds the PCR of the fund at all times.

• The PCR is intended to provide a 99.5 percent 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 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.

• Components of balance sheet:

• Components of PCR:

24.3.2 VaR and TailVaR

PCR is an example of VaR.

*Weakness: ignore size of losses in tail of the loss distribution beyond 99.5% confidence level.*

24.3.3 What could happen to a life company with insufficient capital?

• The options available to a life company with a statutory fund or shareholders’ fund that breaches PCR:

1. *raising additional capital from outside the company*
2. *transfer of surplus assets from another fund*
3. *closure of the fund to new business 🡺 reduce capital strain*
4. *de-risking the fund 🡺 shift to less risky assets; purchase derivatives / reinsurance*

• **Judicial manager**:

* 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. A judicial manager effectively takes over the day to day management of the company from the board and senior managers.
* Section 175 of the Life Insurance Act lists the courses of action that the judicial manager can recommend to the court. These can include:

*i. recapitalization*

*ii. transfer of liabilities to another insurer*

*iii. the wind-up of the life company (the least desirable) P71*

• There are **no** statutory arrangements for providing compensation to policy owners for their losses if a life company fails, but for depositors of banks and the p/h of general insurers.

24.3.4 APRA’s Three Pillars of Supervision

**Pillar 1:** 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 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.*
* *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: (P72)*

***\*supervisory adjustment*** *is not allowed to be disclosed because the market or public may interpret it incorrectly and this could cause a loss of confidence in the insurer (e.g. resulting in higher lapses) and possibly for the industry as a whole.*

**Pillar 3:** the disclosure requirements.

* *APRA does not allow life companies to disclose supervisory adjustments. The PCR must always remain confidential.*
* *AASB 1038 requires life companies to disclose the regulatory capital position of each statutory fund (before supervisory adjustments).*

**24.4 Capital Base**

**The capital base** of a life company is the sum of Tier 1 capital and Tier 2 capital, where:

*- Tier 1 Capital: Eligible capital provided by shareholders = CET1 + AT1*

*- Tier 2 Capital: Subordinated debt.*

***Capital Base = Total Assets – Total Liabilities – Regulatory Adjustments +Tier 2 Capital***

***= Net Assets – Regulatory Adjustments\* +Tier 2 Capital****(not allowed in s/h fund)*

***>******PCR (****which means Net Asset should > PCR + Regulatory Adjustments****)***

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.

**24.4.1 Common Equity Tier 1 Capital** (P73)

• **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.

• APRA requires that CET1 be at least 60% of a life company’s PCA at all times.

• 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

**Adjusted policy liabilities:**

A **regulatory adjustment\*** to CET1 **must** be made by adjusting the policy liabilities.

**\*regulatory adjustment = Adjusted PL – PL(*both values net of reinsurance*)+DTA +DAC**

These adjustments:

* act to reverse out any of the negative policy liabilities in the company’s balance sheet – i.e. the capital calculation does not take into account future profits (or DAC)
* allow expected reserves for future shareholder profits to be removed from policy liabilities and included in CET1
* apply a minimum liability equal to the “termination value” of policies

\****Termination values****:* an approximation to the liabilities to policy owners in the event of the company being wound-up.

**1) Non participating policies without discretionary additions**

**Adjusted policy liabilities** = the greater of the risk-free best estimate liabilities (**RFBEL**) and the termination values, where:

* *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******= CICP + IBNR + RBNA + DLR + UPR + Surrender Value****, i.e. PV 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 termination value (and hence the adjusted policy liability) for the YRT business is assumed to be zero.*
* ***The RFBEL*** *(includes IBNR) 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 (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). 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****.*

***\* For example, Adjusted PL = max (RFBEL for all policies, minimum termination value)***

***= max (Active Lives RFBEL + IBNR + DLR, IBNR + DLR)***

**2) Non participating policies with entitlement to discretionary additions**

**Adjusted policy liabilities** = the greater of the RFBEL and [sum of the investment fluctuation reserve (if it is greater than zero) and the termination values].

* *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.*
* *This adjustment prevents the IFR from being included in the capital base.*
* *Note that IFR is included in RFBEL but not part of the termination value.*

**3) Participating policies**

**Adjusted policy liabilities** = the greater of the participating policy liability (**PPL**) and the termination values

* *calculated at sub-group level if each sub-group has a different asset allocation for the purpose of determining its bonus rates.*
* ***PPL*** *is similar to the RFBEL but includes the value of future bonuses, including distributions from policy owners’ retained profits.*
* *These adjustments mean that* ***future bonuses and policy owners’ retained profits PRP 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.*

24.4.2 Additional Tier 1 Capital (AT1)

• **AT 1** Capital consists of shareholder capital that has less ability to absorb losses than CET1.

• APRA requires that Tier 1 capital (CET1 + AT1) be at least 80% of a life company’s PCA at all times.

24.4.3 Tier 2 Capital

• 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 amount of Tier 2 Capital that can be included in the capital base is scaled down over the 4 years preceding its maturity date.

• 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.

24.4.4 Statutory funds and shareholders’ funds

• 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.

**• Statutory fund**

* *Net assets of a statutory fund (before the regulatory adjustments) include shareholders’ capital and shareholders’ retained profits.*
* *APRA requires the net assets of a statutory fund (after applying the same regulatory adjustments as apply to CET1) to exceed 80% of PCA at all times.*
* *The capital base (including any Tier 2 Capital of the fund) must exceed the PCR of the fund at all times.*

• **Shareholder’s fund**

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

• 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.

**24.5 Prescribed Capital Amount**

• PCA is determined **separately** for each statutory fund and the shareholders’ fund.

• The PCA for a life company has a **minimum of $10 million**.

• IRC, ARC and ORC are determined **separately** for participating and non-participating business. While aggregation benefit is determined for the whole statutory fund.

24.5.1 Insurance Risk Charge

• Insurance risks include mortality, morbidity, longevity, lapses, servicing expenses and other insurance contingencies such as take-up rates for guaranteed conversion options.

• ***Insurance risk charge*** *(pre-tax)****=Stressed Policy Liabilities – Adjusted Policy Liabilities***, i.e. the reduction in the capital base that would occur if the adjusted policy liabilities were replaced with stressed policy liabilities.

• 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.

• IRC for the YRT business is driven by the time it would take the company to re-price.

• 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.

• APRA specifies 3 different types of stresses that must be applied to the best estimate assumptions – random, event and future stresses

• **AA**: Random, Event and Future **stress margin** **determination** (*2014 S2 1b*)

**1) Random Stress (1 year)**

* *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.*
* *A larger number of lives will result in smaller random claim fluctuations and therefore a lower amount of capital will be required.*
* *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.*

**2) Event Stress (2-year)**

* *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****.*
* *For most companies the event stress is the pandemic scenario.*
* *The pandemic scenario is spread over 2 years.*
* *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.*
* *Selection effects: 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.*

**3) Future Stress (3-year)**

* *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 changes to allowances for future trends in mortality and morbidity experience will have to be made.*
* *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.*

**4) Longevity Stress**

APRA specifies the longevity stress, rather than leaving it to the AA to determine.

**5) 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
* increasing premium rates for non-participating business: increases in fees or premium rates are subject to a minimum 12 month delay.
* *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.*

**6) Diversification**

**7) Expense Stress**

* *The expense stress margin is specified by APRA, instead of being determined by AA.*
* *Management actions, such as reductions in bonus rates or increases in fees or premium rates, can be assumed in response to the expense stress.*
* *There is no adjustment for diversification for the expense stress margin.*

**8) Lapse Stress**

* *The stress margin for lapses must be determined by the actuary.*
* *The lapse margin cannot be set in isolation from other risks.*
* *Diversification of lapse risk with other risks can be allowed for.*

**9) Summary of insurance risk charge calculation (P87)**

24.5.2 Asset Risk Charge

• The asset risk charge reflects the potential losses arising from such risks, including asset/liability mismatch, market and credit risks.

• 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. In other words, there is only a 0.5% probability that a more severe stress could occur.

• Unlike the insurance risk charge, all of the asset risk stresses are specified by APRA.

• **Asset risk charge** = the fall in the capital base of the fund in seven stress tests:

* *real interest rates (bi-directional, i.e. rises and falls)*
* *expected inflation (bi-directional, i.e. rises and falls)*
* *currency (bi-directional, i.e. rises and falls)*
* *equity*
* *property*
* *credit spreads*
* *default*

• **Management actions:**

* *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).*
* *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.*
* *altering the asset exposures of the fund after the stresses have occurred.*

• 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.

24.5.3 Asset Concentration Risk Charge

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.

24.5.4 Operational Risk Charge

• ***ORCR = A × { max(GP1, NL1) + max(0, |GP1 – GP0| – 0.2 x GP0) }***

*where:*

(a) A is 2% for a statutory fund that is a specialist reinsurer and 3% for other funds;

(b) GP1: premium income (gross of reinsurance) for the 12 months ending on the reporting date;

(c) NL1 is the adjusted policy liabilities (net of reinsurance) at the reporting date;

(d) GP0: premium income (gross of reinsurance) for the 12 months ending on the date 12 months prior to the reporting date; and

• 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);*
* *misselling 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.*

• **Operational risk charge** includes 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.

• 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.

• Operational risks can manifest in the form of poor management of investment policy, underwriting and claims administration.

24.5.5 Aggregation Benefit

• ***Aggregation Benefit = (ARC+IRC) – (ARC2+IRC2+2\*correlation\*ARC\*IRC)0.5***

• An explicit allowance for diversification: a correlation factor of 20% is assumed between asset and insurance risks.

• 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.

• 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.

24.5.6 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.

**[Exercise]**

***Why a merger of two statutory funds could reduce the PCR for a life company?***

* 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.

**24.6 Internal Capital Adequacy Assessment**

• APRA requires life companies to have an **Internal Capital Adequacy Assessment Process (ICAAP)**, aimed at ensuring that the capital held is adequate in the context of the risk profile and risk appetite of the life company.

• At a minimum, the ICAAP must include (P96)

• A life company must, on an annual basis, provide a report on the implementation of its ICAAP to APRA. The ICAAP report to APRA must include (P96)

24.6.1 Target Capital

Target capital is the amount of capital that a life insurance company aims to hold over the medium to long term.

The excess of target capital over the PCR is referred to as target surplus.

• It is common practice to set a target surplus amount that is based on the risk appetite of the company. This may be expressed as a probability of not breaching the PCA over a one year timeframe after a stressed event.

• 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*
* *the cost of capital: 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*
* *other companies’ position, remain price competitive*

• A target capital model would normally consider:

* *all the material risks that are currently faced by the entity, including for example strategic and political risks, some of which may not be covered under APRA’s capital standards*
* *how to quantify the probability and impact of these risks, taking into account the underlying probability distributions, correlations between different risk types and how these could interact or break down in extreme scenarios*
* *management actions that are available and able to be taken in case of a deterioration in capital position*
* *how risks could emerge (e.g. a sudden shock or a gradual deterioration), which could affect the timing of the impact of these risks on the capital position and management actions.*

**[Exercise]**

*1) There was a 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?*

**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.

*2) In above exercise, why might the cost of additional reinsurance be lower than the cost of holding additional capital for insurance risks?*

* 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.

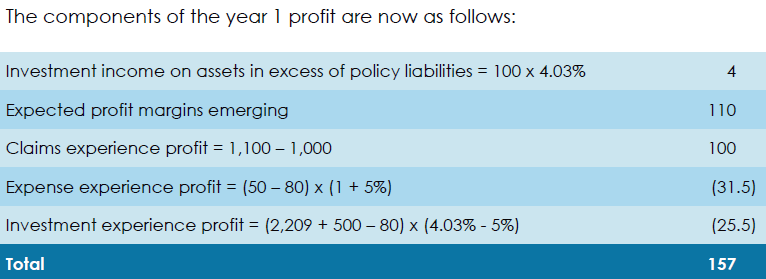
24.6.2 Capital response

A life company’s ICAAP would typically adopt a graduated approach of response actions to protect the company’s capital position should it fall below target capital. These actions might include:

* *adjust dividend policy*
* *reprice existing business*
* *manage the rate at which new business is acquired*
* *change the company’s reinsurance arrangements*
* *adjust the investment asset mix to achieve a change in the company’s risk profile*
* *transfer assets between statutory funds and into (and potentially back from) shareholders’ funds, if available*
* *capital injections from the company’s parent*

24.6.3 Stress testing

Scenario testing is used to assess the vulnerability and resilience of a life company under a severe but plausible scenario.

24.6.5 Distributions of capital and capital raising

• Life Insurance Act prevents 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.

• 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.

**24.7 Regulation of financial conglomerates**

NOHCs: non-operating holding companies (P104)

**24.8 Implications of the capital adequacy standards on the actions of a life company**

**1) New business**

* *The way the product is sold (e.g. the commission structure), which contributes to new business capital strain.*
* *The benefits offered in the product (i.e. product design), which can influence the profile of the capital requirement over the life of the policy.*
* *The expected volume of new sales, which will influence the amount of capital required in the short term (and/or the ability of the life company to pay dividends). Capital may be required for some years to fund new business growth before the business is self-supporting (and/or may be supplemented by ceasing distributions of capital).*

**2) Reinsurance**

* *One primary reason for entering into a reinsurance treaty is often to release capital.*
* *Large initial reinsurance commissions can have the effect of releasing capital immediately.*
* *Consideration needs to be given to the level of exposure a statutory fund has to a single reinsurer, both currently and as anticipated in the future (as this can result in an Asset Concentration Risk Charge, which reduces the effectiveness of the reinsurance from a capital perspective).*

**3) Investment strategies and asset allocations**

* *A life company’s asset and liability management strategy has an impact on the capital that needs to be held (through the asset risk charge). One example of this is deferred or lifetime annuities:*
  + *Due to their expected long term nature, investing in riskier asset is expected on the long term to bring higher returns compared to defensive assets.*
  + *However, doing so would result in a significant amount of capital that needs to be held compared to a portfolio of high quality bonds which are duration-matched to the expected annuity payments.*
* *A life company may not approach investment strategies with solely a view of minimising capital requirement. E.g. an asset/liability mismatch may result in extra investment returns achieved which could increase distributable profit in total over a longer time horizon.*

**4) Assumption setting**

Prior to changing best estimate assumptions, life companies will typically analyse the impact of such changes ahead of time to ensure:

* *The implications on both profit and capital are understood.*
* *There is sufficient capital available so that each statutory fund will maintain capital levels which are within the capital triggers described in the ICAAP (e.g. as related to target surplus) even when the assumptions change (which may require capital injections or transfers between statutory funds ahead of the assumptions being changed).*

**24.9 Example of a life company failure**

The reasons for the expense overruns included:

* *too many products for efficient management;*
* *difficulties in maintaining and upgrading computer systems;*
* *products were sold via independent agents who received generous remuneration*

[APRA’s power under Life Insurance Act 1995] APRA took over the company and:

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

**Chapter 25 Analysis of Profit**

The analysis is not only a test of the valuation assumptions but also a test of the correctness of the calculations.

**25.2 The Approach**

Profit is the movement in asset values less the movement in liabilities.

25.2.1 Step Through Approach (P117) & 25.2.2 Calculation Approach (P120)

**25.3 Analysis of Profit for an Insurance Contract**

P123 a simple example of analysis of profit:

*\*The analysis of profit for participating business can be performed in a similar manner to non-participating business. The main difference is that there is no investment experience profit as actual investment returns are included in the value of supporting assets (VSA) and hence the end of year policy liability.*

**Explain the underlying causes of each of the experience items.**

* **Investment experience**: usually be explained by examining the performance of each of the main asset sectors that the life company invests in. Reports from investment managers can assist in this explanation.
* Changes to discount rates will reflect movements in risk-free interest rates.
* **Claims experience** could be attributable to:
* *random fluctuations / single events causing multiple claims / misestimation of the mean / adverse trends*
* *changes in underwriting or claims management practices*
* *If a life company has high retentions (i.e. low levels of reinsurance), claims experience can be quite volatile as it will be affected by the number of claims incurred for policies with high sums insured.*
* **Expense experience** for a product will depend on the total expenses for the life company, how they are allocated to products and how they are split between acquisition and maintenance categories.
* **Lapse experience:** this may indicate the need for a thorough investigation of lapse experience by various rating factors (distribution channel, benefit type, policy size, etc.) which in turn may feed into a revision of the premium rates, charges and commissions.
* **Operational issues:**
* *previously undiscovered errors in the company’s administrative, accounting or investment systems*
* *previously undiscovered errors in the methodology or systems used to calculate the values of in-force and new business*
* *identification of areas where actual transactions differ from stated company practice (possibilities include payment of policy owner benefits or refunding of policy premiums and commissions)*
* *poor management of underwriting or claims*

**25.4 Analysis of Profit for an Investment Contract**

• APRA form LRF 430 requires profit to be split between:

* *investment earnings on assets in excess of policy liabilities*
* *Financial Instrument Profit =*

*sum of all cash flows relating to the financial instrument element of life investment contracts, including investment earnings on the underlying assets, less the change in the value of the Life Investment Contract Liability.*

*\*The Financial Instrument Profit reflects any mismatch between the LICL and the assets that back it. For investment-linked business there should normally be an exact match, so this item of profit will be zero. An exception could occur for investment-linked policies that have performance guarantees.*

* *Management Services Profit =*

*the difference between fees and expenses, including changes to the MSE. In other words, fees include reductions in deferred fee revenue and expenses include reductions to deferred acquisition costs*

* *changes in valuation methods and assumptions affecting the MSE:*

*would normally only affect the future run-off of the MSE. However, if a contract becomes onerous (i.e. it is expected to make losses in the future) there will be an immediate impact. Investment-linked contracts could become onerous if high rates of termination or poor investment performance make it unlikely that future fees will be sufficient to recover the existing deferred acquisition costs and future maintenance expenses*

• Example (P130)

**25.5 Reasons for Analysing the Profit**

* to enable the actuary to advise management on the factors affecting the profit
* as a semi-independent check on the accuracy of the valuation and of the data in the company accounts
* to compare the valuation assumptions to actual experience, thus signalling the need for a review of the best estimate assumptions or for management to take action to address areas where experience has deteriorated (this does not apply to an analysis of surplus as the assumptions used are not best estimates)
* to comply with requirements for a basic analysis of profit to be disclosed in the general purpose financial statements and in APRA reporting form LRF 430.
* Note that the analysis is not a complete check. It may not be possible to explain all experience profits. However, any unexplained profit should be within acceptable limits.
* The analysis will not provide a foolproof verification that the valuation data is correct. For example, consistently wrong policy data over time may not be identified.

