

# LIFE INSURANCE AND RETIREMENT VALUATION

MODULE 11: ASSET VALUATION AND  
INVESTMENT STRATEGIES





## Module 11

# ASSET VALUATION AND INVESTMENT STRATEGIES



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# 11. Asset valuation and investment strategies

This module addresses the following learning objectives.

Item	Unit/Key Performance Objective/Learning Objective
4.	<b>Evaluate Asset Valuation Methods and Asset Liability Management Strategies</b>
4.1.	Differentiate between the different types of assets on the balance sheet of a life company or retirement fund
4.2.	Assess the nature of the relationship between assets and liabilities and the need for consistency in their valuation approaches
4.3	Examine the key steps and actuarial analyses required in the setting of investment strategies
4.4	Explain asset liability management strategies
4.5	Evaluate and apply asset valuation methodologies for a range of asset types

In previous modules, our focus has largely been on the liability side of the balance sheet. This module focuses on the other side of the balance sheet, exploring the valuation and management of the assets of a life company or retirement fund.

As stated previously, a key goal of a life insurer or retirement fund is to ensure its assets are adequate to cover its liabilities as they fall due.

The assets of an entity can include a broad range of investments, from the more traditional asset classes such as equity, property and fixed interest securities, to other assets such as derivatives, commercial loans, hedge funds, private equity and controlled subsidiaries.



This module will examine the different types of assets held by life insurers and retirement funds, the relationship between assets and liabilities, investment and asset management strategies, and asset valuation techniques.

## 11.1. Assets on the balance sheet

### 11.1.1. Definition of assets

In economics, an *asset* is any form in which wealth can be held. The assets on a life company's balance sheet are related to liabilities as follows:

$$\text{Assets} = \text{Liabilities} + \text{Capital}$$

For a retirement fund, assets held in excess of the value of liabilities belong to the fund and are managed by the trustees for the benefit of members. For a defined benefit (DB) fund, any excess or shortfall will potentially impact the required contribution rates of the sponsoring employer. Similarly, in a life insurance company, policy owners may have an interest in assets in excess of liabilities.

The management and valuation of assets clearly have implications for the security of policy owner or member benefits, and the interests of shareholders and the sponsoring employer.

The following definition of an *asset* is based on that of the International Accounting Standards Board:

*An asset is a resource controlled by the enterprise, as a result of past events, from which future economic benefits are expected to flow to the enterprise.*

"Expected benefits" indicates a probabilistic nature. An asset has a capacity (not necessarily with certainty) to contribute singly, or in combination with other assets, to future net cash flows.



Past events, as used in the definition above, could include the purchase of the asset or the sale of an investment that gives rise to a loss that generates a deferred tax asset. The event gives rise to the entity's right to, or control of, the benefit. An asset can only be recognised when the event has occurred.

### 11.1.2. Types of assets

There is a wide range of asset classes that form suitable investments for life companies or retirement funds. These can include more traditional asset classes such as local shares, international shares, direct property, listed property trusts, government bonds and corporate bonds. Other investments might include residential and commercial mortgages or other loans, infrastructure, private equity, derivatives, hedge funds, joint ventures and enterprises (which may be controlled subsidiaries).

Figure 11.1 provides an example of the types of assets held on the balance sheet of an Australian group that includes a life company and related operational companies, and the way that these are reported.

**Figure 11.1: Example of assets held by a financial services company**

### Consolidated statement of financial position For the year ended 30 June 2017

		Consolidated		Company	
	Note	2017 \$'000	2016 \$'000	2017 \$'000	2016 \$'000
Assets					
Cash and cash equivalents	15	222,197	217,673	5,880	20,889
Investments	16	1,814,049	1,615,226	377,159	354,158
Receivables	17	37,947	16,097	13,689	11,855
Fixed interest deposits	18	78,327	79,584	-	-
Reinsurers' share of life insurance policy liabilities	25	15,338	(703)	-	-
Current tax assets		-	641	-	641
Deferred tax asset	24	10,509	10,801	310	573
Property, plant and equipment	21	1,425	1,823	-	-
Goodwill	19	20,452	19,952	-	-
Intangible assets	20	24,202	28,428	-	-
Total assets		2,224,446	1,989,522	397,038	388,116

Source: Clearview 2017 annual report



Note the distinction above between investments and other asset categories. The other asset categories generally relate to assets that arise from, and are specific to, the conduct of the business. The categorisation of assets on a company's or fund's balance sheet will depend on local reporting standards. Australian standards have tended to adopt international accounting standards.

The Note 16 referred to in the above annual report extract provides a breakdown of the investments into three categories: equity securities, debt securities and property/infrastructure securities. Each category is further subdivided into direct holdings and indirect holdings via unit-trusts. The asset mix held within the life company and the wealth management company will depend on the products that are sold.

Some assets that are typically included in the asset categories listed above in Figure 11.1 are as follows.

**Receivables:** Many companies extend credit to their customers. For life insurers, receivables may include premiums payable, investment income and dividend entitlements not yet received, and reinsurance receivables.



**Cash and fixed-interest deposits** may be considered part of the entity's investment assets. They are reported separately from other assets as they are highly liquid and can be used to meet more immediate expenditure, both planned and unexpected.

**Investment assets** can include equities, property, fixed-interest and indexed securities, options, private equity interests or any other assets held for investment purposes (see opening paragraph in this section).



**Property, plant and equipment** are assets that are held specifically for the running of the business. These may include office buildings, office furniture and computers.



**Intangible assets** are non-monetary and non-physical assets.

Examples are trademarks, patents, goodwill and deferred acquisition costs.



**Deferred acquisition costs** relate to costs such as initial commissions paid on new policies. These costs are sometimes deferred and recovered from future profit margins. In some jurisdictions, they may be treated as a negative liability, which is effectively an asset, and was described in Module 6 (Profit).

