Actuaries Institute.

Technical Paper: Asymmetric Financial Risk

Life Insurance Practice Committee
May 2025

Contents

1. Introduction

1.1. Status of Technical Paper

This Technical Paper was prepared by the Life Insurance Practice Committee (LIPC) of the Actuaries Institute. This Technical Paper does not represent a Professional Standard or a Practice Guideline of the Institute.

It has been prepared for the purposes of providing information and generating discussion on the nature and treatment of asymmetric financial risks within the management and reporting of life insurance business. References to asymmetric risk within this Technical Paper largely pertain to asymmetric financial risks within life insurance. Other types of asymmetric risk such as those seen in the general insurance space and reinsurance are not covered in this document.

Feedback from Institute Members is encouraged and can be forwarded to the LIPC at ppd@actuaries.asn.au.

This Technical Paper was issued in May 2025 and will be reviewed periodically. It replaces the Technical Paper issued in September 2013, due to the replacement of AASB 1038 Life Insurance Contracts with AASB 17 Insurance Contracts ("AASB 17") (effective from 1 July 2023). It also reflects the revised APRA Prudential Standards effective from 1 July 2023.

This Technical Paper does not constitute legal advice. Any interpretation or commentary within the Technical Paper regarding specific legislative or regulatory requirements reflects the expectations of the Institute but does not guarantee compliance under applicable legislation or regulations. Accordingly, Members may seek clarification from the relevant regulator and/or seek legal advice in the event they are unsure or require specific guidance regarding their legal or regulatory obligations.

1.2. Summary

Asymmetric financial risks are complex, and the importance of understanding their nature is set out in Section 3, with examples of asymmetric financial risk given in Appendix 1.

Allowance for asymmetric financial risks is important for Members providing actuarial advice across a wide range of life insurance practice areas, in particular determination of policy liabilities, economic valuations, product pricing, bonus philosophy, risk management and setting investment policy. The existing guidance and legislation is set out in Section 4.

Section 5 discusses alternative valuation methodologies and raises the question of consistency between the bases of the valuations placed on the assets and the various components of the liabilities. There is some debate about the extent to which consistency is possible, which is discussed in Appendix 2.

Section 6 sets out the requirements for best estimate valuations, with a focus on AASB17 and LPS340. Some examples of possible inconsistencies caused by valuation methods are given in Appendix 3.

Section 7 covers the asymmetric risk valuations for participating business using the AASB 17 led method and the VSA led method. At commencement of reporting under AASB 17, life companies elected to use one of these methods for all future reporting dates.

The last five sections cover capital calculations and tail distributions, AASB 17 risk adjustment, management actions, policyholder behaviour and communicating the results respectively.

2. Background

2.1. Asymmetric Risks

Asymmetric risks arise where cash flows or values have an asymmetrical statistical distribution. Common examples include a skewed distribution where the dispersion of outcomes is greater for negative results than for positive ones and an embedded option which generates a "kinked" payoff.

Where the outcome function is non-linear, the outcome from a deterministic projection of the mean assumption values may misstate the mean value of the outcome function. For example, an out-of-the-money option would often be valued at zero under this approach.

Understanding asymmetry is important when determining insurance liabilities for general purpose financial statements (e.g., AASB 17) and under APRA's Prudential Standard for Valuation of Policy Liabilities (i.e., "LPS 340") and other calculations which require mean outcome values.

2.2. Embedded Options

As noted above, the embedded options that exist in certain types of life insurance products are a particular example of a possible asymmetric outcome (although sometimes the terms are used interchangeably). Some embedded options are "auto exercise" (such as a guaranteed minimum crediting rate for a non-par investment account product) whilst others are exercised by specific policyholder actions (such as a conversion option with guaranteed terms).

The assessment of asymmetric risks arising from specific policyholder actions may be more complicated as the outcome function depends on whether policyholders exercise their options and whether they are exercised in an optimal manner.

3. Nature of Asymmetric Risks

3.1. Identifying and Understanding Asymmetric Risks

Asymmetric risks are common to many life insurance products and are a key consideration for Members when providing actuarial advice across a wide range of areas (for example, determination of policy liabilities, economic valuations, product pricing, bonus philosophy/declaration, setting investment policy, risk management, evaluating reinsurance, prudential reserving and calculating economic capital). Not all of these areas are explicitly covered by the current Professional Standards, Practice Guidelines and legislation discussed in Section 4.