**25.9 The Budgeting/Planning Process (P138)**

1) The 1st step in this process is for each department to review the previous budget and identify changes to the business or particular plans that will result in lower or higher costs.

2) The 2nd step is that actuary and finance/accounts people get together and review these plans. The inputs to this part of the process are: (*2010 S2 1a – information needed*)

* *The new budgets set by the department – this indicates how much the area wishes to spend and what on. The budget would have included the cost of additional staff anticipated, salary increases, computer upgrades.*
* *The expense experience analysis – this indicates how expenses of the company were spent or are generally spent. The analysis would have information that would identify the costs of calculating and paying commissions from the previous year.*
* *It would also have numbers of advisors and total amount of business written, which allows the expense to be expressed as an amount per advisor, per contract or per sum insured amount.*
* *With a bit of work, the expense analysis should be able to tell the finance and actuarial people how this department performed against the expected (based on loadings in the expense assumptions on the contract) experience in the previous year.*
* *The strategy or business plan of the company. This will provide information about the anticipated additional costs, areas in which these costs are likely to occur and the anticipated new business and lapse experience expected given changes to aspects of the company from this plan.*
* *The analysis of profit – the information about actual to expected profit and the reasons for its variance will give information about the spending of the company in the previous year and also the environment in which the company is operating. This is explored further below.*

25.9.1 Analysis of Profit and the **Budgeting/Planning Process**

• Management are usually more interested in comparing the actual profit with budget forecasts than splitting actual profit into the profit margins emerging and experience profits.

• The budget profit may differ from the profit margins emerging for a number of reasons:

* *The budget assumptions may allow for short term variances from the best estimate assumptions – for example lapse rates may be anticipated to be higher than normal because the company has just raised its premium rates.*
* *The expected investment return will most likely differ from the discount rates used in the policy liability valuations.*
* *The best estimate assumptions may change between preparation of the budget and the start of year liability valuation (e.g. discount rates will almost certainly change).*

• **True-up**: as new sales will differ from those assumed in the business plan, the first stage in the process would be to recalculate the plan using actual sales. It may also be necessary to restate the opening position due to different volumes of business being in force at the start of the year compared to the volumes forecast in the budget (remember that the budget is prepared some time before the start of the year).

• The analysis can offer insights as to which products are profitable, which products need to be repriced or markets from which the company may wish to withdraw, enabling company management to take appropriate action.

**[Exercise]**

*Expense overrun: a list of things that need to be investigated together with reasons why.*

|  |  |
| --- | --- |
| **Investigation item** | **Reason** |
| Expenses Overrun | |
| Check the payments process. | To ensure no breakdowns in procedure that have led to expensive work-arounds or manual intervention. |
| Check the expense apportionment from the current year and compare to previous years. | To identify if any areas have changed their split up of expenses and this has resulted in more being attributed to this product than there should be. |
| Check for one-off expenses. | To identify any unusual and non-recurring items that may affect the accounts. |
| Check the non-apportioned expense data. | To make sure no large/repetitive entries have been put through to this product by mistake. |
| Comparison of Actual to Budget. | Highlight any areas of differences. |
| Reconcile projected expense results. | Are there any errors in the expense treatment within the valuation system? |

**Chapter 26 Distribution of Profits to Policy Owners**

**26.2 Distribution of Profits**

• LPS 600 effectively requires a participating benefit to have a substantial exposure to investment risk. For example, group risk business with profit- sharing features via premium refunds is not regarded as participating business. Nor is investment account business if the account balances will always be between 95% and 103% of the value of the assets.

• The issues the actuary must consider as part of this advice include:

* *policy owners’ reasonable expectations*
* *equity between policy owners and shareholders*
* *equity between different groups of policy owners*
* *the timing of profit emergence*
* *the impact on the company’s capital requirements*
* *the capabilities of the policy administration system*
* *potential impacts on future surrender experience*
* *potential impacts on future sales of new business*

**26.3 Reasonable Expectations**

• Reasonable expectations are based on a combination of policy documentation, promotional material, annual statements and the past practice of the company.

• How to manage: regularly remind policy owners how bonus rates might vary in future and apply this bonus philosophy in a consistent manner when declaring bonus rates.

**26.4 Reversionary Bonuses**

• The reversionary bonus becomes a contractual liability of the life company which **cannot be revoked**.

• There are three main types of reversionary bonus:

* *simple reversionary bonuses are calculated as a bonus rate multiplied by the sum insured*
* *compound reversionary bonuses are calculated as a bonus rate multiplied by the sum insured plus existing reversionary bonuses*
* *super-compounding reversionary bonuses are calculated as a bonus rate multiplied by the sum insured plus a higher bonus rate multiplied by existing reversionary bonuses*

*At times when interest rates are unusually high, the super- compounding method provides a more equitable outcome as it allows higher investment returns to be passed to policies with longer durations and substantial asset shares, whilst limiting the amount of bonuses added to newer policies with small asset shares.*

• **Asset share** calculations for individual policies can be useful as a guide for determining bonus rates. (Chapter 22) The liability calculated using an asset share approach can be compared with the best estimate liability and value of future bonuses calculated using a projection approach. Supportable future bonus rates can then be found by equating the projected liabilities to the asset shares.

**26.5 Terminal Bonuses**

• Terminal bonuses were a useful mechanism for adjusting policy values in response to fluctuating investment returns.

• Unlike reversionary bonuses, existing **terminal bonuses could be reduced or removed** from a policy in response to poor investment returns.

• The methods for distributing terminal bonuses include:

* *terminal bonus equal to a percentage of existing reversionary bonuses*
* *terminal bonus equal to a percentage of sum insured and existing reversionary bonuses multiplied by the number of years the policy has been in force*
* *terminal bonus equal to a percentage of existing reversionary bonuses, the rate varying by year of policy commencement*
* *terminal bonus equal to a percentage of surrender value multiplied by the number of years in force.*

*Administration systems may also be a constraint on the method adopted.*

• **Risk**: anti-selective surrenders occurring after a major drop in asset values, but before a company has been able to implement a reduction in its terminal bonus rates.

• The main advantages of using terminal bonuses are:

* *improved equity between policy owners*
* *a reduction in shareholder capital requirements*

• A significant disadvantage for shareholders is the deferral of profit emergence

**26.6 Equity**

26.6.1 Equity between shareholders and policy owners

• Potential areas of **conflict** include the allocations of expenses, investment income and tax.

* ***Expense****: judgement is required in allocating overhead expenses amongst different categories of business. The majority of overhead expenses allocated to participating business will be borne by policy owners, whereas overhead expenses allocated to non-participating business will be borne entirely by shareholders.*
* ***Capital requirements****: Participating business always provides guaranteed minimum benefits in some form (e.g. for traditional business the sum insured and premiums are guaranteed). Guarantees must be supported with capital. A life company can potentially minimise the amount of shareholder capital required to support participating business by moving the asset allocation towards a more conservative asset mix, by placing greater reliance on non-guaranteed terminal bonuses instead of reversionary bonuses, or by suppressing bonus distributions so that policy owners’ retained profits build up over time. However, all of these actions are likely to disadvantage policy owners.*

• The question of **ownership** becomes important if shareholders need to inject additional capital or wish to withdraw excess capital from a life company. Shareholders will be reluctant to inject capital if it is not clearly identified as belonging to them and can be repaid when it is no longer needed. If the ownership interests of existing capital and retained profits are not clearly identified, it becomes difficult to decide whether any excess capital should be distributed to policy owners or shareholders.

26.6.2 Equity between policy owners • Bonus or crediting rates will usually vary between the following groups:

* *policies with fundamentally different designs (e.g. traditional and investment account policies)*
* *ordinary, superannuation and exempt (retirement income) business. Bonus rates much reflect differences in rates of taxation;*
* *policies with significantly different benefits, guarantees or asset allocations. For example, whole of life policies have very long terms and may have a different asset allocation from shorter term endowments. Pure endowments may be distinguished from endowment policies that provide death cover*
* *policies with premium rates based on different pricing assumptions (e.g. different bonus loadings)*
* *policies that commenced at different points in time. There will be differences in historical experience for different cohorts of policies and there may also be differences in pricing assumptions.*

*A balance must be struck between having an excessively complicated bonus structure and achieving a reasonable degree of equity between policy owners.*

• One of the key features of participating business is the **smoothing of investment returns**, so some degree of inequity between policies maturing at different points in time is to be expected. The smoothing of investment returns is also one of the reasons why there will normally be differences between maturity values and asset shares at any point in time.

**26.7 Profit Emergence**

• Terminal bonuses are only distributed when a policy terminates. The use of terminal bonuses therefore delays the emergence and distribution of profits to both policy owners and shareholders. This feature can cause distortions in profit emergence:

*For example, if an unusually large number of policies terminate in a single year there can be a temporary increase in reported profit, even though there has been no real improvement in the financial position of the life company. This is one of the reasons why embedded values are a useful form of supplementary financial reporting.*

**26.8 Capital Requirement**

• A distribution in the form of terminal bonus would normally not affect the capital base or Prudential Capital Requirement as terminal bonuses are, in effect, paid directly from policy owners’ retained profits to the owners of the terminating policies.

• In contrast, a reversionary bonus is guaranteed and the declaration of a reversionary bonus reduces the ability of the capital base to absorb the stresses applied in the calculation of the insurance risk charge and the asset risk charge. The capital base is more resilient to these stresses if the distribution of retained profits is deferred by declaring terminal bonuses instead of reversionary bonuses.

**26.9 Administration Systems**

The actuary will have to consider whether the cost of making system changes is justified by benefits in other areas.

**26.10 Impact on Surrenders**

• The increase of surrender can lead to experience profits or losses, depending on whether surrender values are lower or higher than policy liabilities.

*\*good when struggling to meet the its target capital requirements*

• In Australia AASB 1038 acts as a deterrent to over-crediting of bonuses as unvested policy benefits liabilities (which include policy owners’ retained profits) cannot become negative. Once unvested benefits liabilities reach zero, any further distributions of vested bonuses to policy owners must be reported as a loss to shareholders.

• For APRA and Life Act reporting purposes, policy owners’ retained profits can become negative.

**26.11 Impact on New Business**

A life company that continues to sell participating business in either of these circumstances may be reluctant to cut bonus rates in response to low investment returns as there is likely to be an impact on future sales of new business unless other companies make similar cuts.

**26.12 Variations in Policy Owners’ Retained Profits**

• For participating business investment experience is included within the VSA and hence the policy liability. However, mortality, expense and surrender experience emerges as an experience profit. This leads to variations in policy owners’ retained profits unless these experience items are immediately distributed to policy owners. The investment returns on the assets backing policy owners’ retained profits will also result in variations.

• Life companies typically aim to dampen the volatility of their declared reversionary bonus rates. Policy owners’ retained profits can therefore act as a form of smoothing reserve for bonuses.

**26.13 Closed Books and the Tontine Problem**

• In order to run policy owner retained profits down to zero, profit distributions need to closely match the profits emerging and also allow for the distribution of existing retained profits.

• As the business runs off it may become necessary to adopt strategies that reduce the volatility of emerging profits, so that bonus distributions do not become unduly volatile. These strategies might include a gradual move to a more conservative asset allocation, the reinsurance of mortality risks and the adoption of a surrender basis that closely matches the policy liabilities and retained profits.

**26.14 Investment Account Policies**

• Policy owners will be more likely to surrender and the company may find itself unable to recoup all of its past over-crediting.

• The risk of anti-selection can be mitigated by applying penalties on the surrender of a policy if they are allowed by the policy and have been clearly disclosed at the point of sale.

* *make these products less marketable*.

• Common methods of applying surrender penalties (P162)

• Non-participating investment account policies: account balances will always be between 95% and 103% of the value of the assets. **ALL** **profits** (other than investment experience) are allocated to shareholders.

**Example**: Simple cash dividend calculation for Interest / Mortality / Expense (P164)

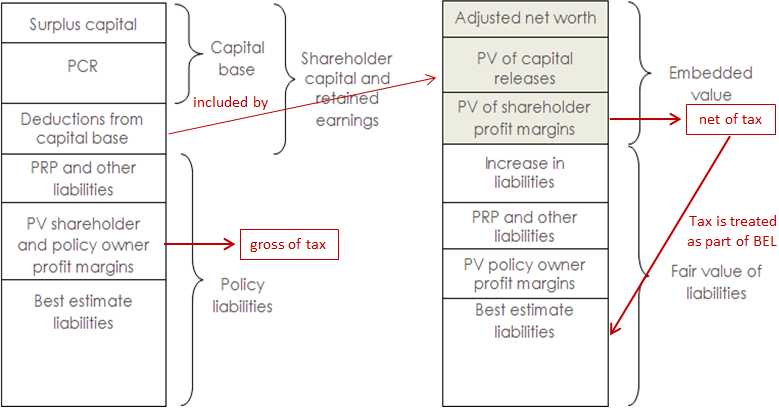
**Chapter 27 Appraisal Values**

**27.1 Introduction**

An appraisal value is an economic valuation of the **shareholders’** interests in a life insurance or other financial services company. (Shareholders’ view)

**27.2 Definition of Appraisal Value**

• An appraisal value has three components:

* *adjusted net worth (ANW)*
* *value of in force business (VIF): does not include profits allocated to policy owners*
* *value of future new business (VNB)*

• EV = ANW + VIF

**27.3 Adjusted Net Worth**

• **ANW** = the amount of shareholder assets in excess of regulatory capital requirements and could in theory be paid to shareholders immediately. In most circumstances the net worth can be calculated as the capital base less the prudential capital requirement (PCR).

i.e. ***ANW = Capital Base – (Prescribed Capital Amount + Target Surplus)***

***= Net Assets over required capital***

*= Free surplus in excess of required capital @ starting point of the reporting period*

• The prescribed capital amount would be used instead of the PCR if the embedded value was to be disclosed to persons outside the company. **Any supervisory adjustments included in the PCR must remain confidential**.

• If subordinated debt was included in the capital base, it would need to be excluded from adjusted net worth as it does not belong to shareholders.

• If surplus assets are included in the value of in force, the overall embedded value will be reduced due to the delay in the availability of such assets to shareholders and the risks associated with this delay.

**27.4 Value of In Force Business**

• **VIF** = the PV, **at the hurdle rate (or risk discount rate),** of future distributions to shareholders of profits and capital.

i.e. ***VIF = PV of Future Profits + PV of Capital Releases***

It excludes capital that has already been included in the adjusted net worth. The amount that can be distributed at the end of each year is the profit for the year, plus the amount of capital that can be released. These distributions are often known as “distributable profits”.

• **Considerations in setting RDR**:

* + The part of the AV that is being calculated:
    - VNB may have a higher risk discount rate than the VIF, as there is greater risk and uncertainty associated with new business.
  + The greater the uncertainty and riskiness, the higher the risk discount rate.
  + The assumed investment earning rate in the AV calculation, as the risk discount rate should be consistent with this.
  + Tax rate and imputation credits.
  + The published risk discount rates of the other life companies in the market.

• **Cost of capital**: The hurdle rate normally exceeds the expected after tax rate of investment return on the assets backing capital and this results in the present value of future distributions of capital being less than the current face value of capital. This difference between the current face value of capital and the present value of future distributions is sometimes referred to as a “cost of capital”. *(see Cell C95, tab[ALIC\_PA\_Deal\_Model], file[Antelope Deal Model])*

• The key differences between the valuation of future profits and the VIF are:

* *A valuation of in force business requires projections for all types of business, including insurance contracts whose policy liabilities are determined using an accumulation method and investment contracts.*
* ***Discount Rates*** *– the value of in force is determined using a hurdle rate (or risk discount rate) representing the required rate of shareholder return whereas insurance contract policy liabilities are calculated using the expected earned rate on the assets backing the business or a risk free discount rate.*
* ***Prudential Capital Requirement*** *– the value of in force business includes the release of the capital required to meet the PCR for the business as well as the best estimate shareholder profits emerging from the policy liabilities. The amount of capital needed to meet the future PCR needs to be projected as well as the policy cash flows.*
* ***Investment returns*** *– the value of in force business includes the investment earnings on the assets backing the policy liabilities and capital. The rate of investment earnings is the best estimate. The discount rate differs from the investment earnings rate. Therefore, investment earnings have to be projected as an explicit cash flow item.*
* ***Tax*** *– this must be modelled as an explicit cash flow item. Profits must be valued net of tax.*
* ***Business planning purposes:*** *EV aligns the company’s plans and operations with shareholder’s objectives, as it reflects shareholder cost of capital and the profits distributable to shareholders.*

• Assumptions under AV:

* *Best estimate assumptions are used to determine appraisal values.*
* *For insurance contracts, the mortality, morbidity and lapse assumptions are usually the same as the assumptions used in determining policy liabilities. Expense assumptions may differ as an embedded valuation may allow for anticipated future expense savings. There may also be an allowance for future changes to pricing. Future reductions to fees and/or premiums may be assumed to occur due to competitive pressures – this is known as* ***margin squeeze****.*
* *For investment-linked contracts, assumptions for lapse/withdrawal rates and servicing expenses are necessary, even though these may not be required to value the policy liabilities.*

**27.5 Value of Future New Business**

• **VNB** = the value of the shareholder profits expected to emerge from future sales of new business, net of the cost of supporting capital.