**Goodwill** is listed separately in the example balance sheet above. Goodwill represents the value of an entity not directly attributable to its assets and liabilities. A goodwill asset can arise when the amount paid to acquire an entire business exceeds the value of net tangible assets (reported value of physical and monetary assets less liabilities) of that business. The excess is expected to be recovered from future profits for that business and is reported as a goodwill asset. The goodwill asset recognises, on the balance sheet, these future cost recovery amounts and prevents losses being reported at the time of acquisition. The principles underlying this approach and the resultant reported goodwill asset are similar to those for deferred acquisition costs on new life policies (except that goodwill is recorded as an explicit asset, not a negative liability).

Accounting rules for intangible assets can differ between jurisdictions. If an intangible asset or goodwill asset is viewed as having a finite life, the asset may be amortised or reduced over its expected life. If the asset is viewed as having an indefinite life, it may not be amortised. In this case, the accounting rules may require the company or fund to demonstrate that the value placed on the asset is supported by expected future profits. An actuarial valuation of future profits [termed *appraisal* or *embedded valuation* – see Module 15 (Appraisal values)] may be required to support the valuation placed on goodwill assets for reporting. The valuation of goodwill assets is covered in Section 11.4.6.

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.





# Life Insurance and Retirement Valuation

## Module 11: Asset valuation and investment strategies



**Reinsurers' share of life insurance policy liabilities:** A reinsurer's obligation to pay a portion of claims effectively reduces the value of a life insurer's liability for those claims. For transparency and more meaningful disclosure, international reporting standards require reinsurance to be reported separately as an asset. The value of this asset is usually determined by the actuary using assumptions and methodologies consistent with those used for valuing the underlying policy liabilities.

**Current and deferred tax assets:** In most jurisdictions, where a company is carrying a net loss, this loss is generally deductible from future profits, reducing future tax payable. Tax losses carried forward are therefore recognised as an asset on the balance sheet.



### Exercise 11.1

Search on the internet for other balance sheet examples from either life insurers or retirement funds. How do asset categorisations differ between the balance sheets you've found?

Clearly, there is a range of investment options available to an entity. The next section looks at investment strategies which can be adopted by entities to guide their choice of assets to invest in.



### 11.2. Determining investment strategies

As has been discussed throughout previous modules of this subject, the timing of income and outgo for life companies and retirement funds is mismatched. Premiums or contributions plus investment earnings are used to meet future claims or benefit payments, expenses, tax obligations and, for proprietary life companies, to generate profit. These premiums, contributions and investment earnings contribute to the assets of the company or fund.

Good management of investments is, therefore, an important activity of retirement funds and life companies, allowing them to provide benefits and claims at an efficient cost to retirement fund members and their employers, and to life insurance policy owners.

*Investment strategy* refers to the rules and tactics used to guide an investor's selection of investment portfolios. A strategy is put into effect through the acquisition, management and disposal of investment assets.

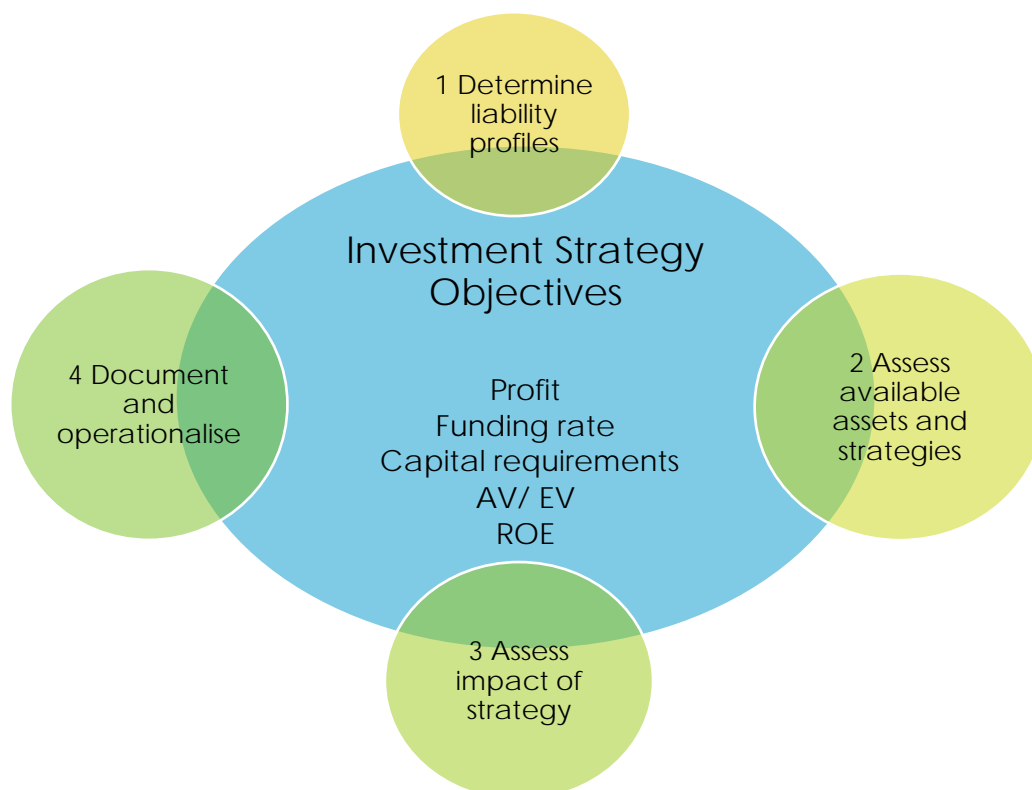
Investment management may be partially or wholly outsourced, especially for smaller companies and funds. However, in selecting and executing investment strategies, many of the considerations of a company or fund are the same whether investment management is outsourced or conducted in-house. These considerations are discussed in the following section.



### 11.2.1. Investment strategy process

There are several steps involved in setting and maintaining a suitable investment strategy. These steps are illustrated in Figure 11.2 and described in the section below.

Figure 11.2: Setting investment strategy



A life or retirement fund actuary may not have specific expertise in the selection, setting or execution of investment strategies but contributes to the investment strategy in a number of ways. In particular, an actuary can assess the liability risk profile and the suitability of an investment strategy in meeting the company's risk and return objectives (possibly with reliance on investment experts to assess the risk profile of the invested assets).