To identify and develop an understanding of key asymmetric risks, the Member may need to consider:

- options and guarantees granted to policyholders, either explicitly in the policy document or implicitly through policyholder reasonable expectations ("PRE");

- the operation of participating contracts and other forms of profit sharing and rebating;
- discretions available to the life insurer within policy design and legislative requirements. These might be constrained by PRE; and
- guaranteed crediting rates in non-participating investment account business and unit price guarantees in investment-linked business.

This Technical Paper is intended to help Members decide whether they have sufficient information and have undertaken adequate analysis to identify and understand all asymmetric risks that are material within the context of the calculation or assignment being undertaken.

More examples of asymmetric risks are provided in Appendix 1.

3.2. Asymmetric Assumptions

Many assumptions are slightly asymmetric because the value cannot go below zero but may increase by more than 100% of the expected. Further, short term symmetry may be converted into long term asymmetry by compounding. Mortality, expenses and lapses fall into these categories. The asymmetry of the assumptions may be material, particularly in the tail of the probability distribution used in determining capital requirements.

To the extent that these risks are not seen to correlate strongly with investment markets, this asymmetry may have limited direct impacts on the economic valuation of cash flows associated with these risks, provided the mean outcome is used rather than the median.

4. Existing Requirements, Guidance and Legislation

4.1. References to Asymmetric Risks

In certain instances – such as policy liability calculations, economic valuations and regulatory prudential capital requirements – the requirement and/or the method for allowing for asymmetric risks is covered in Prudential Standards, Accounting Standards, Professional Standards or Practice Guidelines. A high-level summary of these references is set out in the sub-sections below.

The following terminology (in respect of the Prudential Standards issued by APRA in October 2012 and updated in September 2022) is used in the remainder of this Technical Paper:

- Valuation of Policy Liabilities (“LPS 340”); and
- Capital Adequacy (“LPS 110”).

Similarly, the term “AASB 17” is used to refer to the Insurance Contracts Accounting Standard issued by the Australian Accounting Standards Board in July 2020. The term “policy liabilities” is also used in this Technical Paper to refer to AASB 17 term “Insurance Liabilities”.

The contents of this Technical Paper may need to be revised if future successor standards contain different requirements for asymmetric risks compared to the standards listed above.

4.2. LPS 340 (Valuation of Policy Liabilities Prudential Standard)

This standard enables, generally, insurers to use AASB 17 accounting policies to report financial statement information, including insurance assets and liabilities, to APRA. A key exception is life insurance participating business, where the life insurer has the option to use either the AASB 17 led method or the Value of Supporting Assets ("VSA") led method that has been grandfathered from previous versions of LPS 340. Another key exception relates to Friendly Societies, such that where a policy includes benefits referable to more than one approved benefit fund, or class of life insurance business, a friendly society must unbundle the benefits and treat them as if they were stand-alone policies.

LPS 340 also outlines the calculation of Best Estimate Liabilities ("BEL"), which is a component of the policy liability for participating business valued according to the VSA led method. The method used in determining the BEL is also used in determining the risk-free best estimate liability for all types of life insurance business in determining regulatory capital (as defined in LPS 112 Capital Adequacy – Measurement of Capital).

Consistent with AASB 17, the BEL is to be representative of the mean of the distribution of the potential liability outcomes. It is suggested that members undertake analysis to identify and understand instances where the input assumptions or outcome function for the BEL is asymmetric.

Where embedded options exist, these must also be allowed for in the calculation of the BEL. Paragraph 83 of LPS 340 states:

> *"Where the benefits contain options that may be exercised against the company, then either the value of those options must be determined (via a suitable option pricing method) and added to the best estimate liability, or the best estimate assumptions adjusted so as to appropriately capture the value of the options as part of the best estimate liability."*

4.3. AASB 17 (Accounting for Insurance Contracts)

This standard sets out the requirements for measuring insurance contract liabilities for general purpose financial accounts and makes no explicit requirements regarding asymmetry. However, the estimate of future cash flows is required to be an estimate of the probability-weighted mean of the full range of outcomes. Hence, any asymmetry in the possible outcomes would be captured within this estimate of future cash flows.