• VNB may be done in a number of ways. These include:

* *estimating sales into the future and building a projection model of the distributable profits from all such future sales*
* *calculating the value of one year’s new business and multiplying by a “capitalisation” factor. The capitalisation factor depends on the number of years of new business that are to be included in the appraisal value and the discount rate (and margin squeeze/expansion) that is considered appropriate for this purpose.*

**27.6 Imputation Credits**

• Imputation credits (also known as franking credits) are tax benefits that are passed to shareholders with their dividend distributions. An imputation credit represents the amount of tax that the company has already paid on its shareholder profits.

• Gross-gross valuation (P171)

**27.7 Embedded Value Reporting**

The column on the left shows the breakdown that corresponds to the balance sheet,

The column on the right shows the breakdown according to economic values:

• “Deductions from the capital base” on the left hand side are included in “PV of capital releases” on the right hand side. For example, deferred tax assets in excess of deferred tax liabilities must be deducted from the capital base, but will form part of the embedded value.

• The capital base is measured using a “wind-up” basis, whereas the embedded value is measured assuming the company continues as a going concern. DTA can have zero value in a “wind-up” but can be used to reduce future tax liabilities for a going concern.

**27.9 Analysis of Change in Appraisal Value**

Changes in the value of one year’s new business will be mainly driven by changes in:

* *volume and mix*
* *best estimate assumptions*
* *acquisition costs*
* *product pricing*

27.9.1 Expected Change in Appraisal Value

**1) “rolling forward”**: this involves growing the net worth at the assumed fund earning rate, growing the value of in force and value of future new business at the RDR (referred to as “unwinding the discount rate”) and adjusting the net assets for dividend payments to shareholders (including franking credits) and new capital raised during the period.

*i.e. AVt+1 = NWt (1+earning rate) + (VIFt+VNBt)(1+RDR) – Div\_pmtt + New capital*

**2)** **CF(distributable profit) 🡺 Net Asset**: Allocate expected cash flow for the period from both in force and new business over the period into the net assets (and subsequently remove from the value of in force and new business).

**3) VNB 🡺 VIF**: Adjust the value of in force and value of future new business by transferring the PV of future profits from the new business expected to be written over the period to the in force, as by the end of the period such new business would now be in force. This amount, now included as in force, should be removed from the value of future new business.

27.9.2 Experience Variations and Assumption Changes

• Some experience variations will be the same as for the analysis of profit. For example, there will be an item for death claims being different from the best estimate. Other experience variations will be very different.

• **ANY** assumption changes made at the reporting date will affect future expected cash flows and have a far greater impact on the appraisal value than on the reported profits.

**27.10 Comparison with Other Valuation Methods**

• Two other methods that can be used to value a life company are:

1. the shareholders’ equity reported on the BS (capital and retained profits)
2. a price/earnings ratio.

• The equity on the balance sheet is not useful as a measure of shareholder value because:

* *it ignores the value of future profits expected to emerge from the liabilities;*
* *it ignores the value of future new business; and*
* *it does not deduct a “cost of capital” from the capital held to meet the prudential capital* requirement.

• The method most commonly used to value non-life insurance companies is via a price/earnings (P/E) ratio.

**[Example 3, P186] *Identify the changes you would expect in the VIF, VNB and ANW and the appraisal value overall if actual lapses were 30% higher than expected at all durations in force.***

* There will be a lower end of year in force than expected, which will result in a proportionate reduction in the PVFP and thus VIF will reduce.
* VNB will not be affected as the NB strain affects the net worth.
* There will be a lower capital requirement at the end of the year due to the reduced end of year in force.
* ANW is affected by the reduction in capital, which increases the net worth.
* The reduction in VIF would be expected to be greater than the increase in ANW due to the capitalised effect of loss of all future profits from a lower in force at year-end.
* Therefore overall AV will be lower.
* Any subsequent increase in the lapse assumption (given experience) will further decrease the VIF and also reduce the VNB due to the reduction in renewal premium volumes to recover the new business strain.

**27.14 Market Consistent Embedded Values (also see 2009 S2 Q6)**

• MCEV uses a more complex method of allowing for risk: The MCEV methodology is particularly useful for valuing life companies with complex or asymmetric risks such as those found in participating business. It tends to be less useful for simpler types of business such as risk insurance business and investment-linked business that do not have financial options or guarantees.

• An **MCEV** consists of:

* *free surplus*
* *required capital*
* *value of in force business*

*where,*

*i. required capital consists of shareholder assets whose distribution is restricted (e.g. required to meet regulatory requirements, but may include target surplus).*

*ii. Free surplus consists of the remaining shareholder equity.*

*iii. The value of in force business is the risk-adjusted value of future distributable profits expected to emerge from the policy liabilities*.

• The value of in force business consists of:

* *PV of future shareholder profits (after tax); less*
* *the time value of financial options and guarantees (include guarantees provided to participating business, e.g. that death and maturity benefits will not be less than the sum insured and reversionary bonuses, and the surrender values will not be less than the LPS 360 minimum, calculated using stochastic techniques); less*
* *frictional costs of required capital (tax and investment expenses); less*
* *the cost of residual non-hedgeable risks (operational, strategic and reputational risks)*

• The VIF should be valued on a market consistent basis. For example, if shareholder assets were invested in equities, a higher discount rate would be used to value the best estimate investment returns than if the assets were invested in fixed interest.

**Tutorial 3**

1. **MCEV (also see 2009 S2 Q6)**
2. **Asymmetric Risk Reserve: Introduced as part of IFRS changes to make the BEL more fair value based.**
3. **Topical issues: IFRS17. Also see tutorial 1**

**Chapter 28 Financial Statements**

Financial statements for funds management companies are less complex and are prepared on a “**fees less expenses**” basis.

**28.2 Life Insurance Company Data**

• The item that the actuary needs to determine is the **policy liabilities**. **The increase in policy liabilities determines the profit for the period**.

• Profit consists of net revenue less increase in reserves, and includes both shareholder and policy owner portions.

*i.e.* ***Net Profit = Net premiums + Investment income - Net claims – Expenses - Increase in liabilities – Tax***

*then apportioned to:*

* *Policy owners = 80% Net Profit*
* *Shareholders = 20% Net Profit*

• The balance at the end of the year is calculated as the balance brought forward plus the share of net profit.

• The balance carried forward to the beginning of next year is this amount less the cost of bonus and transfers paid out pursuant to the valuation.

i.e. ***Total Net Assets (EOY before distribution)***

***= Total Assets (Investment assets + Cash + Reinsurance asset\* + Other assets)***

***- Policy liability - Other liabilities***

*\*Reinsurance asset: Treated as an asset rather than a negative liability*

***Total Net Assets (EOY after distribution)***

***= Total Net Assets (EOY before distribution) - Cost of Bonus - Net transfers***

**28.3 Profit and Loss Statement**

• Reporting under IFRS 4 differs from Life Act reporting in two significant respects:

* *The profit reported is the profit allocated to shareholders. It does not include profit allocated to policy owners****[A]****.*
* *The revenue and expenses shown on the income statement must exclude the deposit components of the premiums and claims if a deposit component can be measured separately****[B]****.*
* *The profit and loss statement derived in this manner is also known as the “income statement” or “statement of financial performance”.*

***A:*** *The exclusion of policy owner share of profits is achieved by:*

*1) Defining the increase in net policy liability to be the net policy liability at the end of year including bonus less the net policy liability at the start of the year and*

*2) Showing the increase in policy owner retained profits as an outgo item (i.e. as an increase in liabilities).*

***B:*** *Premium and claim splitting has no effect on profit – it only affects the presentation of revenue and expenses. The reduction in revenue caused by exclusion of the deposit components is exactly offset by a reduction to the increase in policy liabilities.*

**28.6. Summary of Significant Actuarial Methods and Assumptions**

The **assumptions** that are disclosed include:

* *Discount rates*
* *Bonus and interest crediting rates*
* *Future expenses and indexation*
* *Inflation*
* *Future participating benefits*
* *Voluntary discontinuances and premium dormancy*
* *Surrender values*
* *Unit prices*
* *Mortality and morbidity*
* *Taxation and commission*

**28.13 Statement of Sources of Operating Profit**

• **Shareholder Profit after Tax** = Investment earnings on s/h retained profits and capital

+ Emergence of shareholder profit margins

+ Experience profit / (loss)

+ Loss reversal / (loss recognition)

• **Policy Owner Profit after Tax** = Investment earnings on p/h retained profits

+ Emergence of policy owner profit margins

+ Experience profit / (loss)

• One-off components: experience profit & loss reversal

• Ongoing components: planned profit & interest on retained profit

**28.15 Risk Management Policies**

Under AASB 1038, life insurers are required to disclose information about the amount, timing and uncertainty of future cash flows. This includes:

* *Details of the company’s objectives in managing risks arising from life insurance contracts and its policies for mitigating these risks*
* *The terms and conditions of the products issued by the life insurance company that materially affect its cash flows*
* *The sensitivity of profit and loss and equity to changes in variables that have a major effect on them.*
* *Concentrations of insurance risk*
* *The development of claims those are not resolved within one year. This disclosure would not normally be required for most life insurance products and annuities are specifically exempt*
* *Information about credit and interest rate risk*
* *Information about exposures to interest rate risk or market risk under embedded derivatives not measured at fair value.*

**28.17 Interpreting Financial Statements**

The financial statements can also be used to see:

*1. trends in premium revenues and claims*

*2. the amount of capital base supporting the prescribed capital amount*

*3. the assets backing the liabilities*

**Everything in relation to Appointed Actuary**

**21. Valuation of Policy Liability**

**21.2 Relevant Parties and Legal Requirements**

The responsibility for placing a value on the company's policy liabilities rests with the board of a life company.

The board must consider the advice of the **appointed actuary**.

The **appointed actuary** must calculate the policy liabilities on an annual basis.

The **appointed actuary** must provide advice on an appropriate methodology if he/she does not perform the calculations for interim financial reports.

If the board decides not to adopt the values or methodology advised by the **appointed actuary** it must explain why to APRA.

**21.5.2. Expense Allocation**

**Appointed actuary** must advise the life company whether the apportionment of expenses is appropriate.

**Chapter 24 Capital Management**

**24.5 Prescribed Capital Amount**

**24.5.1 Insurance Risk Charge**

The appointed actuary must determine the stressed assumptions for mortality, morbidity and lapse risks.

**The difference in the key responsibility btw an AA and Board of Directors:**

* + The Appointed Actuary is an adviser to the Board of Directors.
  + The Board ultimately takes responsibility for decisions concerning the company.

**AA’s role regarding determining distribution (crediting rate)**

(2009 S2 2c)

**AA’s consideration regarding the expense experience loss**

(2017 S1 3d)

**AA’s consideration regarding:** (2017 S2 3b)

**i) Distribution of surplus asset to shareholder**

* + Need to ensure that the total dividend paid does not exceed the reported profit for the last 4 quarters (LPS 110), otherwise approval from the prudential regulator (APRA) is required (which requires supplying APRA with projected future capital positions).
  + What is the capital position of the fund after the transfer and can it meet regulatory capital requirements (PCR) (and internal capital requirements depending on ICAAP) post dividend
  + In respect to the shareholder retained profits generated by the participating business, these cannot be distributed to the shareholder without bonus being paid to policyholder. Hence, need to declare a bonus prior to any distribution to shareholders (LPS 600 PARA 31). Note that there is no such restriction on the retained profits generated from the shareholder capital in SF1.
  + Opens up the company to regulatory supervision, including a supervisory adjustment in the future, because capital margin may not meet APRA’s expectations.
  + There could be an impact on rating agency ratings, because if one Statutory Fund has insufficient capital buffer, it could impact the whole company’s ability to meet its obligations.
  + Are there any equity issues between policyholders and shareholders? For example, will shareholders need to invest more capital in order to fund guaranteed benefits?

**ii) Transfer between Statutory Funds**

* + Will need to ensure that the regulatory capital requirements of both SF1 and SF2 are met post transfer. Although capital is staying in the company, the prudential requirements relate to both the company and each individual statutory fund.
  + The transfer of excess assets from one Statutory Fund to another in the same life company does not require APRA approval
  + In addition to the above, also needs to consider the future capital requirements of each statutory fund including the impact this transfer will have on those future capital requirements and whether future capital support will be needed from the parent.
  + Target Surplus Policy. It is not uncommon for life companies to hold Target Surplus in its shareholders fund rather than in each individual statutory fund. Hence, could some of this capital be moved into SF2 to support?
  + A transfer of shareholder retained profits from SF1 to SF2 in order to provide capital support implies that this capital will not be distributed to the parent company as a dividend. Comply with its dividend policy and ICAAP.

**AA’s role regarding FCR components:**

*(2009 S2 5a) & The matters that the AA must address in the FCR (2011 S2 1c, C2A - P272)*

**AA to consider regarding increasing dividend**

*(2008 S2 3b)*

**AA to consider regarding setting BE assumptions**

*(2008 S2 4a)*

**AA’s advice regarding Target Surplus**

*(2008 S2 5d)*

**AA determining the stress margin for IRC**

*(2013 S2 1b)*

**Chapter 1 The Market**

**1.1 Introduction**

Until 1 July 2000, there were tax benefits for shareholders arising from issuing new business under a life company structure. Removed by “The Review of Business Taxation”.

**(20 years ago)** Sales of new traditional business disappeared almost completely by the end of the 1990s. replaced the by unbundled savings and risk products.

**• Stronger Super:** P13 and P89

**1.3 Product**

1.3.1 Legal definition of life insurance

Life insurance business is regulated by the Life Insurance Act 1995.

If the duration is less than 1 year, the contract is not a life policy.

1.3.3 Risk Business (P19)

Term Insurance / TPD / Trauma / DI / Buy Back Option / Funeral Insurance etc.

1.3.4 Investment Contracts

**• Unbundle Contracts**: investment returns, fees and the premiums are all separately identified.

(P25) e.g. Investment Account / Investment-linked / Funeral Bonds / Fixed rate/term policy / Deferred Annuity / Allocated Annuity (the retiree bears longevity risk and the investment fluctuation risk under these contracts)

Investment Account: provide that the benefits are calculated by reference to a running account and the account is guaranteed not to reduce other than via contracted charges or policy owner withdrawals.

Investment-linked: provide benefits that are based on unit values determined by reference to the market value of a specified pool of assets.

**• Bundled**: no explicit fees or investment returns, these items are implicitly allowed for in the price quoted by the life company.

(P27) e.g. Immediate Annuity: Life company pay no tax on the investment income they earn from the assets backing their annuity liabilities.

1.3.5 Management Funds (Unit Trusts

Issued outside of the life company, similar to investment-linked products.

(P28) e.g. Master Trusts / Cash Management Trust / Wraps

**Chapter 2 Organisational Structure and Operation**

**Chapter 3 Unit Pricing**

**3.2 Administration of Investment Liked Business**

Unit price determination frequency: once every business day, based on asset values at the close of markets for that day.

3.2.1 Unit Pricing Mechanism

The main components of any unit pricing system:

1) Bank Account

2) Unit Register (Number of unit)

• Two basic ways of pricing:

i. Historical: market value at the end of the previous day

ii. Forward pricing: market value at the end of the transaction

• Initial fees and rebates are deducted from the purchase price before units are purchased. The remaining amount then purchases units and it is this amount and number of units that appear on the unit register.

3) Asset Register (Value of unit)

To price an investment fund, the value of assets is taken from the asset register and divided by the **number of units on issue** from the unit register.

3.2.2 Units

P/H only benefits from the investment performance of a pool of assets without owning any shares of the underlying assets.

3.3 Basic Unit Prices

E.g. the cost is 0.15%

Entry price: P/H pays $1.0015 for a unit valued at $1.

Exit price: P/H receives $0.9985 for selling a $1 unit backed by Australian equities.

3.3.1 Capital Units (P42)

3.3.2 Fees

3.3.3 Deferred Tax

For unit pricing, achieving equity between unit-holders is generally more important than achieving consistency with account standards.

**Chapter 4 Acquisition of New Business**

**4.2 Distribution Channels**

• **Retail Business**: products sold individually through an intermediary

4.2.1 Group Business

• In 2005, “**Choice of Fund**” was introduced.

• 2 main opportunities arise for insurers to sell their products to the group business market:

1) becoming the insurer for a superannuation fund or standalone scheme.

2) selling voluntary additional cover (in addition to default cover) to individual members of a fund or standalone scheme.

• (P71) Tender Process / Default Cover / Voluntary Cover

4.2.2 Individual Business

APL: approved product list

**4.3 Remuneration**

The only products that pay commissions are individual risk business group insurance outside super (standalone schemes) and products sold directly.

**Clawback**: An adviser is required to return initial commission to the company should the policy lapse during the responsibility period.

**4.4 Legislative Environment (P80)**

The Corporation Act 2001 (the Act) --- P110

The Financial Services Reform Act 2001 (FSRA) --- P110

The Future of Financial Advice (FOFA) --- P83

Life Insurance Framework (LIF) --- P87

Financial Services Council (FSC) --- P89

• Licensing

Australian Financial Services (AFS) licence, or be an authorized representative of an AFS licensee (e.g. dealer group).

**4.5 Key Drivers of New Business Sales**

1) Front end technology

2) Claims and servicing

3) Product and pricing

4) Cross-selling

**Chapter 5 Life Insurance Law**

The requirement for an insured person to have “insurable interest” in the subject matter of the contract was **removed** by the Life Insurance Act 1995 --- P97

5.3.5 Statutory Funds of Life Companies

A fund must include all assets, investments and liabilities relating to the business of that fund.