### Determine liability profiles

A first step in the determination of an appropriate investment strategy is the analysis of the nature, term and currency of liabilities. This includes quantification of the expected cash flow profiles and risk characteristics of policies or benefits.

Results need to be summarised and presented in a way that makes them useful in setting and monitoring the investment strategy. Therefore, care should be taken to present the results in a way that other experts will be able to understand, particularly in regard to the level of detail provided and the language or terminology used. As an example, a projected profile of expected cash flows under lifetime annuity policies using a realistic valuation basis may guide the selection of a fixed-interest portfolio. The projected cash outflows will show the expected future cash payments to the current annuitants. A bond portfolio may be constructed where the coupon payments and bond redemptions broadly match the future annuity payments. Further projections or scenario analyses to illustrate the impact of variations in assumptions may also be useful in determining an appropriate investment strategy.

### Assess available assets and strategies

Having analysed the key characteristics of liabilities, the next step is the identification of suitable assets and investment strategies. Investment strategies are set with consideration given to:

- **the risk profile of the liabilities:** The level of uncertainty about the amount and timing of future contingent payments (e.g. insurance claims, policy surrenders or retirement fund voluntary withdrawals) will influence the insurer's or fund's choice of investment strategy. For example, short-term, highly uncertain payments will likely lead to investments in conservative, highly liquid assets;
- **the risk and return objectives** of the company or fund, including the amount of tolerance for mismatch between assets and liabilities and resultant profit volatility;



- **regulatory requirements or restrictions**, such as the total capital adequacy margin required to support a particular investment strategy (this is discussed further in Section 11.2.2). In addition, some assets, such as equity, debt or other interests in related companies and intangible assets may be deemed by the regulator to have zero value for capital adequacy purposes;
- any **company or fund restrictions** on certain asset classes or types of assets. For example, gearing through exposure to uncovered future contracts may be prohibited. An entity may also have a desire to invest ethically or in a socially sustainable way, such that the environmental and social impacts of different investments are considered; and
- the need for **diversification**: According to Modern Portfolio Theory, diversification improves the risk/return trade-off. Having determined an appropriate strategy and rules at an asset class level, diversification, within the constraints of the strategy, is therefore desirable.

The types of products sold or benefits provided will also impact the choice of a suitable investment strategy for the assets backing them. There are categories of policy liabilities or member benefits where investment strategies are governed by either customer expectations about future returns or customer selected investment options. For example:

- **Investment-linked or index-linked policies**: Under investment-linked or indexed policies, the policy owner receives returns based on a selected investment strategy or index. This creates an obligation to invest proceeds according to a particular investment mandate or approach. The policy owner expects investment returns to move in line with the chosen strategy or index. For investment-linked policies, product documentation may include specific limits (maximums and minimums) on exposure to various asset classes such as shares, property and fixed-interest securities. A matched strategy is one that aligns with that promoted in the policy documentation.
- **Defined contribution (DC) retirement benefits**, which are calculated as contributions less fees or costs plus investment returns, have benefits determined on a similar basis to investment-linked or indexed life insurance policies. In fact, retirement funds providing DC benefits may invest in investment-linked policies to support those benefits.



- **Participating business:** Participating or other discretionary investment business policy owners are entitled to a share of profits. Profits include investment earnings. In setting an investment strategy, regard must be had for policy owners' reasonable expectations. The promotional material for these types of products gives a broad indication of the types of assets the company intends to use to back the liabilities.
- **Guaranteed benefits:** Many types of policies and benefits are guaranteed. For example, term insurance, non-participating annuity benefit amounts and the basic sum assured, together with any declared reversionary bonuses in participating endowment insurance, are guaranteed. The benefits under a DB fund are usually based on average final salary and period of membership with no adjustment for investment performance. Expected returns on supporting assets are an important part of the funding of guaranteed benefits.
- **Life company shareholder equity:** Where assets exceed liabilities, the excess is referred to as *surplus assets* or, for a proprietary life company, *shareholder equity* or *shareholder capital*. Surplus assets do not necessarily back specific policy liabilities but support the security of the company generally. The investment strategy for these assets is modified accordingly. The risk and return objectives of the company, the need for and potential uses of shareholder equity, and the potential sources of additional capital, if needed in the future, will all be considered.
- **Retirement fund reserves:** Where assets exceed liabilities, the excess may be referred to as *reserves*, *net assets* or *surplus assets*. Surplus assets do not necessarily back specific member liabilities but support the security of the fund generally or are set aside for a specific purpose. The investment strategy for these assets is modified accordingly. The risk and return objectives of the fund trustee, the need for and potential uses of reserves, and the potential sources of additional reserves, if needed in the future, will all be considered.

### Assess impact of strategy

The third step is to assess the impact of various proposed strategies on risk and return, taking into account the company's or fund's financial objectives. These objectives might include:

- maintaining solvency;



- maximising profit or surplus;
- minimising profit or surplus volatility;
- maintaining the employer contribution rate or insurance premiums within a target range;
- minimising regulatory capital requirements;
- maximising a life insurer's appraisal value; and
- maximising expected return on capital (i.e. profit divided by capital).

### Exercise 11.2

Describe the ways in which some of the financial objectives listed above can conflict with each other and be difficult to achieve at the same time.

## Document and operationalise

The final step is to document the chosen strategy, operational parameters, performance objectives and the process for future monitoring and reassessment.

Then, implement all the aspects of the strategy, carry out the ongoing monitoring and assessment, and close the loop with regular reviews of the investment strategy by repeating the cycle of steps as shown in Figure 11.2.

### 11.2.2. Capital requirements, risk and investment strategy

Regulators require life companies to hold capital adequacy margins (shareholder equity for proprietary life insurers) to reduce the probability of insolvency. The amount of extra capital that needs to be maintained is, or should be, responsive to the asset profile and investment strategy adopted.