For contracts eligible for the Variable Fee Approach ("VFA") and where the risk of asymmetry is hedged, then the value of any derivatives or reinsurance contract held may be included in the pool of underlying items, offsetting the value of the assets in that pool. However, where the value of such derivatives or reinsurance contract held is not in the pool of underlying items, then the movement in value of the risk mitigants does not have to be offset by a change in the Contractual Service Margin ("CSM").

The "Information Note: AASB 17 Insurance Contracts" issued by the Actuaries Institute contains a discussion on asymmetry for contracts eligible for the VFA.

It would be normal to consider and quantify asymmetric risks for the purpose of assessing onerousness under AASB 17.

4.4. Capital Adequacy Prudential Standards

4.4.1. Overview

LPS 110 sets out prudential regulatory capital requirements ("PCR") for each statutory fund and shareholders' fund of life companies. The PCR is the sum of the prescribed capital amount ("PCA") and any supervisory adjustment determined by APRA. Industry practice in 2023 is to determine the PCA using the 'Standard Method' outlined in LPS 110. LPS112 outlines the calculation of the capital base and LPS114, LPS115, LPS117 and LPS118 provide detail on specific elements of the PCA.

Paragraph 13 in Attachment F of LPS 112 states:

> *"The adjusted policy liabilities must not be less than the mean of the distribution of the potential liability outcomes. If the benefits being valued contain options that may potentially be exercised against the company, or the potential liability outcomes have an asymmetrical distribution, then the adjusted policy liability must include an appropriate value in respect of those options and/or asymmetries. For this purpose, the benefits being valued must allow for the distribution of all investment fluctuation reserves and policy owners' retained profits."*

Therefore, the adjusted policy liabilities for the purpose of determining the capital base are to be calculated taking into account asymmetric risks.

The PCA is determined by applying stresses to the assets and liabilities of the funds. This suggests that:

- the PCA be determined by applying the stresses required by the standards to the adjusted policy liabilities; and
- the allowances for asymmetric risk included in the recalculated adjusted policy liabilities be consistent with the stress scenarios considered.

It is noted that materiality may be a consideration in determining whether an explicit allowance for asymmetric risks is required. In particular, paragraph 52 of LPS 110 states:

> *"A life company may take into account materiality when calculating its capital base and prescribed capital amount. Particular values or components are considered material to the overall result of a calculation if misstating or omitting them would produce results likely to be misleading to the users of the information."*

4.5. LPS 370 (Cost of Investment Performance Guarantees)

LPS 370 is concerned with the asymmetric outcome from providing performance guarantees on unit linked business. It sets out a prescribed approach for measuring the cost of an embedded option for the purposes of determining whether it exceeds the limit for investment linked business as set out under section 42 of the Life Insurance Act 1995 ("Life Act").

This standard states that the cost of performance guarantees must be determined based on the impact of the fair performance guarantee on the fair value of the financial instrument element assessed in accordance with the relevant Accounting Standards.

4.6. PS 201 (Actuarial Advice to a Life Insurance or Friendly Society) and PS 202 (Actuarial Valuations for Life Insurance Companies (including Friendly Societies and eligible Foreign Life Insurance Companies))

PS 201 applies to advice to a life insurance company or friendly society on a number of matters including product advice, financial condition investigations and the distribution of surplus. When providing any advice covered by the Professional Standard, the Appointed Actuary is required to consider the nature, terms and conditions, and disclosures of the contracts in force and currently being sold with particular reference to all options and guarantees.

PS 202 applies to liability valuations for life insurance companies and friendly societies. Under this Professional Standard, the Appointed Actuary must review the Material Risks reflected in the valuation, including liability option and guarantee risks, and discuss the principal means by which they are managed and/or controlled. They must also undertake sensitivity and/or scenario analyses as a means of quantitatively illustrating the impact of uncertainty in the valuation.

4.7. PG 199.03 (Economic Valuations)

PG 199.03 sets out the considerations that bear on the work involved in carrying out economic valuations. It describes general principles and procedures for carrying out, and reporting on, economic valuations. This includes economic valuations used to support a market valuation or a fair valuation.

PG 199.03 expects that Members make appropriate allowance for any material optionality or nonlinear outcomes in the cash flows being modelled.

4.8. AASB 39 (Financial Instruments: Recognition and Measurement) and AASB 32 (Financial Instruments: Disclosure and Presentation)

AASB 39 and AASB 32 deal with options and guarantees.