5.4.1 Corporation Act 2001 --- P110

This Act is administrated by ASIC

Collusive behavior is outlawed.

**5.5 The Regulators**

APRA

ASIC

ACCC (Australian Competition & Consumer Commission)

**Chapter 6 Taxation**

**6.2 Direct Tax**

Tax shareholder profits at the full corporate tax rate:

- Tax on underwriting profits for risk business;

- Tax on funds management profits for non-risk business

Concessional tax to earnings on assets supporting policyholder savings products:

- e.g. non-life policy superannuation / allocated annuity products

**6.2.1 Direct Tax for Life Insurance Companies**

Taxation treatment for life insurers varies by a number of tax classes:

1) Ordinary business (”Ordinary”), which includes shareholder funds

2) Segregated Exempt Assets (“SEA”)

3) Complying superannuation / First home saver account (FHSA)

Tax office view: there is no distinction between different statutory funds or the shareholder fund.

(P120) Shareholders’ fund belongs to the “Ordinary” category.

For taxation purposes, the company’s taxable income (or tax loss) of one class is calculated separately for each class. Different classes are not blended together.

**1) Ordinary**

This class is taxed at corporate tax rate.

**• Unbundled Risk Business**

Unbundled risk business is effectively taxed on accounting profits, adjusted for any capitalized losses. This consists of:

* premium income; plus
* investment income; less
* claims; less
* expenses;
* less increase (plus decrease) in policy liability

Above items are calculated **net** of any reinsurance.

**• Ordinary Savings Including Traditional Bundled Business**

This includes investment account, unit link and traditional bundled business.

They are taxed on investment earnings less expenses, at the corporate tax rate.

This means policyholder is being charged the **corporate tax rate** on their earnings rather than their marginal tax rate, and the shareholder is being taxed at the corporate tax rate on their profits arising from this business.

\*A provision for tax liabilities on unrealized gains is include in the financial statement accounts and for calculating tax accruals **for unit pricing**. Discounting of this tax provision for time value of money is not permitted under accounting standards.

(P122) the “**10-year rule**”; Reset date: increase in premium more than 125% 🡺 reset date for the “10-year rule”.

**2) SEA**

The SEA class includes assets supporting the immediate annuity business and some other polices as specified in Section 320-246 of the income tax assessment Act 1997.

**3) Complying superannuation / First home saver account (FHSA)**

Superannuation benefits received after age 60 are tax-free. Prior to age 60, tax may be payable.

(P125) 6.2.2 Transfers between tax classes

6.2.3 Deferred Tax

sold at profit: deferred tax liability, **DTL**

sold at loss: deferred tax asset, **DTA**, which is an asset representing the reduction in tax

6.2.4 Tax for Reinsurers

(P126) In general, the premium paid to non-resident reinsurers are not tax-deductible and the claim payments received from non-resident reinsurers are not tax assessable (except for Death cover).

**6.3 Tax on Risk Business from the Policyholder Perspective**

6.3.1 Ordinary Class Life Insurance Products

Ordinary lump sum risk: in most cases premiums not deductible and benefits not assessable. **Exception**: companies holding key person insurance.

**6.4 Indirect Taxes**

6.4.1 Goods and Services Tax (GST)

(P128) RITC: reduced input tax credit. Some life insurance administration services provided for a life insurer give rise to an RITC.

6.4.2 Stamp Duty

For Life: Only new business is subject to stamp duty.

For GI: renewal as well as new business is subject to stamp duty.

*N.B*. DI is treated as GI business.

**6.5 Imputation Credits**

(P130) An example of **Franking Credit**.

**6.6. Applications for Actuaries**

Deferred Tax Assets (DTA) are normally excluded from the capital base as they are generally available should the life company encounter difficulties.

(P132) 6.7 Sample Question

**Chapter 7 ERM for a Life Insurance Company**

**7.3 RMF**

• Prudential Standard CPS 220

7.3.1 Risk Assessment (P142)

7.3.2 Risk Management

Capital Management: APRA includes the ICAAP (Internal Capital Adequacy Assessment Process) as part of the risk management framework.

Risk based capital / Regulatory capital

3 lines of defence (P147)

**7.4 Risk Classification**

(P159) Practice Question 1: Risks for adding a new condition to Trauma product.

Practice Question 2: Risks involved for an acquisition.

**Chapter 8 Underwriting**

**8.2 Individual Risks**

(P172) **Forward underwriting**: underwrites the client as if they were taking insurance to the maximum of the testing limit for the level of insurance they have.

e.g. testing limit are: $400,000, $600,000. The client’s sum insured is $550,000. Then underwrite as if he/she applies for the $600,000.

The normal **principles of insurance** suggest that the amount of cover should be set at a level which leaves the policy owner in much the same financial position as would have applied if the life insured had not died or been disabled.

P174 Reasons for insurance: family, debt, key person, partnership.

8.2.8 Underwriting decisions

Once underwritten, a risk will either be:

1) Accepted

2) Loaded

3) Excluded

4) Declined

8.2.9 Rating the risk

Two aspects of the extra risk: the intensity and the incidence.

• Alternative Allowance for Extra Risks

1) Rating Up of Age

2) Liens: reducing the sum insured

**8.3 Group Underwriting**

8.3.2 Amounts above AAL (Automatic Acceptance Level)

If a loading is required, only the amount the AAL is loaded, the AAL is rated as standard regardless of the state of health of the applicant.

If the state of health of the applicant is poor enough, the amount above the AAL can be declined.

8.3.6 The **Tender** Process

1) starts with a request for tender issued by the scheme to insurers

2) insurer reviewing the terms and condition

3) proceeds to determine a price

• Preliminary analysis:

1) setting premium rates

2) considering product design features

3) eligibility rules

4) incorporating reinsurance

5) alternative structured arrangements such as profit sharing arrangement

(P184) the information the insurer needs to price a group scheme.

8.3.7 Profit Share

PS = 85% x (90% x Premium paid – Claim incurred)

This creates an asymmetry where the life company retains 15% of profits but 100% of losses.

The IBNR may be longer than individual due to the fact the insured lives might be not aware of that they have cover under an employee scheme.

8.3.8 Continuation Options

(P202) 8.8.4 Case Study 4 - **Memorandum**

With regard to group underwriting of mining scheme:

What are the main risks?

What questions we should be asking?

Any limits/restrictions we should be making?

**Chapter 9 Reinsurance**

**9.2 Reasons for reinsurance**

1) reduce the amount of capital required.

2) access to technical expertise to assist with underwriting, product design and claims management.

3) one-off event

4) capital strain: negative CFs in first year.

9.2.7 The reinsurer’s perspective

Reinsurers are particularly concerned with pandemic risk. Catastrophe bonds can help to diversify an investment portfolio, low correlation with other financial market risks. (P224)

**9.3 Structuring a reinsurance arrangement**

9.3.1 Proportional Reinsurance: The portion of benefits that the reinsurer is responsible

for is *defined at time of cession*

• Agreement types

- Obligatory: reinsurance occurs automatically.

- Facultative: every risk offered must be assessed separately by the reinsurer.

- Facultative obligatory (very rare in practice)

• Amount reinsured

**Quota share**: a standard proportion of each risk. Often uses original premium.

**Surplus**: risks above a certain $ level (i.e. the retention). Often uses risk premium.

• Premium Types

Original terms: the rate table used by the ceding company in the market.

Risk premium: the reinsurer and the ceding company agree to use a table of rates that apply to the reinsurance alone.

• Selection Discount / Commission (Re pays to ceding)

**• How to calculate cession rate for surplus reinsurance?**

e.g. Retention Level: 1,000,000

|  |  |  |
| --- | --- | --- |
| **Average sum insured** | **Proportion by sum insured** | **Above retention** |
| 1,250,000 | 8% | 250,000 |
| 2,500,000 | 5% | 1,500,000 |
| 5,750,000 | 1% | 4,750,000 |

***Cession Rate*** =

9.3.2 Non-Proportional Reinsurance (not common in Australia): Amount for which reinsurer is liable is not fixed in advance; the reinsurance benefit is dependent on the amount / number of claims *incurred*.

A portfolio is covered for **total claims** **above a certain level**. Cannot be expressed as a proportion of the sum insured per individual policy.

• Catastrophe Reinsurance

• Stop Loss (excess of loss) Reinsurance

aggregate claims experience on the entire reinsured portfolio during a specified period exceeds a predetermined level.

**9.4 Entering into a reinsurance arrangement**

(P236) 9.4.2 The ceding company’s perspective (how insurer find a reinsurer)

During the tender process, the insurer needs to take into consideration various factors: e.g. credit rating, capacity, data security etc.

(P238) 9.4.4 The reinsurer’s perspective (how insurer find a reinsurer)

Reinsurer need to look into: experience analysis / return on capital etc.

9.5.2 Annuities

“longevity swap” and some factors to consider when entering into a longevity swap. (P240)

9.5.5 Financial Reinsurance

It is effectively a **loan** made by a reinsurer to the ceding company.

Prudential Standard LPS 230 Reinsurance does not allow life companies to enter into reinsurance arrangements that might be regarded as financial reinsurance without the prior approval of APRA.

**Chapter 10 Investing Assets**

**10.2 Products and asset classes**

10.2.1 Investment Linked

A difference between unit trusts and the life company structure is that a unit trust investor becomes an owner of specific units in a trust that holds the assets. A life policy owner is a liability of the total statutory fund and does directly own part of the fund.

10.2.2 Annuities

For investment linked business, the policy owners bear all of the investments risks.

For annuities, the company bears the investment risks.

Equities and properties are generally unsuitable for backing annuity liabilities.

• Mismatch Risk

Long term annuity cannot be matched by government bonds - If the duration of fixed interest assets is shorter than the duration of the liabilities, a company will be at risk of immediate loss if market interest rates fall. The increase in the value of the assets will be less than the increase in the value of the liabilities 🡺 hold additional capital

If the duration of fixed interest assets is longer than the duration of the liabilities, losses will occur immediately if market interest rates rise. The fall in the value of the assets will be greater than the fall in the value of the liabilities.

• Reinvestment Risk

If the interest rate remains at the new level, the interest payments and maturity values of the assets will eventually have to be reinvested at the new lower interest rates.

10.2.3 Risk Business

There is greater uncertainty for risk business in the timing and amount of payments to policy owners 🡺 to invest in relatively short term, liquid assets such as bank bills, government bonds and highly-rated corporate bond.

Also, risk business has regular premiums. The cash inflows are more predictable than for annuities, because annuity inflows only occur for new business.

**10.3 Investment Options and Guarantees**

10.3.1 Investment Linked Business with Guarantees

(P263) 4 main types of guarantee & the cost of the **guarantee** depends on.

**Chapter 11 Background to Actuarial Investigations**

**11.4 Financial Condition Report (FCR)**

The appointed actuary is required to investigate and report on the financial condition of the company every 12 months, the FCR, which is a private and confidential document prepared for the company’s Board of Directors.

(P272) The matters that the AA must address in the FCR

**Chapter 12 Discontinuances or Lapses**

The terms are used interchangeably: discontinuance, lapse, surrender and forfeiture.

**12.2 Industry Data**

12.2.1 Factors Affecting Lapse Rates **(P279)**

Product Type / Stepped or level premium / Upfront or level commission / Tax class / Distribution channel / Attained age / Policy duration / Sex / Smoking status / Policy size / Method of premium payment / Economic environment / Regulatory environment / Competitor activities / Company own activities

12.2.2 Setting Lapse Rate Assumptions

For pricing purpose, use BE, a more granular level.

For an appraisal value calculation, allow for short-term effects such as the current economic environment, legislative changes and unusual competitor activity.

**12.3 Management Reporting**

• The rate of persistency

Risk business: 1­ – premiums voluntarily discontinued / premiums in force at the start of the year

Investment business: 1– cash outflows during the year / start of year assets under management

**12.5 Premium Dormancy (冬眠)**

Premium dormancy rate: the proportion of expected regular premiums that are not actually being paid.

**12.6 Controlling Lapse Rates (P285)**

To reduce lapse rates:

1) financial advisor

2) customer service

3) communications to policy holders

4) product design

\* For YRT 🡺 Selective Lapsation: More healthy lives are more likely to be lapsed.

For Level Term 🡺 1) higher than expected in early years, initial costs might not be recouped. This risk is exacerbated when the product is a new product with significant development costs.

2) lapse being too low in later years can lead to adverse outcomes when cost of claims relative to premiums is increasing.

**Chapter 13 Mortality**

• Selection effect: ultimate mortality = (1 – selection factor) \* Mortality

• For group business, loss ratio = cost of claims(inc. IBNA and RBNA) / earned premiums

where the earned premium is the premiums due to the paid in the period less the increase in the unearned premium reserve during the period.

• Why Loss ratio for Group whereas A/E analysis used for individual?

i. Group is written on a price per scheme basis and as such insurers may not have access to information on individual lives. So it is not possible to calculate E for Group business.

ii. Pricing basis for individual business includes detailed assumptions to estimate claims on an individual basis. The pricing basis for Group business is usually calculated on an overall loss ratio basis for the scheme.

iii. For Group, the lack of industry experience studies or data may mean a credible expected basis cannot be derived. In contrast, the industry mortality and morbidity tables are readily available for individual business.

**13.4 Mortality of Lifetime Annuitants**

Lifetime annuitants tend to be relatively wealthy. This also contributes to lower mortality rates as lifetime annuitants are likely to be able to afford higher standards of health care than the general population, have healthier lifestyles and are less likely to have ever smoked.

**Practice Question 1 - Solution**

If a greater proportion of the population buy annuities, the “self-selection” effect is likely to be diluted. As such, annuitant mortality is likely to increase despite underlying mortality improvements.

**(P307) Practice Question 3 – Solution (Additional Infor Needed)**

When mortality rate suddenly increases, the actuary needs to ask for:

1) data from earlier years

2) experience of other competitors

3) any plausible reasons for the worsening of the company’s experience?

4) any change in the mix of business?

**[2016 S1 Q3.c]** Recommendations for existing and future new business.

1) Strategy: market share is not that important?

2) Data: data errors/omission? Auditing process.

3) Premium guarantee for group business: not renew / increase prem / reduced AAL

4) Claims management: review claims assessors’ being appropriately trained or not.

5) Risk transfer: Reinsurance

6) Pricing methodology: definition of TPD / too generous / excluding conditions / increase premium rates / reduced premium guarantee period

**Chapter 14 Morbidity**

**14.2 Experience Investigations**

Life companies must rely on a combination of industry experience analysis and analysis of their own experience (own morbidity experience is more important).

(P316) The main **differences** between mortality and morbidity investigations.

**14.3 Disability Insurance (DII and TPD)**

14.3.1 Claims Philosophy

14.3.2 Definition of Disablement

14.3.3 SIS Act Definition of Incapacity (P318)

The SIS Act definitions are used when determining whether payments to members of a superannuation can be made (these are known as “condition of release”).

From 1 July 2014, it must be possible to release insured benefits to members who successfully make a claim.

The SIS Act definition is tighter than the “own occupation” definition which is often used for TPD benefits. As a result, it was not always possible in the past to release superannuation TPD benefits to members who successfully submitted an insurance claim.

14.3.4 Incidence Rates

• Agreed value: have a fixed dollar benefit. Tend to have worse experience.

• Indemnity: have a benefit capped at a specified percentage of pre-disablement income.

14.3.5 DII Claim Termination Rates

Recover / Die / Commute the claim by paying a lump sum / End of benefit period

14.3.6 Trends in Disability Experience

**14.4 Trauma Insurance**

A trauma insurance policy might pay a significant benefit when it is not really needed, but does not cover some of the common causes of medical costs or loss of income.

**14.5 IBNR and RBNA**

IBNR: Incurred but not reported

RBNA: Reported but not admitted

IBNR can be a particular problem for large group superannuation policies that switch between insurers.

**14.8 Appendices (P330)**

14.8.1 Definition of Total and Permanent Disablement

14.8.2 Definition of Trauma Events

**Chapter 15 Expenses**

**15.2 Type of Expenses (P340)**

1) Acquisition Expenses

2) Commissions

3) Maintenance Expenses

4) Investment Expenses

5) Termination Expenses

**15.3 Purpose of Expense Analysis**

15.3.1 Profit Testing

For modelling purposes, expenses would be broken down into expenses per policy, percentage of premium and percent of sum insured.

15.3.2 Policy Liabilities and Appraisal Values

In calculating minimum capital requirements, APRA requires life companies to increase the best estimate maintenance (or servicing) expenses assumptions by 10%.

15.3.3 Monitoring the Experience and Expense Control

Useful categories for comparison purpose:

- products or product groups

- particular functional areas within the company (administrative, marketing, IT, etc.)

- activity (e.g. new business, policy maintenance, premium collection, claims administration, retention of business).

15.3.5 Budgets

Top-down methods involve senior management setting on overall target for expenses.

Bottom-up methods require each individual cost centre manager to forecast their expected costs.

**15.4 Issues when Performing an Expense Analysis (P346)**

purpose / classification / capitalization /amortization / one-off expense (computer system)

**15.5 Source of Data**

Life Insurance Act requires an expense split between Statutory Funds.

LRF 310 requires an expense split between acquisition and maintenance activity.

A further subdivision and reclassification of the expense items will probably be required.

**15.6 Expense Apportionment**

Expense Drivers:

1) policy count

2) NB premium

3) account balances or funds under management

4) transaction counts

5) annual premiums

6) time analysis

7) Effort e.g. The relative underwriting effort for one disability income policy is a lot higher due to the many risk factors involved than underwriting one term life policy.

15.6.1 An example of Expense Apportionment (P350)

**15.8 Marginal vs. Allocated Expenses**

The minimum policy size can be set so that a policy of that size is profitable on a marginal expense basis, even though it may be unprofitable on fully allocated expenses.