Riskier investment strategies are expected to provide higher expected returns. However, a company or fund attempting to improve returns through riskier investment strategies also risks higher losses if these strategies under-perform. Riskier investment strategies may, therefore, require additional capital adequacy margins to protect against such losses.



The risks inherent in the relationship between an insurer's or fund's liabilities and the assets backing those liabilities can be categorised as follows:

- **Inadequate returns:** The return on assets (income and capital gains) may be insufficient to enable obligations to be met as they fall due.
- **Illiquidity:** Assets may lack liquidity, making it difficult to generate adequate cash flows to pay obligations as they are due. This is different from the point above, although if illiquid assets need to be sold quickly, in which circumstances a low price may well eventuate, the same outcome will arise.
- **Reinvestment risk:** Asset cash flows due for reinvestment may attract worse returns than originally expected. This is termed *reinvestment risk* and is relevant where benefit guarantees are offered many years before the premiums or contributions are received.
- **Mismatch risk:** If asset cash flows do not exactly match the liability cash flows, then there is a mismatch between the two cash flows. A mismatched portfolio that contains fixed-interest bonds is at risk if interest rates change, as explained in Section 11.3.1, below.
- **Credit risk:** With fixed-interest assets, there is the risk of default and also the risk of price falls if the credit spread (the difference between the yield on the bond and the risk-free interest rate) increases.
- **Volatility risk:** It may be argued that if assets do not need to be realised or sold for some time, short-term volatility in asset values does not matter. However, if the value placed on those assets for reporting purposes (often market value) falls, this may cause reported losses or even threaten solvency (where the value of reported assets is less than that of liabilities). If a fall in asset values occurs and a company or fund holds additional margins for adversity (capital adequacy margins), the value of assets may remain higher than that of liabilities. However, in this situation, the company or fund may still be considered to have a shortfall relative to their target capital margin, which needs to be addressed.





Volatility of asset values or investment returns can be a significant source of risk and may add significantly to the required amount of capital for life insurers. Retirement funds may not be subject to the same capital adequacy requirements as life companies due to explicit or implied guarantees from the sponsoring employer (in the case of DB funds) or because the member bears the investment risk (in DC funds). Volatility of asset values and returns will still impact retirement fund member security and may affect the required future employer contribution rate in DB funds. Where cash flows under liabilities are well matched by future cash flows from investment assets, there is lower asset risk and, therefore, lower capital adequacy margins are required. A simple example of a well-matched liability is a pure endowment policy matched by a fixed-interest security with the same interest rate and term.

While matching of assets to liabilities may minimise regulatory or capital adequacy requirements and reduce volatility of surplus or profit, it may not produce optimal returns. *Optimal*, here, means the best expected returns given the objectives and risk tolerance of the company or fund.

The impact of asset risk on capital requirements is explored further in Module 14 (Capital).

### 11.2.3. Allocation of assets to specific liabilities

Life companies typically divide their assets into different pools based on the nature of the liabilities they support, with different investment strategies formulated for each pool. The separation may be notional, for internal management purposes, or more formal. In some situations, funds or sub-funds may be created with separate accounts.

Examples of separate pools (formal or notional) which may be maintained by life companies include those related to:

- tax-advantaged or tax-exempt business, such as retirement business;
- guaranteed retirement income products, such as immediate annuities;
- investment-linked or index-linked business, where investment mandates may be determined according to commitments under policies;
- participating business, where profits are apportioned between shareholders and policy owners;



- savings account-style policies, where investment income is allocated to policy owner accounts by means of a crediting rate, smoothed over time through the maintenance of an investment fluctuation reserve;
- reserves supporting claims in payment for disabled lives; and
- term business.

Similarly, a retirement fund may have different classes of member; for example, active, deferred and pensioner members. The assets supporting these classes may be notionally or formally separated. Funds which include both DB and DC benefits are usually split along those lines. Funds may also contain reserves for specific purposes such as insurance or redundancy. In calculating the value of assets for the determination of solvency or funding rates, the retirement actuary needs to be aware of any notional or actual attribution of assets within the fund.

Where legally separate funds are maintained, all amounts received or paid are allocated to a specific pool or fund. Assets and investments are similarly attributed to specific funds.

### 11.3. Asset liability management strategies

Asset liability management (ALM) is the process of managing risks due to mismatches between an insurer's or fund's assets and liabilities. It includes the selection, implementation and ongoing management of the fund's or company's investment strategy. ALM addresses a wide range of risks such as interest rate and liquidity risk, business and regulatory risk.

A company's or fund's primary objective is to meet liabilities as they fall due. An entity may choose to reduce investment risk by adopting a matched ALM strategy. It may also choose to deliberately mismatch, where allowable, in order to maximise return on investments.

ALM strategies which seek to match assets to liabilities include the following:

- matching;
- approximate matching; and
- replicating portfolios.



These are each addressed below.

### 11.3.1. Matching

Where benefit amounts are reasonably certain, one way to reduce or eliminate asset/liability risk is to match asset and liability cash flows. As an example, consider a single premium savings policy where the policy proceeds are based on a guaranteed rate of investment earnings and are payable at the end of 10 years, with no option of prior surrender of the policy. The timing and amount of the policy payments are fixed. The only uncertainty in the liability cash flows is the servicing expenses, which are likely to be small in proportion to policy payments. A 10-year, low risk, zero coupon fixed-interest security with the same yield as the guaranteed rate of investment earnings will provide matching cash flows and a matching risk profile.

For a guaranteed savings policy such as the one described above, there may not be a zero coupon bond with the same duration as the liability. Investing in coupon paying fixed interest assets may expand the range of investment terms and choices available and provide better returns. However, there will be a duration mismatch risk. This is likely to give rise to additional capital adequacy requirements. If the asset portfolio duration is shorter than the liability duration, then reinvestment is required and there is a risk that future reinvestment yields will be lower than expected. If the asset duration exceeds the liability duration, then there is a risk exposure to future yield increases. Growth assets such as properties or shares, while also likely to provide higher investment returns, are a poor match. Rents, dividends and the values of these assets are also likely to be volatile.