AASB 39 generally requires derivatives on investment contracts to be separated from the host contract and valued as a derivative. This is not required if the host contract itself is a life insurance contract.

5. Valuation Methodologies

5.1. Appropriateness

It is common practice that a Member is satisfied that any method used is appropriate for the particular circumstances, with the degree of detail and precision in an asymmetric risk calculation appropriate to the context in which it is being performed.

The model used will depend on the size and materiality of the asymmetric risk, the quality of the data available, the intended use of the analysis and the needs expressed by the key stakeholders.

Common valuation models which the Member is likely to consider using include:

- stochastic:

  - risk neutral models;
  - real world models;
- scenario and stress testing;
- replicating portfolios; and
- combinations of the above.

Key aspects of these models are discussed in the following sub-sections.

5.2. Internal consistency

Whatever method is used, it is recommended that the Member ensure, as far as possible, that there is consistency between the valuation placed on the assets and the various components of the liability. There is some debate about the extent to which this is possible, which is discussed in Appendix 2.

5.3. Stochastic Models

This method normally involves multiple simulations of the asset or liability outcomes using distributions for key assumptions regarding future experience.

The risks to which life insurance companies are exposed are complex and there may be many processes and outcomes that are correlated, while other processes may have limited correlation and may provide diversification benefits. These relationships can be incorporated in a stochastic model enabling the risks to be statistically analysed. The complexity and interaction of events in many cases necessitates a full analysis across the full distribution of outcomes as opposed to analysis of a single tail event.

It is desirable that:

(a) the underlying distributions assumed are reasonable;

(b) a statistically sufficient number of simulations are used to produce stable results or convergence, particularly when uncertainty in the 'tail' of a distribution is being considered; and

(c) appropriate allowance for the impact of correlations in the tails of distributions is made.

Stochastic models for assessing asymmetric risks for participating business are invariably complex if they are to calculate representative outcomes allowing for the interaction of investment performance, bonus philosophy and underlying guarantees to policyholders.

Modelling considerations include allowance for:

- investment assumptions – asset class returns and correlations of returns between asset classes. Volatility assumptions, both current and extending over the duration of the model, can be 75 plus years, to points where there is little or no market activity;

- bonus philosophy – changes in reversionary and terminal bonus rates in response to modelled impacts of investment and other assumptions;
- the approach to profit allocation and distribution e.g. when will less than the standard share of profits or more than the standard share of losses be allocated to shareholders; and
- other assumptions – allowance for impact of interaction of assumptions above on other assumptions such as lapses and expenses.

5.3.1. Risk neutral methods

With risk neutral methods, the discount rate used is a risk free rate and a "risk neutral" and notional probability distribution of (asset) return outcomes is established from the market price of relevant derivatives. Risk neutral methods are particularly applicable where investment or market-related gearing exists. They may also be more appropriate to determine the impact of asymmetric risks on the policy liability, when it is discounted at the risk free rate. Some practitioners would extend risk neutral methods to liabilities based on best estimate earning rates, such as contracts with direct participation features under AASB 17.

These methods will not produce cash flow projections on a realistic basis. This means that projected cash flows will generally not be suitable for other purposes, such as business planning. It also means that the communication of the projection results to users and the validation of the risk neutral cash flows may be challenging, as they will not necessarily reconcile to real world cash flows.

In applying these methods, it is recommended that the Member be satisfied that the degree to which each cash flow is market-related can be reasonably ascertained or approximated and that the risk neutral probabilities are appropriate.

Risk neutral probabilities are not available for non-investment risks that are not traded. There are some theoretical grounds for adjusting real world lapse and expense rates for pricing and valuation purposes, but these are often not applied on either materiality grounds or because of a lack of a reasonable basis for an adjustment.

5.3.2. Real world methods

"Real world" projections use distributions of values or cash flows based on expected future actual experience (that is, realistic projections). They are appropriate for determining capital adequacy requirements but are more difficult to use in the determination of market consistent option costs.

If a real world approach is adopted, significant adaptation is required (via the use of state price deflators which adjust for the fact that market participants place different "utility" on different outcomes) when used in the determination of market consistent present values.

5.3.3. Models being market consistent and arbitrage free

Members would normally take care that their models are consistent with market prices. This not only means that assets are valued at market prices, but that the liability assumptions as to discount rates and statistical distributions are consistent with the market price of available derivatives (options, swaps, futures contracts, etc).