(P358) an example of calculating the marginal expense.

**Chapter 16 Economic Assumptions**

**16.2 Investment Experience**

(P368) 16.2.2 Measuring Rates of Return

• Time-weighted rate of return

• Money-weighted rate of return

**16.3 Expected Investment Returns**

• **Franking Credit**: is normally treated as an addition to the investment return rather than as a deduction from tax.

**16.4 Discount Rates**

16.4.1 Risk Free Interest Rates

According to the accounting standard AASB 1038 and APRA prudential standard LPS 340, a **RFR** of return must be used to value the policy liabilities for insurance contracts where the benefits are not dependent on the performance of the assets backing the liabilities.

16.4.2 Risk Discount Rates

For profit-testing and appraisal value calculations, a risk discount rate is used to value the future transfers to shareholders (also known as distributable profits).

The RDR is the minimum rate of return (or hurdle rate) that shareholders require on their invested capital.

• CAPM 🡺 set the RDR

• Mortality risk is regarded as being largely non-systematic. Risks related to property markets, morbidity, lapses, expenses and new business volumes are partly systematic as these risks depend to some degree on the health of the overall economy.

• A lower RDR might be used for risk products than for investment products that are highly exposed to systematic risks.

16.4.3 Fair Value Discount Rates

The accounting standards and LPS 340 require liabilities for term annuities and some other types of investment contracts to be valued at their fair value. This means that a risk free discount rate cannot be used for these contracts.

**16.5 Inflation**

**16.6 Asymmetric Risks**

(P381) To value business with asymmetric liability outcomes, two techniques may be required.

1) stochastic modelling

2) replicating portfolios (also see **16.9 Replicating Portfolios**)

**16.10 Other Measures of Return**

16.10.1 Return on Assets

16.10.2 **Return on Equity**

The net shareholder profit (after tax) divided by the average equity employed in the business over the period. Equity refers to shareholder capital and retained earnings (also known as the net assets of the business).

16.10.3 Return on Capital

16.10.4 Capital Efficiency

16.10.5 Return on Embedded Value

EV is an economic valuation of the shareholders’ interests in the existing business of the life company. It specifically excludes future new business.

Appraisal Value: the economic value including future new business.

**Chapter 17 Marketing and Product Development**

17.2.3 Objectives

The value of profits arising from the sale of new business is usually measured using:

1) the yield on transfers

2) the present value of transfers

• Transfers consist of profits plus releases from the capital reserves that are required to support policies.

17.2.5 Market Segmentation

(P393) In developing a marketing strategy, 5 features need to be considered.

1) product

2) distribution channel

3) promotion

4) the price of the product

5) target market

**17.4 Product Development (P396)**

4 teams involved: Actuary, marketing, administration and sales management.

(P402) Product Implementation: issues must be addressed.

**17.5 Actuarial Product Advice**

APRA prudential standard LPS 320 states that a life company must not issue or modify a policy unless the appointed actuary has provided written advice on:

- the proposed terms and conditions

- the proposed surrender value basis

- where appropriate, the means by which unit values are to be determined

**17.6 Principle of Product Advice (P404)**

The AA should address the following issues when giving product advice to a life company:

- Adequacy

- Future experience

- Equity

- Capital requirements

- Consistency

- Competitiveness

- Ease of use

**17.7 Control of Risk (P409)**

17.7.1 Participating Policies: conservative premium basis

17.7.2 Investment-linked Policies: right to increase fees

17.7.3 Risk Business: exclusions for pre-existing conditions, rates increase, etc.

17.7.4 Immediate Annuities: reinsure the longevity risk

17.7.5 Financial Selection

**\* Should note the following for all products:**

commission rates / fees charged / investment management charges / exclusions / benefits / waiting period / benefit definitions / min and max entry age / min and max sum insured / premium rates / premium rating factors

**Chapter 18 Premium Rates and Charges**

18.2.2 Capital Requirements

There is a number of ways of reducing the capital strain. These include reinsurance, asset-liability matching and other risk management techniques.

If the company has the ability to vary its premium rates, charges and surrender values after a policy commences, the capital requirement can be significantly lower than if these items are guaranteed to remain unchanged until the policy terminates.

**18.3 Projection Techniques**

18.3.1 Traditional and Risk Business

**• Transfer** is (**P419**):

Premium + Investment Income

– Expenses (inc. commission and tax) – Claims­ – Surrender Payments – (Fundt – Fundt–1)

where Fund is the valuation reserve in respect of the remaining in force.

• The Pattern of Profits

The reasons that the valuation basis for new policies can result in a loss being reported:

1) The liability valuation basis will result in a loss being reported at commencement of NB.

2) The product was priced using marginal expenses whilst the valuation basis uses fully allocated expenses (inc. overheads)

3) The product was priced as a “loss-leader” and will never make profits.

• Profit Margin in Premium = NPV of Transfer / NPV of Premium @ hurdle OR investment rate

18.3.2 Investment-linked Business (**P422**) – A Profit Test Example

**18.4 The Concept of Yield on Transfers**

- The yield on transfers determines the rate of expansion that the company can support if it does not raise additional capital or pay dividends and continues selling the same mix of business.

- Therefore, if the yield on transfers from a block of business is y, the rate of expansion that business will support is also y. If it pays dividends, then the growth rate g < y.

- If the yield is equal to the rate of investment return, shareholders are not gaining any additional return from the sale of life policies.

18.4.1 Present Values

- The value added by new business is the present value of transfers, discounted at RDR.

- PV can be misleading as they do not indicate the time frame over which profits are expected to emerge. 1) for long-term business… 2) for short-term business (P428)

**Chapter 19 Product Features**

**19.2 Term Insurance**

19.2.1 Stepped Premium Term Insurance (YRT)

The higher mortality rates are likely to be caused by the fact that policies on impaired lives are less likely to be lapsed than policies on healthy lives.

**19.3 Trauma Insurance**

19.3.1 Pricing Considerations (P438)

**19.4 Disability Insurance**

19.4.1 Pricing Considerations (P442)

**19.5 Traditional Contracts (Whole of Life)**

The use of very conservative assumptions in the premium rate formula means that profits will almost certainly emerge in all but most adverse circumstances.

**19.6 Rider Benefits**

**19.7 Group Policies (P445)**

Premiums are usually guaranteed for a period of three years, providing the membership of the scheme does not change significantly during this time 🡺 affect the capital requirements.

**• Discussion Points:**

- own experience

- AAL 🡺 claim experience higher than for individual contracts

- APRA requires maintaining previous 5 years records

- Continuation Option (without evidence of health)

- Expenses and commissions are very different to those for individual policies

- profit-sharing terms

**19.8 Investment-linked Policies (P447)**

• Release Price = (1 – X%) times the allocation price

• Allocation Rate: if allocation rate is 101% and the release price is 95% of the allocation price, then the overall fee is effectively 4.05% of each premium (1 – 1.01\*0.95).

**19.9 Investment Account Policies (P450)**

- These are unbundled policies in which the premiums, fees, insurance premiums and interest are added or deduced from an investment account.

- An investment account policy is similar to an investment-linked policy, except that investment returns are smoothed by the life company (via the crediting rate) and there is a guarantee that thee crediting rate cannot be negative.

- At least 80% of profits will have to be allocated to policy owners and no more than 20% to shareholders.

**19.10 Annuities (P451)**

• Key assumptions:

1) investment return

2) mortality (lifetime annuities only)

3) expenses

- Annuity rates are normally quoted on case by case basis, using the latest market interest rates.

- There will be a risk of interest rates being lower than expected on reinvestment. This risk can be priced for either by using a lower rate of interest at long durations, or by increasing the capital requirement.

**19.10 Allocated Annuities & 19.11 Variable Annuities**

\***Subsidy:** Polices that are underpriced are likely to sell in much greater volumes than those that are overpriced. As a result, the profits for the product as a whole may fail to meet expectations.

**Past Paper**

**2017 S2**

Q1 b. Lifetime annuity v.s. YRT (also diff. as to capital)

c. Risk of introducing a new product and how to manage (memo)

Q2 b. Actions under recession scenario

**2017 S1**

Q2 b. Manage Guarantee Risk

Q3 a.ii Actions to be taken to address worse DI termination

c. ii Level premium v.s Stepped premium

**2016 S2**

Q1 a.ii Claim Loading Calculation

b. Memo Template

Q2 c. Choose a reinsurer:

Profit / Risk management / Capital management / Other: underwriting and claim support, staff training, expertise and ease to work etc. (also textbook P236)

Q3 a. Why the following are important and how to access:

Data / Underwriting / Claims / Product design / Risk appetite statement

**2016 S1**

Q1 b. Third party risk

Q3 b. Underwriting: Group v.s Individual

c. Addition information needed

Recommendation for improving experience

**2015 S1**

Q1 TPD for professional sports players.

Q3 a. Lapse rate: YRT v.s. Participating WL

c. Insurer pays commission v.s customer pays (**Trowbridge** report)

**Tutorial**

**Tutorial 1**

• SMALL life company

1. not enough capital
2. limited distribution channel
3. less experience study
4. seek advices from reinsurers

**Tutorial 2**

• A list of stakeholders:

Insurer / rating agency / government / regulator / policyholder

• Lapse:

Male only?

Which product?

How competitors do?

Premium structure

Distribution channel

• Complaints 🡺 to decline a death claim under 13-month exclusion clause

Distribution channel

Size of the claim

What’s in the PDS?

Cause of the death?

• Investment fees

Lapse rate

Customer’s feeling about initial extra fees

Expected duration

Target market

How existing products do?

• Annuity: only healthy people tend to purchase annuities.

• CAPM 🡺 determines the return on capital in product pricing.

• Discrimination

Less subsidy

Disadvantage: 1) very small extra profit a the % of the population is small

2) reputation damage

**Tutorial 3**

• Surplus treaty premium increases

🡺 bigger claims, bad experience in industry, claim distribution has changed

Reason could be: risk / cover / experience / industry / treaty conditions (more generous; profit sharing)

• Why people lapse?

Talk to advisors / survey

• Price elasticity: if the customers are not very price-oriented, changing a low price is not a good strategy.

• 24-hour continuation

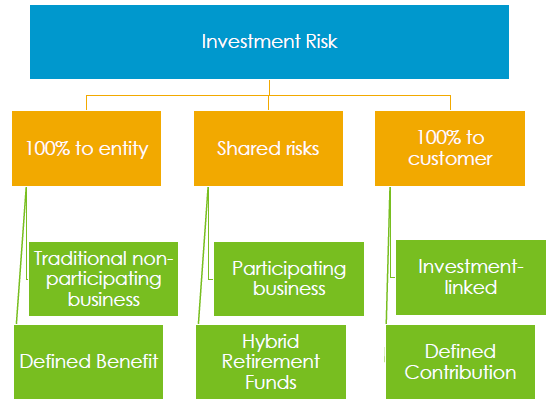
Extra team in different time zone

• The principle of unit pricing 🡺 pooling

**LIRV**

Green: 120 190 32 **/** Orange: 242 169 0 **/** Blue: 0 152 205

**Module 3 Product cash flows**

**3.3.2 Sharing of investment risks**

**3.7.3 Universal life**

This is simply another name for the Investment Account or Investment-linked policy where a death benefit is attached. There is no end date and policy owners can surrender at any time, although there may be an exit fee in the early years of the contract.

**Module 4 Life Insurance and Retirement Fund Liabilities**

• Life insurance liabilities (often referred to as “**policy liabilities**”) comprise liabilities for:

* future claims that have not yet occurred;
* claims that have occurred but the insurer is unaware of the claim (**IBNR**);
* claims that have been reported but have not been accepted as a valid claim (**RBNA**);
* claims that the insurer has accepted (or admitted), but not yet paid: these remain liabilities until the point of payment;
* claims that have been accepted and involve on-going payments contingent on the insured satisfying specified criteria, such as:
  + *immediate annuity payments contingent on the annuitant surviving to the payment dates;*
  + *disabled lives remaining disabled at the payment dates;*
* closed claims that may reopen, e.g. a closed income protection claim may reopen because the relevant condition was reoccurring within a specified time frame.

**4.2.1 Reasons for valuing liabilities**

• Policy and benefit liability valuations can be performed for a range of different reasons, including:

* meet underlying contractual obligations;
* performance monitoring as a management tool;
* disclosure of value of obligations in a company’s / fund’s financial accounts and reports;
* demonstration of capital adequacy under a range of adverse scenarios;
* pricing of new products;
* FCR showing likely progression of the solvency position over the next 3 -5 years;
* calculation of tax payable.

• In addition, policy liability valuations for a life insurer can be performed to:

* assess the value of shareholder equity;
* determine profit in a period;
* estimate profit distribution between policy-owners and shareholders and set bonus rates for participating business; and
* assist in the determination of embedded or appraisal value.

• 2 key reasons for valuing the liabilities of DB retirement funds:

* determine the funding status of the fund
* determine a recommended employer contribution rate

**4.2.2 Stakeholders**

• **Retirement funds**: Members / employer or sponsor / trustee / Governments

***Exercise 4.2***

• If you were required to audit the valuation results of a life company, what questions would you ask about the valuation?

* How has the actuary ensured that all material matters have been taken into account, including options and guarantees under products, reinsurance and changes to products or the business since last time
* Valuation methodology
* Appropriateness of assumptions, taking into account company and industry experience and current economic conditions
* Any changes to assumptions, methodologies or models since last time and the reasons
* What data reconciliation checks have been applied, what issues were found and how were they addressed
* What internal review processes exist, covering appropriateness of models, assumptions, methodologies and processes
* Judgements applied by the company
* Quality of explanations of results, changes since last time and any other material matters
* Spot checking of models and results; overall reasonableness checks using ratios; comparison to previous results and those of other companies where available.

• One difference between insurers and DB funds lies in the different parties that are involved with the fund: the trustees, the employer, and the fund administrator. For instance, the fund administrator may be independent of both the employer and the trustees. The auditor will need to understand reliances by the actuary on data or other information provided by each of these parties, and any undertakings given.

**Module 5 Life Insurance Liability Valuation Methods**

**5.1 Valuation approach**

• **4 key components of PL valuation**: data, a valuation method, a basis and a model.

• Key inputs into the selection of an appropriate valuation approach (P11):

* Purpose of the valuation
* Valuation standards (related jurisdiction)
* Products to be valued
* Timing of profit release

• Consider **CHANGES** to:

* Product
* Claim management philosophy
* IT system
* Reinsurance arrangement
* Regulation standards
* Experience
* Changes within the industry

**5.2 Valuation methodologies**

• When a part of the valuation basis changes (i.e. assumptions change), the effect is NOT spread over the remaining term of the policy but is capitalized immediately at the valuation date.

**5.2.4 Accumulation (retrospective) method**

• There are difficulties in determining an appropriate retrospective liability and determining the prudence of the resulting reserve for some products.

*For example, a model may need historical data going back as far as the commencement date of the oldest policies still in force. Obtaining this data can be a challenging exercise.*

• Contract types that use this method are:

* *Group risk business: typically short term and has relatively level expenses*
* *Unit-linked and investment-linked business: a mix of accumulation and prospective*
* *Participating business relies on the concept of retrospective reserves, also called asset shares*

**5.2.5 Deterministic versus stochastic**

• Deterministic valuations are NOT suitable for **asymmetric risk**:

* *Guaranteed minimum surrender and maturity values in participating business and discretionary non-participating business: Bonus or investment earnings can be credited to policies but cannot be subsequently reduced or removed if investment losses occur.*
* *Profit sharing for group risk business: losses are not shared when experience is bad.*

**5.2.6 Unit linked policies**

• If future fees under unit-linked policy series are likely not to cover future expenses, then a **non-unit reserve** is required. This may occur on day 1 if the contract is not profitable.

**5.3 Provisions for claims incurred**

• IBNR / RBNA / CICP (also referred to as DLR)

• IBNR chain ladder example - Table 5.2

*The IBNR using a chain ladder method uses historical average loss ratios to estimate the cost of outstanding claims for the latest incidence year.*

• New group scheme: the actuary may seek to obtain experience data from the scheme’s previous insurer to assist in estimating claims run-off rates. The reliability of externally sourced data can be problematic.

• Reserves for RBNA claims may be based on expert assessment of each individual claim (case assessments), which are often made by claims managers.

*\*Exercise 5.21 Open disability income claims at the valuation date may also be valued using case estimates provided by claims managers and other experts. Adv and DisAdv*

***Advantages:***

* *Case estimates may readily incorporate known facts about a claim or the circumstances of the case that may not be reflected in an actuarial statistical basis*
* *For a claim (or liability) that is large relative to the rest of the portfolio, it may be more appropriate to place more importance on individual assessment.*

***Disadvantages:***

* *Estimates may lack rigorous statistical basis*
* *Claims manager may have financial motivation to lower reported costs and understate estimate*
* *May lead to inconsistency in treatment of identical claims*
* *May be quite subjective and change frequently depending on views of relevant manager at the time*
* *The statistical or actuarial basis is valid when applied to the entire portfolio, if some claims are singled out for separate treatment, this may undermine the validity of using “average” rates for the remainder.*

**5.5 Reinsurance**

Circumvent prudential rules 智取/绕过/规避规则

**• Proportional**

* *Quota share*
* *Surplus*
* *Co-insurance: it is like quota share except that the reinsurance premiums are based on the premium rates for the underlying policies, rather than based on separate reinsurance premium rates.*

**• Non-proportional**

* *is where the reinsurer makes payments when the total (aggregate) claims cost for a portfolio of included policies exceeds an agreed threshold over an agreed time period*
* *at an aggregate rather than individual risk level*
* *provides cover in more extreme adverse situations, representing the tail of the distribution of probabilistic outcomes. Valuations using stochastic methodologies*

**Module 6 Life Insurance Profit**

**Principles**

Profit = in flows (e.g. premiums) less out flows (e.g. expenses and claims) - change in reserves.