### 11.3.2. Approximate matching

For many policy and fund types, a limiting issue in following a matching strategy is the availability of assets with matching terms and profiles and suitable investment returns.

For pure risk products such as term insurance, a matching portfolio will typically be comprised of risk-free, fixed-interest assets whose cash flows match the expected cash flows of the liabilities. Mismatch may occur if the actual pattern of deaths and surrenders is not aligned with the assumptions.



Alternative strategies with approximate or partial matching may be followed, particularly where benefit amounts have greater uncertainty. For example, 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. On the other hand, greater short-term volatility in equity values is expected compared to fixed-interest securities. While equities may be the best “match” for retirement fund liabilities, a “matched” strategy in this case does not remove investment risk.

More complex and longer-term liabilities can be more difficult to match. For lifetime annuities and disability claims in payment, expected payment terms can exceed 20 or 30 years. Current instalments of claim payments will be known but the amount and duration of future payments are uncertain. This uncertainty arises both from the underlying survival distributions and inflationary indexation of benefits. Inflation-linked investments, such as indexed bonds, may provide an acceptable matching asset profile, assuming the duration of policy payments is close to expected. However, these investments can be difficult to source in the required quantity and may provide poor investment yields.

For participating business, bonus mechanisms provide a means of sharing investment gains and losses. 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. However, the basic benefits and certain types of credited bonuses provided under participating policies are guaranteed. Therefore, the investment strategy must take into account the nature of the guarantees on different elements of the policy benefits. 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.



Reinvestment risk was explained in Section 11.2.2 as one type of investment risk faced by retirement funds and life insurers. For regular premium business, policy terms are often set well before premiums are received and invested. In this case, matching may only be possible through the use of derivatives. For example, interest rate futures could be used to lock in current interest rates until future cash inflows can be invested.

A similar but more difficult problem arises with matching liability options, which may not be exercised until many years into the future. For example, a retirement product or deferred retirement benefit might include an option to convert a lump sum to an annuity or pension at age 65 at guaranteed rates. The company or fund will not know, in advance, what proportion of its policy owners or members will take this option. In this case, an approximate matching strategy will require an estimation of the future take-up rate of such options.

### 11.3.3. Replicating portfolios and immunisation

A replicating portfolio is a portfolio of assets constructed from various asset classes and market instruments that closely replicates the expected cash flows under the liabilities. Replicating portfolios may provide exact or approximate matching.

An exact approach, called *immunisation*, was first devised by the British actuary Frank Redington. He developed a theoretical formula in 1952 (Redington's immunisation formula) that showed that the effect of a small interest rate change can be virtually eliminated for conventional non-profit contracts, providing the following conditions are met:

1. The present value of assets is the same as the present value of liabilities.
2. The average duration of assets equals that of liabilities.
3. The average spread of cash flows about the average duration is less for liabilities than for assets.

The small change in interest rate is assumed to occur simultaneously across all durations of the yield curve. The portfolio will need to be rebalanced both as time progresses and whenever a change in interest rates occurs.



Where a matched strategy is desirable but appropriate matching assets are difficult to source, matching strategies can be implemented, albeit in limited circumstances, by constructing replicating portfolios based on Redington's immunisation formula.

By definition, the value of the replicating portfolio is required to be close to the value of the liabilities and must move in line with it as financial markets change; for instance, when interest and inflation rates change. The replicating portfolio consists of traded assets and will not move in line with liabilities in respect of changes to non-economic factors such as mortality, morbidity and lapse rates.

For products with exposure to financial market risk, such as investment-linked business and DC funds where there is a direct link between assets and liabilities, the replicating portfolio is identical to the actual assets. Typically, there is no mismatch with death or surrender as the assets are marked to market each day. The situation is different if there are investment guarantees.

In many jurisdictions, participating business policy owners are usually allocated a minimum proportion of the profits (e.g. 80% in Australia). However, there is a minimum investment return implied by the guarantees of sums insured and reversionary bonuses or investment account balances. For this business, the replicating portfolio is more problematic as it will depend on the maturity of the fund.

- Suppose the participating business replicating portfolio consisted of highly rated fixed-interest securities, matched by term to expected future liability payments, and with yields at least equal to the minimum rates implied by the guaranteed benefits. Such a portfolio, constructed either by direct investments or a mixture of direct and other more complex market instruments, might be considered a replicating portfolio for some portfolios. For example, this approach may work for a more mature business mix where benefits are largely known and guaranteed. For a less mature mix of policies, policy owners will have an expectation of receiving higher future bonuses than would be achieved through a "replicating" portfolio constructed in this way.
- Policy owner bonus expectations for a less mature mix of policies are more likely to be supported with a meaningful allocation to growth assets; e.g., a 50% allocation to listed equities.



- This suggests a broader approach to replicating strategies for participating business. A replicating portfolio, in this case, might comprise a fixed interest component (matched by duration for more mature policies), an equity component, plus the use of options to reduce downside volatility and protect liability guarantees. The portfolio will have to be reviewed and changed according to factors such as actual returns, bonus declarations, surrenders and new business inflow.

There is a considerable amount of work involved in deriving replicating portfolios for business with complex financial guarantees.

The use of replicating portfolios expands the range of matching asset portfolios that can be constructed. It also expands the range of asset types that can be included in a matching portfolio; for example, through the use of put options to limit downside risks. However, there is no guarantee that a replicating portfolio can always be constructed. For example, long-term fixed-interest assets suitable for backing long-term products such as annuities are difficult to find. As another example, options are not normally available for property investments.

Replicating portfolios, whether actual or hypothetical, can form part of an analysis and attribution of surplus. Expected returns on the replicating portfolio can be used as a liability-driven benchmark. Differences between actual and benchmark returns can be used to split investment performance between investment management performance and other (e.g. insurance) performance as follows:

- investment returns allocated to the insurance operation are returns from the benchmark;
- differences between returns on the actual investment portfolio and the benchmark are allocated to the investment management operation, recognising that the investment management operation has added value (or created a cost) to the company or fund by actively managing the assets.



### 11.3.4. Shareholder equity

As described in Section 11.2.1, where life company assets do not back specific policy liabilities but instead support shareholder equity, the investment strategy can be modified. However, a component of shareholder equity supports capital adequacy margin requirements, which gives rise to regulatory constraints on investments.

Capital adequacy standards in most jurisdictions require life insurers to hold shareholder equity (capital adequacy margins) to cover adversity. The amount of capital will generally be affected by the extent of matching of assets and liabilities. Asset liability matching strategies will generally be based on the risk-based capital liabilities (policy liabilities plus additional capital adequacy margins). In this way, a matching strategy can address company objectives in relation to volatility of capital as well as volatility of profit.

### 11.3.5. Practical issues

Asset liquidity is an important consideration when policy payments are subject to large, short-term fluctuations. A *liquid asset* is an asset that can be sold readily without undue negative impact on its sale price. Cash in the bank is the most liquid type of asset. At the other end of the spectrum, assets such as interests in venture capital holdings and direct property are normally illiquid.

Divisibility of asset holdings and trading costs also need to be considered as part of ALM. For example, direct property is likely to be held or sold in its entirety, as opposed to listed equity which can be sold in smaller parcels. Transaction costs on purchase or sale of direct property are likely to be significant, making this generally an unsuitable asset class for short-term investments.





### 11.4. Asset valuation methodologies

An asset to one party is a liability to another. Assets and liabilities can, therefore, be considered as two perspectives on the same cash flows. For instance, the liability arising from a retirement fund's obligation to pay benefits is an asset from the perspective of the member. The liability of a reinsurer to pay claim recoveries is an asset to the insurer. The obligation of an insurer to pay premiums under contractual reinsurance arrangements is an asset to the reinsurer.

Assets need to be valued for a number of purposes, including:

- reporting the financial position of a company or fund;
- determining the company's or fund's solvency and capital adequacy;
- calculating profits or surpluses generated over a period;
- for potential asset sales or purchases.

As for the valuation of liabilities, the purpose of an asset valuation is an important consideration in selecting models, methods and assumptions for valuing the asset. However, a major difference between valuing assets and liabilities is that highly liquid, transparent, secondary markets exist for many types of assets. For these assets, any valuation methodology can be based on or readily assessed against recently traded market values.

Investment managers and analysts develop methods for the valuation of assets or potential investments, often based on discounting their expected cash flows. Some approaches are sophisticated in terms of the level of financial and statistical techniques used, such as Black Scholes pricing models. Others are more simplistic, such as the valuation of equities based on multiples of current earnings. Even more simplistic models are designed to implicitly capture and value a complex range of underlying risks, probabilistic outcomes and asset characteristics.



While various valuation methods are used by investment professionals in the selection, purchase and sale of assets, some methods are subjective and may not be suitable for reporting in accounts. Given that an objective market price exists for many assets, accounting standards increasingly require valuations to be based on, or justified by, observable market prices, particularly for the valuation of investment assets.

The range of methods used to value assets for asset selection purposes is covered in the Investment and Asset Modelling and Investment Management and Finance subjects. The purpose of this section is to introduce asset valuation methods used for reporting purposes. It also discusses the relationship between the valuation of assets and liabilities under accounting standards and the need for consistency between the two.

### 11.4.1. Consistency between asset and liability valuation

Consistency of methodology and approach in valuing assets and liabilities is important if financial reports are to be meaningful and effective in communicating the financial position of a company or fund. Consistency is also important in determining an appropriate employer funding rate for DB retirement funds.

Consider a single premium policy, where a maturity value is payable in 10 years based on a fixed rate of investment earnings (e.g. 5% p.a.), guaranteed from the outset. Assume that a zero coupon security, with a 5% yield, is purchased to exactly match this liability. A consistent approach to valuation of both assets and liabilities should produce the same value, irrespective of the method adopted. If a passive approach to valuing the liability is taken, for example, by valuing expected cash flows at 5% p.a. irrespective of market rate changes, then a consistent passive approach should be used to value the asset at 5% p.a. On the other hand, if the liability is to be valued at a current market investment earnings rate appropriate to the outstanding term, then the same approach should be applied for the asset.



To build on this example, consider an approach where assets are valued using current market rates but the liability valuation uses the original 5% rate. If interest rates increase to 6% p.a. due to changes to market rates, the market value of the asset will reduce; however, the value of the liability will remain the same. Ignoring the solvency implications of assets being lower in value than liabilities, a loss will occur at the relevant valuation date. With no other changes, the reported loss will eventually reverse, with the earning rate on the asset (6% p.a.) being higher than expected. By the end of the term, the supporting asset will be sufficient to pay the liability and the total profit generated will be the same, regardless of the valuation assumptions used.

Accounting standards increasingly aim for consistency in reporting where possible, including across different industries. This suggests that the assets of life insurers and retirement funds should be valued using the same methods as those applying to the valuation of assets of non-insurance companies. "Fair value" asset valuation (explained in Section 11.4.3) is increasingly being adopted in international accounting standards to achieve consistency between entities and industries. However, even where fair values are adopted, exceptions may be allowed for specific assets and certain circumstances. For instance, some assets may be valued at cost, such as investment property, other property, plant and equipment, and investments in subsidiaries, associates and joint ventures.

Actuaries need to understand the asset valuation methods applied and how asset values may vary over time. If an actuary has concerns over the consistency of approach between the valuation of assets and liabilities, these need to be raised and compensating adjustments to the value of liabilities may be required.

Actuaries also need to understand and may need to adjust the asset values used for capital adequacy purposes. For example, 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.



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. A smoothed value can be calculated by adjusting current market prices based on the underlying long-term trend line or curve of an appropriate asset index. Alternatively, a smoothed value may be based on the discounted value of expected future cash flows from the assets under consideration. In such circumstances, the use of smoothed asset values would produce better consistency in the valuation of assets and liabilities and a more sensible funding rate.