• If the PV of outflows is expected to be greater than the PV of inflows then premiums are insufficient. This means a loss is expected to be incurred over the lifetime of the policy.

• If reserves haven't been building up to cover this shortfall (which occurs for level term) then the business is loss making.

**6.2.1 Actual and expected profit**

• The valuation basis affects the measurement (emergence) of profit from year to year but NOT the total value of actual profits generated, which is affected only by the business experience (claims, expenses, lapses and so on).

**6.2.2 Planned profit**

• The negative liability (that is, an asset) represents the value of planned margins.

**6.3.1 Profit release under different liability bases**

• Different liability basis is ONLY used for estimating PL. Best estimate basis CFs are always used to determine profits under each basis.

**6.3.4 Accounting profit and distributable profit**

• **Accounting profit** is the profit determined according to accounting standards. It is frequently defined as income less outgo, less the change in the value of policy liabilities over a period. Accounting standards are designed to create consistency in the measurement of profit over time, between insurers and, where appropriate, across industries.

• In some jurisdictions, life insurers are required to value liabilities only on a conservative basis and report profit on this basis. Liabilities calculated in this way may be referred to as solvency liabilities, containing solvency margins to support the ongoing solvency of the company.

• **Distributable profit** is the amount of profit that can be distributed in a period: income less outgo, less the change in the value of liabilities over a period. The difference is that the liabilities are determined on a solvency basis. Alternatively, distributable profit can be determined as accounting profit plus the net release of solvency margins in excess of balance sheet policy liabilities.

*See “LI&R Valuation S1 2020 M06 Table 6.9 - 6.10 10 year LPTA.xlsx”*

• In practice, a company’s capital will be funded from both shareholder equity and retained profits. The mutual life insurance model does not assume future access to shareholder capital markets; the main source of funding for solvency margins is therefore retained surplus.

**6.4 Deferral of acquisition costs**

• Companies that are new or growing their business quickly would appear less profitable than companies with more mature portfolios of policies.

**There are 2 ways to deal with DAC:**

**6.4.1 Creating a DAC asset**

• One approach to spreading acquisition costs is to create an asset equal to the acquisition costs paid, referred to as a Deferred Acquisition Cost asset DAC, which essentially recognizes *immediately* the value of future margins in premiums or fees for the recovery of acquisition costs and the recognition of this asset offsets the cost.

• The DAC represents an investment in the policies issued that is, as yet, unrecovered.

• In accounting terminology, the DAC is capitalised as an intangible asset to match costs with related revenues.

• Over time, the DAC is written down (reduced), which causes acquisition costs to be gradually recognised as an expense. The process of recognising the costs in the income statement by reducing the DAC asset is referred to as ‘amortisation’ and results in acquisition costs being spread over a number of years.

• DAC should be set up in respect of groups of contracts rather than individual contracts in an analogous manner to the setting up of premiums as it is unlikely that the DAC amortization period matches that for an individual contract.

**6.4.2 DAC through policy liabilities**

• For life insurers, policy acquisition costs may be spread over a number of years by adjusting the value of policy liabilities, rather than by creating an asset.

• The deferral of acquisition expenses by adjusting liability values: a margin for acquisition expense recovery is subtracted from liability values, which has the same impact on net assets as creating a DAC asset. The margin used to decrease liabilities for acquisition expenses is then gradually withdrawn in subsequent years, in the same way as a DAC asset is amortized.

(DAC written-off margin should be negative while profit margin should be positive)

*See “LI&R Valuation S1 2020 M06 Table 6.11 - 6.13 DAC SPTA.xlsx”*

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**6.6.2 Disabled lives**

• An issue that arises with disability income insurance is whether liability values for disabled lives should include a share of any profit margin for the disability policies as a whole. By including a margin for future profit, some profit is deferred or held back, and released as claim payments are made.

• Potential profit metric: claims + IBNR; as the claims amounts payable within a period would NOT represent the full value of expected claims arising in that period (IBNR is missed).

**6.7 Group risk policy**

• Group risk business PL determined under an accumulation method have the following components:

* Unearned Premium Reserve (**UPR**): This is a proportion of the last premium received, representing payment for insurance risk occurring after the liability calculation date; plus
* **Claim reserves**: These include incurred but not reported (IBNR) claims, reported but not admitted (RBNA) claims and disability claims in the course of payment (CICP); less
* **DAC**

• DAC may be deducted from the PL to spread the cost and recognise it as margins are earned.

• Under an accumulation method, a projection may still be required to test that:

* *reserves are sufficient to meet future outgo less income;*
* *any DAC is recoverable.*

• It is harder to determine an appropriate acquisition cost recovery margin, as the PV of the profit carrier may not be known if projected future cash flows are not available. Hence the driver used to spread acquisition costs is premiums, which are reasonably certain over a 3-year period for a group risk policy.

• For a group risk policy, expected claims (loss ratio) are likely to be a fairly constant proportion of earned premiums due to:

* *the relatively short term of the contract*
* *the absence of any significant selection effects*
* *new lives insured are continuously replacing those who cease to be covered by the policy.*

**Module 7 Liabilities on the Balance Sheet**

• **PCA**

Under Australia environment: prescribed capital amount

Generic: prudential capital adequacy: *Capital = PCA margins (BSCR) + Excess Asset*

• **Excess Asset**

Excess asset can be used to meet the costs of business expansion, to pay dividends etc.

• **Reserves (**forretirement fund**)**

The difference btw a retirement fund’s assets and liabilities is referred to as reserves.

**Module 8 Valuation Assumptions**

**8.2.2 Ongoing concern versus winding down basis**

• **Winding down**

Where a company or fund is winding down (ceasing to write new business), the valuation approach and assumptions will need to reflect this. This is because past experience may not give a true indication of expected future experience. For example:

* *policy lapse rates may trend downwards as longer duration policies start to dominate.*
* *investment strategies for a closed product or fund may be more conservative and include greater matching of assets and liabilities.*
* *expenses per policy or member will likely increase as economies of scale are lost and overhead costs are spread over a smaller base.*

**8.4 Types of valuation assumptions**

**Economic assumptions**

* *investment earnings*
* *discount rates*
* *inflation*
* *taxation*

**Demographic and other assumptions**

* *mortality and morbidity*
* *expenses*
* *policy discontinuance*

**8.4.1 Economic assumptions**

**Risk-free discount rates**

• The use of a risk-free discount rate for profit reporting has the following implications:

* *A company that is able to match its liabilities exactly with a portfolio of risk-free assets will have no investment risk. In this situation, a risk-free discount rate is clearly appropriate as it is certain to be the same as the investment return. Technically, no such portfolio can exist, but yields on governments bonds are often assumed to be a proxy for risk-free rates.*
* *If a company invests in risky non-replicating assets, it expects to earn additional profit but it is also exposed to investment risk. The use of a risk-free discount rate means that any additional uncertain investment profits will only be recognised as they are earned. If a risk-adjusted discount rate that reflects expected investment returns was instead used, any additional expected returns would be capitalised and recognised in profit immediately*
* *As judgement is required in determining risk-free discount rates, the discount rates used by the two companies may not be identical.*

• In some countries, such as Australia, prudential and/or accounting standards require a risk-free rate of return to be used in certain circumstances, such as when valuing policy liabilities for insurance contracts where the benefits are not dependent on the performance of the assets backing the liabilities.

• Where backing assets are not well matched to guaranteed liabilities, a notional backing portfolio may be more important in setting assumptions than the actual investment portfolio. Consider a company backing term insurance liabilities with high-risk equities. These should not be valued using a higher discount rate (thereby placing a lower value on its liabilities) than the same liabilities backed by term-matched risk-free securities. In fact, where there is such a mismatch, liability values may need to be increased by adding mismatch margins to allow for the risk that asset returns may prove inadequate.

**Risk discount rates**

• For profit-testing and appraisal value calculations, a RDR is used to value the future transfers to shareholders (also known as distributable profits). The RDR is the minimum rate of return (or hurdle rate) that shareholders require on their invested capital.

• RDR depends on the type and level of risks to which shareholders are exposed. Higher levels of risk are reflected in higher discount rates and lower values being placed on future profit streams.

• Mortality risk is regarded as being largely non-systematic (i.e. unique to retirement funds and life insurance companies).

• Risks related to property markets, morbidity, lapses, expenses and NB volumes/membership movements are partly systematic, as these risks depend to some degree on the health of the overall economy.

• An investor with an existing share portfolio who has no investments in life companies is able to diversify their portfolio and reduce their overall level of risk by purchasing shares in a life company exposed only to insurance risks (e.g. the life company only sells risk business and matches its assets and liabilities).

• **For the purpose of profit-testing new business**, an additional margin is often added to the RDR (e.g. NB may be required to earn a return on capital of at least 12% p.a. even though the RDR used in calculating the EV is 8%). In committing capital to the selling of new business, the return on capital should exceed the RDR so that value is created for shareholders. There are also additional risks and uncertainties in relation to future sales of new business.

• **For the purpose of calculating an appraisal value**, the RDR used to value future new business may include an additional margin to allow for the systematic risks associated with future sales. This is because sales volumes are, in part, dependent on the state of the broader economy.

**Fair value discount rates**

• Sometimes accounting, prudential and/or professional standards require liabilities to be valued at their fair value. For example, in Australia, this applies to liabilities for term annuities and some other types of investment contracts.

• The fair value of a liability is the amount for which the liability could be transferred between knowledgeable, willing parties in an arm’s-length transaction.

• A fair-value discount rate may differ from the risk-free discount rate in order to reflect the uncertainty in the amount and timing of the liability cash flows. In this case, a deduction from the risk-free rate would be made, leading to an increase in the fair value of the liabilities. Note, however, that a preferable approach to reflecting the uncertainly is to probability-adjust the cash flows rather than adjust the discount rate.

**Expected investment returns**

• For example, in Australia, accounting and prudential standards require an expected investment return to be used in valuing the best estimate liabilities for insurance contracts where the benefits are dependent on the performance of the assets backing the liabilities.

**8.4.2 Non-economic assumptions**

**Expenses**

• The starting point in setting expense assumptions is often a review of the company’s budget.

• Allocated between acquisition and maintenance activities.

• The expenses allocated to participating business will affect the amount of profit paid to participating policy owners.

• Some “one-off” expenses may be excluded when deriving unit expense assumptions for modelling. But it needs to be explained and understood.

**Lapse rates**

If surrender values are greater than the calculated PL for a major policy series, higher surrenders than anticipated may threaten the solvency of the company. For this reason, regulators generally require policy liabilities calculated for solvency purposes to be at least as high as values payable on immediate surrender.

**8.5 Assumption changes**

**8.5.3 Spreading assumption changes through profit margins**

• Assumption changes can be made immediately, but the impact of assumption changes is spread over future years, rather than being released as profit (or loss) in the year the change is made.

• If not in loss recognition:

• If in loss recognition, the deficit (loss) needs to be funded (realized) immediately.

**8.5.5 Grouping and the impact on margins**

***\*Exercise 8.4*** *- What are the advantages and disadvantages of grouping portfolios?*

***Advantages***

* *More stable results. A small marginal portfolio may have a large and volatile impact on total results in isolation as it moves between being profitable and unprofitable*
* *A loss leader could be grouped with more profitable series to provide a more meaningful overall picture.*
* *The allocation of overhead expenses can be subjective, and have a significant impact on reported profitability, particularly for smaller series. By combining smaller and larger series of otherwise similar policies, overall results may be more meaningful.*
* *More streamlined valuation process. Some product groups may not be material. Grouping together similar series can reduce the number of calculations and simplify the process and analysis of results.*

***Disadvantages***

* *There may be pressure to combine more and less profitable groups to hide losses.*
* *Grouping may lead to important information being missed about the underlying policy series being grouped.*

**Module 9 Valuation of Retirement Funds**

• Reasons that valuations are required (P8)

• **Key stakeholders in a DB fund**

Members, the sponsoring employer, trustees and regulators.

**9.2.5 Assumptions**

- *financial*: e, i, tax, CPI

- *demographic*: mort, morb, resignation, e (promotional)

- *expense*: admin, investment mgmt., cost of insurance cover

**9.3.2 Pace of funding**

• Employers have business plans that mean material increases to contribution requirements are not easily made and take time to arrange, so stability in contributions is valuable.

• Paying more upfront means paying less in future, assuming inv returns > salary inflation.

*The conclusion is based on constant expected investment returns. In reality, the volatility of actual returns makes it impossible to make such statements.*

**9.3.3 Types of funding**

• **Fundamental principle**

*value of actual contributions made to a retirement fund + investment earnings on the assets*

*= the actual value of benefit payments + taxes and expenses.*

***VPS + VFS = VEA + VFC***

• **Actuarial Liability (AL):** the quantum of assets that should be held in respect of accrued service**,** also represents the liabilities that should be funded by now under the given funding method = VPS + VFS – VFC.

Any variation between AL and VEA is the funding shortfall / reserve.

|  |  |  |
| --- | --- | --- |
| **Method** | **AL & SCR** | **Comments** |
| **Accrued benefit** | target an asset value equal to the accrued benefit liability and calculate contributions accordingly | |
| ***PUC*** | AL = kPS(1+e/1+i)65-xa65  SCR = k(1+e/1+i)65-x-1a65  *SCRPUC is redone every year* | * Assume VFC = VFS at scheme level (i.e. AL = VPS) * The salary distribution is required as the formula is for a member and the actual SCR will be weighted by the actual salaries in the fund. |
| ***CU*** | AL = kPS(1/1+i)65-xa65  SCR = k(1/1+i)65-x-1a65 + e(1+i)AL/(1+e)S | |
| ***PUC***  *v.s*  ***CU*** | The PUC allows for full salary revaluation compared to none, or only statutory revaluation, for the CU method. The AL adjustment to the CU SCR will alter its size relative to the PUC SCR.  • for a new fund with no past service, the SCRPUC > SCRCU as there is no AL at the start and the SCRPUC salary allowance exceeds the SCRCU salary allowance;  • for a mature fund with stable demographics, or a closed fund, the SCRCU > SCRPUC as the ALCU is lower than the ALPUC.  • SCRCU is less stable than SCRPUC. (P23) | |
| **Projected benefit** | calculate the value of liabilities based on service already completed (accrued) **and** service expected to be completed in the future | |
| ***AAN*** | AL = kPS(1+e/1+i)65-xa65  same as PUC | * Assume VFC = VFS at scheme level (i.e. AL = VPS) * Assuming e < i and there is more than 1 year until retirement, the SCRAAN > SCRPUC. Thus, SCRAAN will overfund its AL, if experience is as expected |
| ***CU***  *v.s*  ***AAN*** | If SCRPUC > SCRCU 🡺 SCRAAN > SCRCU.  If SCRCU > SCRPUC, there are no general rules that determine the level of the SCRCU compared to SCRAAN. | |
| ***EAN*** | • EAN SCR need NOT be redone every year  • for a new plan, ALEAN will start at 0 in the unlikely situation that all members are at the assumed entry age. Then, SCREAN = SCRAAN > SCRPUC > SCRCU. | |
| ***AAN***  *v.s*  ***EAN*** | SCRAAN > SCREAN provided the fund’s average age exceeds the assumed entry age. Under that condition, assuming the i > e 🡺 ALEAN > ALAAN as EAN and AAN have same formula for AL, hence larger SCR results in smaller AL. | |
| ***Aggregate*** | Suitable for a closed scheme. | |
| ***Summary*** | * The AAN, EAN and AGG methods fund more quickly than the PUC and UC methods. If the amortisation period is shorter than the term of future liabilities, then EAN and AAN will fund more quickly than AGG. * Funding more quickly means establishing a reserve asset that is then used to keep the contribution rate constant, even though the actual cost of benefits is increasing. * While stability in contribution rate is an advantage for budgeting and associated issues, a stable contribution rate that generates surplus is at risk of being viewed as wasting shareholders’ funds. * Maintaining an asset value that is just enough to cover liabilities is what PUC and CU do better than the projected benefit funding methods. However, this also creates greater volatility in the rate. | |

• **Deferred member**: When a member leaves a defined benefit fund before retirement their status changes from an active member to a deferred member.

• **Statutory revaluation**: In many jurisdictions, deferred members’ benefits are adjusted to allow for some inflation protection between the leaving date and retirement date.

**Module 10 Valuation Process**

**10.6.2 Content of reports**

* Purpose
* Results
* Sensitivity Test
* Reliance and limitations
* Valuation methods and assumptions

**10.6.4 Additional considerations for a DB retirement fund**

* Funding method adopted and the reasons for adopting it;
* Different categories of members in the fund, such as:
  + current executive members;
  + current staff members;
  + members with deferred benefits who are no longer employed;
  + pensioners;
  + members eligible to retire at any stage but not yet retired;
* Method of determining future salary or pension increases;
* Methods used to determine past and future service entitlements;
* Methods used to determine the value of future benefits accrued from past service and vested member benefit entitlements

• **Some potential employer assurances**

* + Assurance as to accuracy of member data and salary promotional scales provided
  + Commitment to contribute at the recommended rate
  + Commitment to contribute additional amounts to settle any funding shortfall within an agreed period
  + Commitment to fund specific benefit payments arising in the future or an ex-gratia payment granted to a particular employee
  + Commitment to meet certain fund expenses or provide services to support the operation of the fund
  + Commitment to ongoing support of the fund

• **Some potential matters raised by the trustee**

* + Concern over accuracy of fund data
  + Level of surplus arising in the fund and the entitlements of different classes of member and the sponsoring employer in relation to the surplus
  + Concern over shortfalls in the level of funding or the sponsoring employer’s ability to meet commitments
  + Where a funding shortfall exists, the trustee may be concerned about equity between different classes of member and the impact of benefit payments on the security of continuing members
  + Concerns over insurance arrangements or the suitability of an insurer

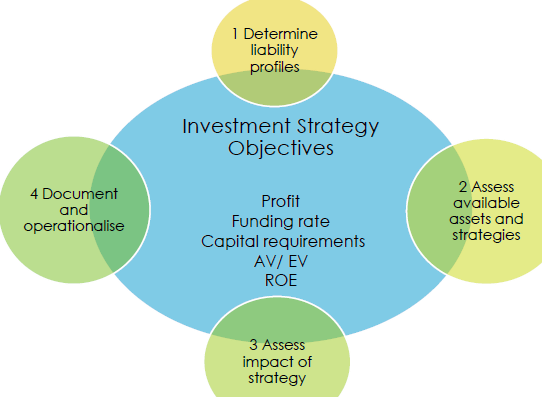
**Module 11 Asset Valuation and Investment Strategies**

**11.1.2 Types of assets**

**Intangible assets** are non-monetary and non-physical assets. Examples are trademarks, patents, goodwill and deferred acquisition costs.