### 11.4.2. The asset valuation process

The valuation of assets is usually subject to regulatory and accounting requirements. These requirements may not be the same. For example, as mentioned above, assets such as investments in subsidiaries and goodwill on acquisitions may have zero value for regulatory valuation for the determination of capital adequacy.

A life company or retirement fund’s policies regarding asset valuation are typically documented in the form of an asset valuation policy approved by the board or fund trustees. The policy may address items such as the following, for each asset class:

- where valuations are sourced (e.g. who performed the valuation and what data was used);
- how frequently assets are revalued;
- how assets not traded in deep, liquid and well-maintained markets are to be valued;
- methods to value assets if the normal sources for asset values are not available or reliable at a particular time (e.g. system failure or market disruption); and
- roles and responsibilities of management and staff in asset valuation.

Accounting standards generally require notes to general purpose financial statements or retirement fund accounts providing descriptions of asset valuation methodologies and approaches. The asset valuation policy will assist in putting these notes together.

While life company boards or fund trustees carry an overarching responsibility for asset valuation, they delegate the asset valuation function to investment professionals.



Data used in asset valuations will include market data from vendors for actively traded assets. External valuers may be engaged for valuation opinions on thinly traded assets such as unlisted property or private equity.

The sections below outline a number of approaches used to value assets.

### 11.4.3. Fair value

*Fair value* is defined as the price that would be paid by a willing buyer to a willing seller. A more technical definition from the international accounting standards states that fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The following elements capture the concept of fair value:

- When measuring fair value, account needs to be taken of the characteristics of the asset or liability in the same way that market participants would take those characteristics into account. Characteristics might include the condition and location of the asset and any restrictions on the sale or use of the asset.
- A fair value measurement assumes that, in pricing the transaction, market participants act in their economic best interest.
- Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction, regardless of whether that price is directly observable or estimated using another valuation technique.

Fair value is determined after spending the transaction costs incurred in purchasing the assets but before any transaction costs are incurred on sale. This means that any buying costs are recognised in the profit and loss statement during the reporting period in which an asset is purchased, and any selling costs are recognised during the reporting period in which an asset is sold. A drawback of this method is that fair value overstates the amount a life company or fund would receive if it sold all of its assets (since part of the proceeds would go to paying selling costs).

The best evidence of fair value is quoted prices in an active market (i.e. a market where the asset is traded in high volumes). For example, the fair value of listed equities can readily be determined from the latest market prices.



For listed assets, fair value is normally determined as the price at the last sale, provided this lies within the bid and asking price. The *bid price* is the highest price at which buyers are offering to purchase the asset. The *asking price* is the lowest price at which existing owners are willing to sell the asset. The asking price is usually greater than or equal to the bid price. Again, fair value can overstate the amount a company or fund will receive if it sold all of its assets, as the amount of assets buyers are willing to purchase at a particular price could be smaller than the company's or fund's holding of the asset.

The requirement that fair value be based on prices agreed between knowledgeable, willing parties means that actual transaction prices may sometimes be ignored. For example, in a mortgagee sale, a house owner is forced to sell their house as they are unable to meet their loan repayments to the bank. In this situation, the house owner or bank may need to sell the house quickly, regardless of the price they are able to receive for it. The selling price may, therefore, be less than fair value. Alternatively, an eager but unknowledgeable buyer may pay a price for an asset that exceeds its fair value.

If a particular asset market is not active (i.e. the market doesn't experience a high volume of trading), fair value must be determined using a different valuation technique. In this case, the objective is to establish what the transaction price would have been on the measurement date in an arm's length exchange motivated by normal business considerations. Such fair valuations include consideration of one or more of the following:

- 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; and
- option pricing models.

If there is a valuation technique commonly used by market participants to price an asset and that technique has been demonstrated to provide reliable estimates of prices obtained in actual market transactions, the company or fund should use that technique.



Valuation techniques should make maximum use of market inputs and rely as little as possible on company-specific inputs. They should incorporate all factors that market participants would consider in setting a price and be consistent with accepted economic methodologies for pricing financial instruments. For example, unlisted property assets may be valued by reference to recent transactions for similar properties.

Another example of a fair valuation technique is the valuation of unlisted fixed interest securities using discounted cash flow analysis. The discount rate is set by reference to recent market transactions for instruments with similar duration, credit risk and liquidity.

It is important for actuaries to understand how valuation techniques have been used by the life company or retirement fund to come up with a fair value. This will help to determine how reliable the valuation is and whether any adjustments need to be made for unreliable estimates. For example, fair value can become particularly difficult to determine at times of extreme market volatility or if there have been no recent transactions for similar assets.

Observable markets for trading of life insurance or retirement fund liabilities generally do not exist<sup>1</sup>. However, observed market values for assets matched to the liabilities can be used as a reference in the fair valuation of the liability. For instance, the risk discount rates used to value liabilities can be implied from the yield achievable on an asset (or portfolio of assets) with similar expected cash flows and risks.

### 11.4.4. Historical cost

For assets valued at historical cost, the asset value is the purchase price plus the transaction costs of purchase. This method is also referred to as *cost price*. Historical cost may be a suitable method for the valuation of equipment and other items purchased for the conduct of the business.

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<sup>1</sup> However, market quotations for lifetime annuities can be used to indicate a market value of lifetime pension liabilities held by a fund.



The historical cost may include adjustments for accounting depreciation (see Section 11.4.5). Accounting depreciation allows for the finite life of some assets but does not necessarily allow for changes in the market or fair value of the asset.

The historical cost method of valuing assets has the benefit of being simple, but it can be unrealistic. It can result in a misleading balance sheet if assets have significantly appreciated or depreciated in value since they were purchased. For example, a property that was purchased five years ago for \$1m may now have a market value of \$1.5m. To value this on the balance sheet using a historical cost of \$1m would be misleading. The historical cost method is therefore not suitable for many classes of investment assets.

The historical cost method is sometimes referred to as *book value*, although book value means the value in the books. Thus, book value may allow for changes in value, including appreciation.