The value of intangible assets is generally linked to the strength and continuation of the company. For this reason, they are generally not included in asset values used to determine the capital adequacy of a company, as their value may disappear under more adverse scenarios.

**11.2.1 Investment strategy process**



Need to consider product features: p/h expectation, guarantees etc.

**11.2.2 Capital requirements, risk and investment strategy**

ALM **risks** can be categorized as follows

* Inadequate returns
* Illiquidity
* Reinvestment risk
* Mismatch risk
* Credit risk
* Volatility risk

**11.3.2 Approximate matching**

• DB fund: equities are expected, on average, to provide returns that exceed salary growth in the longer term. Therefore, equities may be considered a better match to DB retirement fund liabilities (which increase with salary growth) than fixed-interest securities.

• Participating business: Asset strategies with larger proportions invested in growth assets such as equity and property may be considered better matched to these liabilities. Expected returns from these growth assets support higher bonus rates in the longer term, in line with policy owner expectations.

• As policies approach maturity, the proportion of total benefits subject to guarantee increases. A matching strategy for a more mature portfolio will include a substantially greater proportion of higher quality, fixed-interest assets matched to the guaranteed payments.

• **Interest rate futures** could be used to lock in current interest rates until future cash inflows can be invested. (Reinvestment risk)

**11.4.1 Consistency between asset and liability valuation**

Investments in controlled entities may be discounted or valued at zero for capital adequacy purposes. This is because the value of these assets is expected to drop significantly (or be lost altogether) if the company or fund faces extremely adverse experience.

• Smoothed “trend” value

In calculating recommended funding rates, a retirement actuary may, in some limited instances (such as during a time of extreme market volatility), value some assets using a smoothed “trend” value.

**11.4.3 Fair Value (P29)**

**11.4.6 Valuing Goodwill**

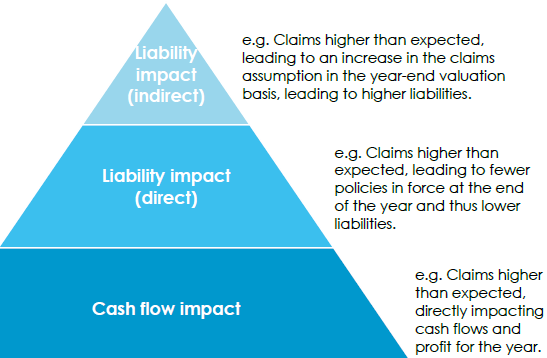
• Goodwill impairment testing (P33)

**Module 12 Analysis of Surplus**

**12.1.2 Rationale for the analysis**

* Monitor experience
* Guide assumption selection / update
* Drive management action
  + *E.g. improve customer service if lapse losses emerge*
  + *E.g. few large claims 🡺 reduce retentions and make more use of reinsurance*
* Validate results

**12.3 Step-through approach**



**12.4 Defined benefit funds**

• A full retirement liability valuation, including a reassessment of assumptions, is often conducted triennially.

• Purpose: for a DB fund, the analysis is aimed more towards the assessment of experience factors affecting the pace of funding and their implications for future contribution rates.

**Module 13 Risk Management Frameworks**

**Exercise 13.1 - If NB sales exceed expectations**

* Additional sales will lead to more capital being allocated to this one line of business and that may impede business development in other, potentially more profitable, areas. Other possible planned uses of capital may include business or system improvements, declaring bonuses or even improving the level of free capital to support solvency.
* There could be solvency issues or potentially a negative effect on policyholders if the unexpected increase in business forces the company to adopt a less risky investment strategy that leads to potentially lower future policy owner returns.
* In a mutual company, the only sources of capital are retained profits.

**13.2.4 Risk classification**

• **Financial risks include:**

* Insurance Risk: Risks taken on through contracts or obligations to provide future benefits to policy owners, retirement fund members and other beneficiaries
* Credit Risk: The risk of default or change in credit quality of issuers of securities, counter parties and intermediaries.
* Market Risk: The exposure to movement in the level of financial variables, including effects of asset liability mismatching.
* Liquidity Risk: Insufficient liquid assets to meet obligations as they fall due & Inability to raise sufficient cash to roll over debt or meet cash, margin or collateral requirements.

• **Non-financial risks include:**

* Operational Risk
* Strategic Risk: the risk that a particular strategy will not work effectively or will fail.
* Application/Execution Risk: the risk that the implementation of the decision fails.
* Outsourcing Risk: the inability of a supplier to offer adequate or competent resources, adequate service levels or flexibility to accommodate business changes. Business continuity planning is critical to ensure a company can continue to operate in the event of outsourcing issues.

**13.3 Risk Management Frameworks**

• To manage risk across a company or fund in accordance with ERM, there needs to be a clear and consistent Risk Management Framework applied to all identified risks, which incorporates the totality of systems, structures, policies, processes and people.

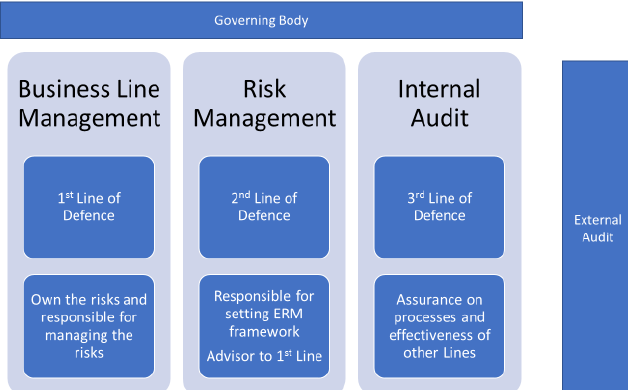
•An effective framework will include RAS / RMP / RMF / defined roles … (P19)

**13.3.2 Risk appetite**

The board of an insurer, or trustees of a retirement fund, are responsible for setting the risk appetite. Considerations (P26)

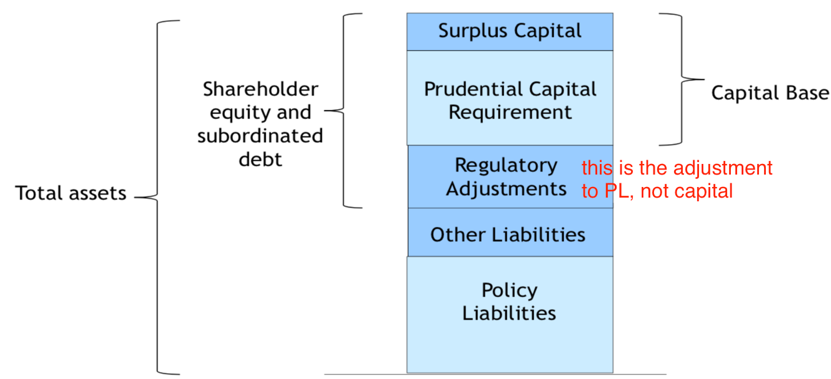
**13.3.4 Governance**

Governing body (an insurance company’s board or a retirement fund’s trustees) is ultimately responsible for the risk management framework.

**• Three lines of defense model**

**• AA’s role in three lines of defense model**

* Policy liability valuation: 1st line since liability estimates are used by board;
* Other valuations such as for statutory capital and embedded value: 1st line;
* Financial Condition Report: all three as report is primarily an independent review but does consider commentary on liability valuations;
* Actuarial advice regarding policies, pricing, and reinsurance: 2nd or 3rd if others make decision based on the advice. 1st line if input drives decision. Often the AA co-ordinates and manages separate parties involved in both pricing and review of pricing advice;
* Assess uncertainty in capital stress testing: 2nd or 3rd line as the work in an independent review that does not directly affect the risk profile of the underlying business.



**13.4 Risk Management Process**

**13.4.2 Risk treatment**

4 main responses to risk: reduce, remove, transfer or accept.

**13.4.5 Role of other stakeholders**

• The board of an insurer, or trustees of a retirement fund

• Business line management (business owners)

• Risk management function

• Internal and external audit

• Appointed Actuary

The Appointed Actuary is the expert in the management of financial risks (in particular, insurance risk) for the organisation. If the AA is a member of the senior management team, he or she will have the same responsibility as other managers for embedding a risk management culture. In addition, AA may perform an assessment of the suitability and adequacy of the risk management framework as part of a financial condition report, as well as providing advice prior to the launch of new products.

• Prudential regulators (e.g. APRA)

• Market conduct regulators (e.g. ASIC)

• Members and Policy owners

**Module 14 Capital Management**

**14.1 Introduction**

• Financial **risks**:

* insurance risk (mort / morb / persistency / expense)
* credit risk
* market risk (incl. mismatch)
* liquidity risk

• Non-financial **risks**:

* operational risk (poor decisions, failed internal processes)
* strategic risk
* application / execution risk

• Key steps in a **risk-based** capital calculation process:

* **identify risk**: select suitable stressed scenarios and assumptions;
* **shock BS**: calculate assets and liabilities under each of the stressed scenarios;
* **aggregate risks**: aggregate the overall impact of each of the stresses, allowing for correlation and diversification between them.

Capital required under each stressed scenario is the difference between net assets calculated under the ‘normal’ valuation basis and under the ‘stressed’ basis. (change in net asset)

• Members and employers of DB funds are exposed to shortfalls in accumulated funds arise from several sources of risk, including:

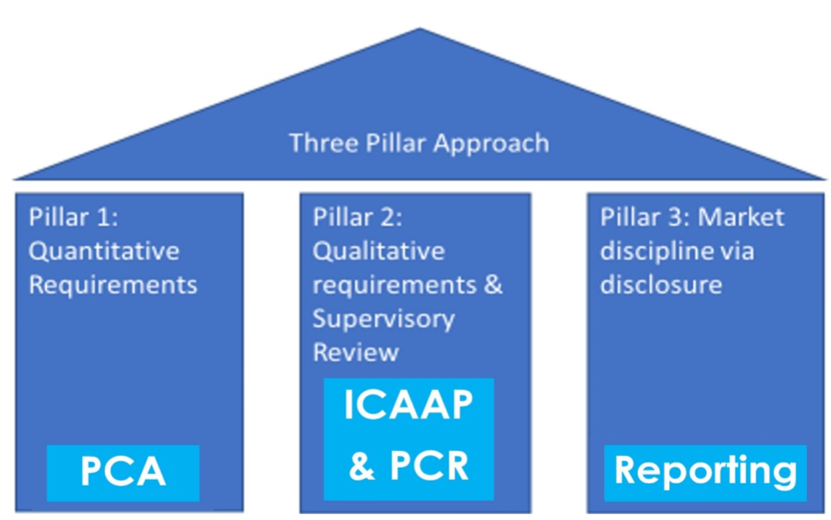
* lower than expected investment earnings (low i)
* higher than expected increases in member salaries (high e)
* higher than expected longevity of retired members receiving annuity benefits.

**14.2.3 Economic and regulatory capital**

Economic capital is the minimum amount of capital a company decides is appropriate for ongoing operations, having regard for the risks in the business, the company’s access to further capital and its risk appetite

Regulatory capital is the amount calculated in accordance with the rules set by a regulator.

Regulatory capital usually exceeds economic capital for an entity as regulatory capital has assumptions appropriate to all entities within a jurisdiction.

**14.3 Three pillars of supervision model**

PCA (Prescribed Capital Amount) is similar to the concept of BSCR.

PCR (Prudential Capital Requirement) = PCA + supervisory adjustment

**PCR** is intended to provide a certain probability (typically 99.5%) that a company will have sufficient capital to absorb unexpected shocks or losses that may arise over a stated time horizon (typically one year).

**• Capital Base = PCR + Surplus Capital**

It is unusual for a regulator to require, or even allow, life companies to disclose any supervisory adjustments, as disclosure of the supervisory adjustment could have unintended or adverse consequences. For example, external observers may over-react to such an adjustment. In addition, disclosing the supervisory adjustment could inhibit the prudential supervisor, in that it would have to consider the market reaction or over-reaction to each of its actions.

**14.4 Pillar 1 - Quantitative requirements**

**14.4.1 Capital Base**

• **“Going concern” basis VS “Wind-up” basis**

Wind-up: intangible assets such as goodwill, DTA, DAC and capitalised expenses may be excluded from the value of assets.

• IFRS 17 should improve consistency in measuring assets and liabilities in different jurisdictions.

• **Adjusted asset values**

The principle is to consider the value of the asset if it were to be sold immediately.

• **Adjusted policy liabilities**

A regulatory adjustment to capital may be made by adjusting the policy liabilities. One purpose of adjusting policy liabilities is to separate policy owner interests and shareholder interests. Examples:

* removal of future shareholder profits from PL and instead including them in capital (usually in CET1)
* setting the minimum policy liability equal to the approximate pay-out to policy owners in the event of a wind-up of the company, which may not equal the surrender value
* adjusting liabilities to ensure policy owner entitlements, e.g. future bonuses in participating business or interest credits for non-participating business are not treated as part of the capital base.

• **Types of capital**

**Tier 1 capital**: eligible capital provided by shareholders, consisting of:

*Regulators require that CET1 and AT1 together comprise a minimum* ***80%*** *of a life company’s PCA at all times.*

* *Common Equity Tier 1 capital (CET1)*

It includes paid-up ordinary shares and retained earnings and must include any regulatory adjustments to policy liabilities (see above on adjusted policy liabilities).

CET1 absorbs losses as and when they occur (through deduction of losses from retained earnings).

Regulators require that CET1 comprises a minimum **60%** of a life company’s PCA at all times.

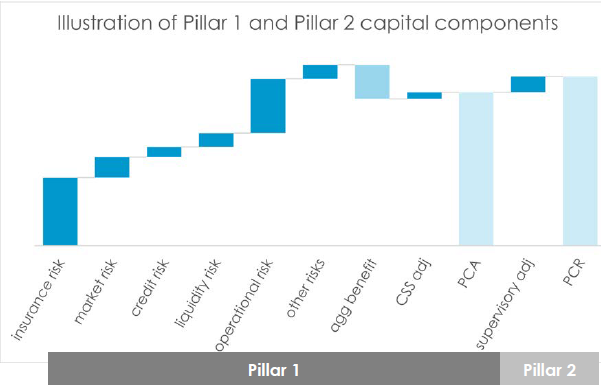
* *Additional Tier 1 capital (AT1)*

The most common type of AT1 instrument is perpetual preference shares. Perpetual preference shares can absorb losses because the life company has no obligation to pay dividends or to repay the amount invested by shareholders.

**Tier 2 capital**: subordinated debt (that is subordinated to the policy and other liabilities)

* *The subordinated debt will appear as a liability on the company’s balance sheet. However, in assessing the capital base of the company, it is NOT treated as a liability.*
* *Tier 2 capital only absorbs losses if the life company becomes non-viable or is wound-up.*
* *Tier 2 capital could bear part or all of any further losses after the Tier 1 capital is exhausted. Loss🡺 Tier 1 🡺 Tier 2*

**14.4.4 Prescribed Capital Amount (PCA)**

Pillar 1 capital amount 🡺 Prescribed Capital Amount (PCA).

The PCA is defined as the sum of:

* + capital to cover:
* *insurance risk (mortality, longevity, morbidity, lapses, expenses, take-up rates of options);*
* *market risk (IR, equity and property, currency, reinvestment, concentration, AL mismatch);*
* *credit risk;*
* *liquidity risk;*
* *operational risk;*
* *other risks identified by the entity; less*
  + aggregation benefit; plus
  + combined stress scenario (CSS) adjustment. *(see 14.4.19 Risk aggregation)*

**14.4.7 Insurance risk**

There are many potential causes of insurance risk, ranging from:

* failure of process at underwriting
* inappropriate contract design
* changing social conditions that lead to higher claims and inadequate reserving.

**14.4.8 Mortality and morbidity risk**

Mortality and morbidity are modelled separately but are subject to the same types of stresses. **4 risk components** which apply to both mortality and morbidity are:

**•** **Random stresses** (also called volatility)

* *Adverse fluctuations in experience from the best estimate, excluding the impact of single events that cause large numbers of claims, such as pandemics, terrorist attacks and natural catastrophes.*
* *The random stresses are applied for a period, typically the capital calculation time horizon, from the reporting date.*
* *The modelling assumes random stress does not apply after the end of the time horizon.*
* *A larger number of lives will result in smaller random claim fluctuations and therefore a lower amount of capital will be required.*
* *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.*

**• Catastrophe**

* *This stress extends the random stress event to allow for the impact of a single event causing multiple claims in some timeframe, usually the capital calculation time horizon, following the reporting date.*
* *A notable feature of the pandemic scenario is that it is the same for all the life insurers regardless of the number of lives insured.*

**• Trend uncertainty**

* *The possibility that changes to allowances for future trends in mortality and morbidity experience will have to be made (trend uncertainty risk).*
* *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.*
* *This stress margin is often applied from the reporting date for the remaining term of the liabilities.*

**• Level uncertainty**

* *The possibility that the best estimate assumptions are incorrect (level uncertainty risk).*
* *If the company has little past experience and relied purely on fairly limited population statistics, a much higher stress margin will be required.*
* *This stress margin is often applied from the reporting date for the remaining term of the liabilities.*

**14.4.10 Expense risk**

3 cost components:

**•** Acquisition

* *New business risk for fixed costs as actual sales may be different than those assumed.*

**•** Maintenance

* *Renewal expense risks may arise if the business develops differently than expected. An additional risk is that the expense components (rental costs, wage growth, utilities, etc.) may grow at rates different than expected.*

**•** Termination

**14.4.11 Lapse risk**

Other stressed events may affect policy owner behavior and hence affect lapse rates (e.g. higher claims rates may drive the decision to increase prices, which would likely lead to higher lapse rates).

**• Lapse risk 1 — release of liability and payment of surrender value**

For a policy, assume there is an associated policy liability of **$V** and surrender value is **$S**. On surrender, the asset side of the balance sheet falls by the cash payment of $S. The liability side falls by the release of the liability, $V. The effect on the company, in terms of the change in available capital (assets less liabilities) is:

* + positive if V > S and thus a stressed lapse will be a decrease in lapse rates;
  + negative if V < S and thus a stressed lapse event is an increase in lapses, although in some jurisdictions a policy liability must never be lower than the surrender value.

**• Lapse risk 2 — acquisition expense recovery shortfall**

Lapse higher than anticipated is a risk to the recovery of the acquisition expense.

**• Lapse risk 3 — interdependence with other assumptions**

Suppose a response to an expense risk is to increase premium rates. Then healthy lives may seek cover elsewhere, leading to worsening mortality for the remaining policies. This could be an additional scenario to apply when considering the totality of insurance risks.

***\*Reasons that a company has an insurance risk charge of 0.***

1) Profitable premium exceeds the stressed claims and expenses.

2) Diversification benefit between businesses.

3) Ability to reprice at short notice 🡺 reduce future trend stress charge (but not the random or event stress charges).

**14.4.12 Market risk**

• Market risk stress may apply to all assets. However, if surplus assets are included when examining the consequences of a stress, that would have the perverse result of capital distributions lowering the PCA (unless the distribution is funded by selling or transferring assets that do not have a market risk charge), i.e. less asset 🡺 lower PCA

Hence, market stress is restricted to assets backing PL.

• IR risk involves a mixture of market risk (real yield and inflation risk premium), credit risk and liquidity risk.

**14.4.13 Credit risk**

• It is arguable that whether credit stress should apply to all assets or only those backing PL.

**14.4.14 Liquidity risk**

• Examples:

* Relatively few policy owners represent a significant portion of a fund (liability concentration)
* the company is small and has limited access to capital markets
* the company has insufficient ability to access short-term borrowing

**14.4.16 Operational risk**

• Examples:

* 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 operations;
* 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;
* external events causing damage to the life company’s premises, equipment or people (e.g. terrorism, vandalism, earthquakes, fires, floods and pandemics);
* the increasing reliance on advanced technology;
* legacy and IT system issues;
* outsourcing and agency distribution channels;
* mergers and acquisitions activity;
* Cyber risk.

• In theory, the amount of capital required for operational risks will 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.

**14.4.17 Management actions**

Must be appropriate, justifiable, equitable and consistent with policy owners’ reasonable expectations based on product disclosure documents.

**•** Mitigating actions in response to **extreme insurance risk stresses**:

* Reducing bonus or crediting rates for participating business;
* Increasing premium rates for non-participating business. 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.

**•** Mitigating actions in response to **extreme market risk stresses**:

* Reducing bonus or crediting rates for participating business;
* Immediate reductions to termination values (e.g. by reducing the surrender value of terminal bonuses or unvested interest credits).
* The reasonable expectations of policy owners is also a constraint if promotional material indicates that premium rates will only be increased in response to a worsening of claims experience, not asset stresses.

**14.4.19 Risk aggregation**

**• Combined stress scenario adjustment**: combined stress scenario is a top-down approach used to cross check the capital requirement calculated using a bottom-up approach (i.e. aggregating the capital requirements under each univariate shock). The combined stress scenario may indicate that an additional amount of capital is required on top of that calculated by aggregating individual risks.

**14.5 Pillar 2 - Qualitative requirements and supervision**

Pillar 2 is the entity’s review of its internal processes, followed by the supervisory review process.

**14.5.1 Self-assessment**

• ICAAP process (P74)

**14.5.2 Target capital**

•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;*
* *cost of capital;*
* *the position of other companies.*

• 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 time horizon.

• A target of this nature (150% of PCR) is less useful as it does not indicate the likelihood of a breach of PCR.

• 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.

**14.5.3 Stress testing**

Should form part of the life company’s ICAAP.

Could help set a life company’s risk appetite and target capital levels.

**14.5.4 Capital response**

• adjusting dividend policy: reduce or suspend;

• repricing existing business;

• managing the rate at which new business is acquired, e.g. too fast for capital raising or closure for NB;

• changing the company’s reinsurance arrangements;

• adjusting the investment asset mix to achieve a change in the company’s risk profile;

• Purchasing derivative to limit asset losses

• transferring assets between statutory funds and into (and potentially back from) shareholders’ funds, if available. Transfers would be made from funds with excess capital to funds that have less than their target capital;

• capital injections from the company’s parent.

***\*Exercise 14.12 - Your company meets its PCR but falls short of target capital by a significant margin after a period of severe turmoil in financial markets. Possible actions:***

* *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.*

***\*Exercise 14.13 - Why might the cost of additional reinsurance be lower than the cost of holding additional capital for insurance risks?***

* *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.*

**14.5.5 Supervisory review**

• Supervisory adjustments to the PCA occur in a range of circumstances, including when:

* the PCA 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;
* the regulator has identified material issues with the competence or probity of responsible persons associated with the life company;
* the regulator 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 organizational structure or is following a business strategy that the regulator regards as highly risky or overly difficult to assess, in a way that is not captured under the calculation of the PCA;
* the life company’s internal processes are not well-defined or documented, or its target capital policy is assessed as being inadequate, such as due to a lack of sufficiently rigorous stress and scenario testing; or
* the life company has been unable to restore its capital position to target capital levels in accordance with its own policies in a timely manner.

• When a supervisory adjustment is added to a company’s PCA, the resulting capital requirement can be referred to as the Prudential Capital Requirement (PCR).

• Supervisory amount is unlikely to be disclosed. It is a private matter between the regulator and the regulated entity.

***\*Exercise 14.14 - Why a merger of 2 companies could reduce PCR for the combined entity?***

* *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.*

**14.5.6 Intervention powers**

**Module 15 Appraisal Values**

**15.1 Introduction**

• **Purpose**: Identification of profitable business lines 🡺 replace loss-making products through repricing or redesigning contract terms.

• A change in VNB needs to be interpreted with caution, as it depends on assumptions about expected future sales and profit margins on those sales, both of which can be very subjective.

• **Book value method**: using the value of equity on the balance sheet as a measure of the value of a company is rarely done as it has the following **Disadv.**:

* *it ignores the value of future profits expected to emerge from existing business;*
* *it ignores the value of future new business;*
* *it does not deduct a cost of capital to reflect the fact that a portion of the net assets must be held to meet prudential capital requirements.*

• **Price/earnings ratios method:** can be used for life companies that have a simple product range and a reasonably stable rate of growth.

• An appraisal value is very sensitive to the assumptions that are used. It is very different in this respect from policy liabilities, where a change in assumptions may have little immediate impact on results, provided there are profit margins to absorb any such changes.

**15.3 Adjusted net worth**

**ANW** refers to the “excess assets” of the company. It is the economic value of assets in excess of liabilities and regulatory capital\*. In theory, it could be paid to owners immediately and thus it is valued at face value.

*\*Sometimes target surplus is included with regulatory capital when determining required capital for economic valuation purposes.*

**15.4 Value of existing business**

**VEB** is the PV, at the hurdle rate, or risk discount rate, of future distributable profits, being the sum of reported profits and net releases of required capital. It excludes excess capital that has already been included in the adjusted net worth.

• VEB is projected by assuming that starting assets equal the amount needed to meet capital requirements, then the distributable profit in each period is simply the excess at the end of the period above the total quantum of assets needed to meet capital requirements.

• The **hurdle rate** represents the average investment return required by the providers of capital. • The hurdle rate normally exceeds the expected after-tax rate of investment return on the assets backing capital and this results in the PV of future distributions of capital < the current face value of capital. This difference between the current face value of capital and the PV of future distributions is referred to as a cost of capital.

• If surplus assets are included in the VEB, the overall EV will be reduced due to a cost of capital being applied to a larger quantum of required capital.

• The key differences between the valuation of future profit margins and the VEB are:

* *VEB requires projections for all types of business;*
  + *contracts whose policy liabilities are determined using an accumulation method, such as investment contracts, will need to be valued using projection methods when calculating the value of existing business;*
* *VEB is determined using a hurdle rate (or risk discount rate) representing the required rate of return, whereas insurance contract policy liabilities are calculated using a risk-free discount rate or the expected earned rate on the assets backing the business;*
* *VEB includes the release of required capital for the business as well as the best estimate profits emerging from the policy liabilities;*
  + *the amount of capital needed to meet the future PCR needs to be projected as well as the policy cash flows to determine VEB;*
* *VEB includes the investment earnings on the assets backing the policy liabilities and capital;*
  + *the discount rate differs from the investment earnings rate and, therefore, investment earnings have to be projected as an explicit cash flow item;*
* *Tax must be modelled as an explicit cash flow item and profits must be valued net of tax.*

**Alternative presentations of EV -** need to decide where capital is allowed for (in VIF or ANW)

ANW includes the full face value of locked-in capital;

VIF is presented as the PV of profits less the difference between the face value and PV of the ultimate release of that locked-in capital, i.e. PV of profits – Cost of capital.

*\*From Samuel on the Forum:*

*There are 2 ways of defining ANW and VIF, however the 2 definitions must be consistent.*

***Presentation method 1:***

*• ANW = Assets - liabilities - regulatory capital = free assets (the amount of assets that you could immediately distribute to shareholders)*

*• VIF = PV(distributable earnings) = PV(profits) + (regulatory capital - "Cost of capital") , where*

*distributable earnings = profit + capital release for that particular year;*

*"Cost of capital" = regulatory capital – PV(capital release)*

*The term in brackets says the actual value of regulatory capital is reduced since releases of capital are deferred, and are discounted at a higher rate than their actual return on capital.*

***Presentation method 2:***

*• ANW = Assets - liabilities = net assets ("ANW includes full face value of locked in capital").*

*• VIF = PV(distributable earnings) - regulatory capital = PV(profits) - "Cost of capital".*

**15.5 Value of future new business**

**VNB** is the value of the distributable profits expected to emerge from future sales of new business. Typically, there is a negative distributable profit at point of sale, which is caused by the need to fund capital requirements as well as to cover any initial expenses that cannot be deferred.

• VNB may be calculated in a number of ways:

* estimating sales into the future and building a projection model of the distributable profits from all such future sales;
* calculating the value of one year’s sales **VOYS** and multiplying by a new business multiplier (a capitalization factor), derived by considering:
  + *the number of years of new business that are to be included in AV*
  + *the rate of growth in NB sales (total market growth & company share of total market)*
  + *margin squeeze (being an allowance for margins to be compressed over time)*
  + *the base risk-adjusted discount rate used for the VEB valuation*
  + *potentially an additional discount rate margin to reflect the riskiness of achieving future new sales at the margins assumed.*

• It is important that any definition of NB is disclosed and applied consistently from year to year.

*e.g. single-premium top-ups may be included in EV calculations.*

**15.6 AV actuarial basis**

• AV BE basis is not necessarily the same as the BE basis used for the determination of PL.

* for insurance contracts, the mortality, morbidity and lapse assumptions are usually the same as the assumptions used in determining policy liabilities;
* expense assumptions may differ as an EV/AV may allow for anticipated future expense savings;
* for investment-linked contracts, assumptions for lapse/withdrawal rates and servicing expenses are necessary, even though these may not be required to value the policy liabilities;
* changes to pricing may include increases or reductions to fees and/or premiums, depending on the outlook regarding competitive pressures;
  + *fee reductions are referred to as margin squeeze;*
  + *statutory valuations may be restricted to consider only pricing changes that are in the process of implementation.*

**15.7 Taxation and Australian imputation credits**

• **Imputation credits**: corporations and individuals receive tax credits where income is derived from dividends paid from net of tax profits. These are often included in EVs and AVs, which means that an EV or AV represents the value of the business in the hands of the shareholders before the shareholders are taxed on their dividend income.

• **Gross-gross** valuation: “gross” (before tax) risk discount rate applied to net of tax profits, plus imputation credits. 🡺 AV is effectively before tax.

• **Net-net** approach: net of tax discount rate applied to net of tax earnings. 🡺 should produce an equivalent result to the gross-gross method.

**15.8 Balance sheet view of EV (see graph in P19)**

• Surplus capital = ANW, can be released immediately.

• The fair value of liabilities is the amount for which a liability could be settled between knowledgeable, willing parties in an arm’s length transaction, i.e. **purchase price**.

*Fair value of liabilities = CoC + cost of delayed profit release + BEL*

• The EV calculation discounts distributable profit (being reported profits plus the net change in required capital) at a higher rate than the rate used in discounting profits in the company balance sheet. Hence, the future profit margin of $350 is reduced to $250 (value of future profit margins) in the EV balance sheet. The difference is the cost of the delayed profit release item.

**15.9 Analysis of change in EV**

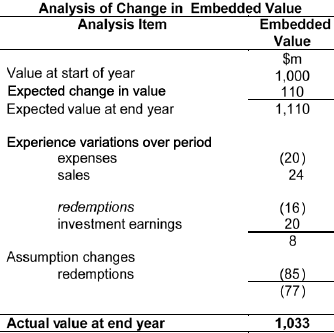
• EV is very sensitive to assumptions that are used.

• An analysis of change acts as a check on the accuracy of the calculations.

• The result will highlight areas where there has been a significant deviation between actual experience and the best estimate assumptions. These may be due to random fluctuations but may indicate a need to update best estimate assumptions.

**15.9.2 Items to consider (similar to the analysis of surplus)**

*Note that NB is always classified as an item of experience variation in the analysis of EV, as the opening EV does not anticipate any future NB.*

*An example*

1. **Return on ANW**

Expected to grow at expected investment return for assets backing ANW0.

1. **Return on VEB**

VEB0 represents the PV, at the risk discount, of future profits distributed to shareholders. It is equal to:

*• PV at t = 0 of profits in the period t = 0 to t = 1; and*

*• PV at t = 0 of profits in periods post t =1.*

Rolling the above forward by one year, the total simply increases by the risk discount rate (although part of the total, being the profits released at t =1, are expected to transfer to ANW, with the balance forming VEB1). Thus, the expected return on VIF0 is the risk discount rate multiplied by VIF0. This item is known as **unwinding of the risk discount rate**.

1. **Demographic experience variations**

*• profit emerging over the year will be different than expected (e.g. more deaths, lower lapses, higher actual office costs);*

*• the number and types of contracts remaining at the end of the year will be different than originally anticipated.*

1. **Demographic assumptions changes**

Changes in the valuation basis at the end of the period will have an effect on EV. (not on PL, unless it is loss recognition).

1. **New business**

*• NB sold in the year will typically cause a decrease in ANW through NB costs or strain, and an increase in VEB.*

*• The value of NB sold will explain part of the increase in the EV. It will also directly affect the VNB if this is calculated using a NB multiplier applied to VOYS.*

*• Changes in VOYS will be driven by changes in volume and mix, best estimate assumptions, acquisition costs and product pricing.*

1. **Investment experience variations, currency movements and economic assumption changes**
2. **Capital raised** will increase ANW and **capital distributed** (i.e. shareholder dividends or capital returns) will decrease ANW.
3. **Movements in risk-free discount rate and risk discount rate.**

They are always likely to be significant and are analyzed by calculating the EV under old and new assumptions.

**15.10 Detailed examples**

• Tax is based on the accounting profit, which = NCF with the interest on all assets (not PL) + release of PL.

• Distributable profit gross of tax is only based on CFs. Change in profit carrier will not affect it. However, change in profit carrier will affect the change in PL, then accounting profit (the pattern of profit release), then tax, then distributable profit net of tax.

• Distributable earnings plus imputation credits at EOY year 1 shall be moved from VEB to ANW.

• *P37 review the exercise: change in AV*

*Lapse up 🡺 VEB down & ANW up 🡺 AV down as the reduction in VEB would be expected to be greater than the increase in ANW due to the capitalised effect of loss of all future profits from a lower volume of business in force at year-end.*

**15.12 Market consistent embedded values**

An **MCEV** consists of:

* **free surplus**
  + *remaining shareholder equity*
* **required capital**
  + *distribution is restricted; may include target surplus.*
* **value of existing business**

• *The value of existing business consists of:*

* + *PV of future shareholder profits (after tax); less*
  + *the time value of financial options and guarantees; less*
  + *frictional costs (tax and investment expenses)of required capital; less*
  + *the cost of residual non-hedgeable risks (operational, strategic, reputational).*

• *VEB should be valued on a market consistent basis (i.e. valued using discount rates consistent with those that would be used to value such cash flows in the capital markets).*

• *The time value of financial options and guarantees must be calculated using* ***stochastic*** *techniques. This is a key difference between an MCEV and the “traditional” method, where the value of financial options and guarantees would be allowed for by adjusting the risk discount rate.*

• The MCEV methodology is particularly **useful** for:

*valuing life companies with complex or asymmetric risks, such as those found in participating business.*

• It tends to be **less useful** for:

*simpler types of business, such as risk insurance business and investment-linked business, which do not have financial options or guarantees.*