### 11.4.5. Amortised cost

Under an amortised cost method, an initial value is determined based on the purchase price. That value is reduced, or *amortised*, over time. Variations include:

- straight-line reductions (for example, a reduction in value of  $1/5$  per year over 5 years); and
- declining balance (a fixed percentage of the asset is amortised each year until its value is essentially zero).

Amortised cost is suitable for assets with a limited expected lifespan. A more complex method might base amortisation on compound discount rates based on observable market rates.

One example of the use of an amortised cost method is the creation and amortisation of a DAC asset (DAC refers to deferred acquisition costs and was discussed in Module 6 (Profit)).

An amortised cost approach is much less sensitive to variation in market rates than a fair value approach. However, the values placed on assets may not reflect their current realisable values.





### 11.4.6. Valuing Goodwill

The acquisition of an entity may generate a goodwill asset on the balance sheet of the acquirer. *Goodwill* is the difference between the acquisition cost and the value of net assets (i.e. assets minus liabilities) acquired. Goodwill represents the amount paid for the future profit-generating capability of the acquisition.

The total value of the acquisition on the balance sheet, including goodwill, is termed the *carrying value*. Goodwill must be tested to ensure that the carrying value of the acquisition on the balance sheet is supported by expected future profits from the acquisition. This testing, referred to as *goodwill impairment testing*, usually occurs on acquisition and at each annual reporting date, and is usually calculated by an actuary. To the extent that the carrying value exceeds the value of net assets and future profits, the value of the acquisition on the balance sheet must be reduced (impaired). On the other hand, the value of goodwill can never increase. Higher expected future profits are reflected in the future financial results of the acquirer, not in changes to the balance sheet value of the acquisition.

For life companies, the value of future cash flows of an acquisition of a life insurer and related businesses is often determined as the *appraisal value* (i.e. the value of current and future life insurance business) of the acquisition. Appraisal values are covered in Module 15 (Appraisal values).

An example of goodwill impairment testing is as follows:

*Goodwill calculated at acquisition:*

Cost of investment into entity (a)	\$500
<u>Net assets of the entity acquired (b)</u>	<u>\$320</u>
Goodwill (c = a – b)	\$180

Paying \$500 to acquire the entity indicates the buyer believes the value of future profits is \$180.



*Goodwill impairment testing one year after acquisition:*

Carrying value of the entity ( $d = a$ )                      \$500

Value of net assets **and future profits** (e)      \$450

Impairment loss ( $f = d - e$ )                              \$50

New (impaired) value of entity ( $d - f$ )              \$450

New goodwill ( $c - f$ )                                      \$130

After one year, the actuary has assessed the value of net assets and future profits at \$450, \$50 less than what was paid for the entity.

The impairment loss of \$50 means this year's balance sheet will have a \$50 reduction in the value of goodwill on the asset side.

### 11.4.7. Valuing deferred tax assets

A deferred tax asset is an asset on a company's or fund's balance sheet that may be used to reduce its taxable income in the future. An example is where a loss generated on the sale of an asset is not recoverable against tax in a current period and can, therefore, be carried forward and used in a future period. These assets do not earn investment income as they are intangible (i.e. not a physical asset).

Deferred tax assets are often discounted based on the length of time the company expects to hold the asset. Since the asset does not generate investment returns, discounting represents a cost associated with holding the asset. This is important where policy owners or members are entitled to a share of fund assets and enter and exit a fund at different times (such as under investment-linked and -indexed policies). By discounting the value of assets in determining say, unit prices, greater equity is achieved between exiting and continuing policy owners.



However, international accounting standards do not allow discounting of deferred tax assets for reporting purposes. The rationale given for not allowing discounting is that it can be impractical and highly complex to apply in practice and potentially reduces consistency in reporting between industries. For life companies and retirement funds, the inability to discount deferred tax assets for reporting purposes creates an inconsistency between the unit pricing and accounting treatment of the underlying assets. This inconsistency may need to be disclosed in financial reports and explained to certain stakeholders, such as management and policy owners.

The value placed on deferred tax assets also reflects the likelihood that it can be used to reduce future tax liabilities. If a company has large accumulated tax losses, as may occur following large stock market falls, the probability of fully utilising tax losses in the medium term may be very low.



### 11.5. Key learning points

- An asset is any form in which wealth can be held.
- Life insurers and retirement funds usually hold a range of asset types including receivables, deposits, investments, property, plant and equipment, and intangible assets.
- Volatility of investment returns can be a significant source of asset risk. The management of assets, therefore, affects the security of policy owner or member benefits.
- Investment strategies are set after considering, inter alia, the nature of liabilities and any guarantees given. A life or retirement fund actuary contributes to investment strategy by assessing liability risk profiles and the impacts of proposed strategies on the company's risk and return objectives.
- Companies or funds reduce investment risk by using ALM strategies including matching of assets to liabilities, approximate matching, or replicating portfolios. While matching of assets to liabilities may minimise capital adequacy requirements and reduce volatility, it may not produce optimal returns.
- Consistency of methodology and approach in valuing assets and liabilities is important if financial reports are to be meaningful.
- Accounting standards increasingly require the valuation of investment assets to be based on observable market prices. While fair value is not the same as market price, the best evidence of fair value is often the prices quoted in an active market.
- Goodwill represents the amount paid for the future profit-generating capability of an acquisition.



### 11.6. Answers to exercises

#### Exercise 11.1:

Search on the internet for other balance sheet examples from either life insurers or retirement funds. How do asset categorisations differ between the balance sheets you've found?

Answer:

Document your own findings.

#### Exercise 11.2:

Describe the ways in which some of the financial objectives listed above can conflict with each other and be difficult to achieve at the same time.

Answer:

- A higher level of solvency will lead to a deferral of profit and conflicts against maximizing profits, if measuring in the short run.
- Similar comments apply for minimising the volatility as that suggests profits are held back to pay for lower profits in future years.
- Stability in contribution rates suggests a decrease in security of the benefits.
- Similarly, stability in insurance premiums may lead to profit volatility.
- Maximising AV may be achieved by having lower capital.



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