Members may have to use their judgment in this area as the prices of derivative instruments are not always consistent with each other or with historical volatilities. It is often inappropriate to extrapolate knowledge about short term probability densities near the mean to estimate longer term probability densities in the tail of the distribution.

Members would normally check that models do not, in effect, assume that unrealistic arbitrage profits will arise in future. It is, for example, inappropriate to discount cash flows that assume an equity risk premium using a discount rate based on a lower amount of market risk or value far out-of-the-money options using volatilities unadjusted for the tail of the volatility surface.

5.4. Scenario and Stress Testing

A projection of a number of especially extreme scenarios can often add insight, aid communication and may provide essential information to management of the impacts that can be expected if the tail of a distribution occurred.

Scenario testing can be used to understand the nature of any asymmetry by investigating outcomes at a range of points in the tail of the distribution. This will provide insight into any inflexion points or discontinuities in the distribution of outcomes. This is particularly valuable for regulatory capital which requires choosing the worst outcome from a range of different scenarios and calculations such as increasing/decreasing yields, increasing/decreasing policy termination rates and BEL or termination value.

Historical events and market conditions are another source of possible stress test scenarios.

5.5. Replicating Portfolio

It is sometimes possible to construct a portfolio of simple financial instruments that replicates a more complex instrument. These simple instruments may include physical holdings of the underlying asset, as well as derivatives (including options). The price of these options can then be obtained from the market. This represents a non-stochastic solution in some cases but can only be used where relevant market prices exist for the components of the complex instrument.

5.6. Combination of Above

A combination of approaches may sometimes be appropriate, particularly to help illustrate the impact of an alternative model.

6. Best Estimate Valuations

Under a best estimate valuation, the focus will be on understanding the mean valuation result. While the whole probability and outcome distribution would typically be considered, the main focus may often be on the more probable outcomes when determining a best estimate valuation, whether it is for profit reporting, economic valuations, pricing or other purposes requiring a best estimate view.

Traditionally, embedded value measures have been calculated on a best estimate basis. Historically, asymmetric risks were typically not explicitly allowed for in these valuations but were, in theory, reflected in the risk discount rate. With the growing prominence of fair value principles (including in embedded value reporting,

for example the market-consistent embedded value principles adopted by the CFO Forum1 in Europe), asymmetric risks are often allowed for in both market consistent and traditional basis.

Part B of LPS 340 prescribes the policy liabilities to be valued in accordance with the relevant accounting standards (e.g., AASB 17) for APRA reporting purposes for life insurer non-participating business, participating business valued according to the Accounting Standard led method, and friendly societies subject to meeting the requirements in paragraphs 21 to 24. Consequently, this extends to asymmetric risks.

Part C of LPS 340 sets out the method for valuing policy liabilities for participating business.

Paragraph 41 of LPS 340 states that, with regard to benefits that include any embedded options, "the best estimate liability must include an appropriate value in respect of those options". Paragraph 83 of LPS 340 states that "either the value of those options must be determined (via a suitable option pricing method) and added to the best estimate liability, or the best estimate assumptions adjusted so as to appropriately capture the value of the options as part of the best estimate liability." A real-word scenario approach or a risk neutral approach may be used. Other interpretations are possible as discussed in Appendix 2.

In particular, paragraph 54 of LPS 340 include considerations for recalculating future profits for VSA led participating business. For such business, the allowance for asymmetric risk may or may not have an impact on the policy liability depending on the backing assets assumed in measuring the allowance for asymmetric risk, except via the deduction of current period profits. The appropriate adjustments to the components of the balance sheet are likely to be dependent on the particular method used to value the asymmetric risks in participating business.

Part D of LPS 340 sets out the method for determining best estimate liabilities, which is a component of policy liabilities for participating business valued according to the VSA led method. The method used to determine the best estimate liability is also used in determining the risk-free best estimate liability for all types of life insurance business as defined in LPS 112.

Paragraphs 80 to 84 of LPS 340 outline the main considerations in incorporating an allowance for asymmetric risks within the best estimate liability.

It is important that any adjustment to the best estimate liability in respect of asymmetric risks is determined consistently with the best estimate liability calculation. For example, the best estimate liability may include the intrinsic value of the risk and hence only a time value adjustment is required. Examples of possible inconsistencies that may arise can be found in Appendix 3.

[1] The European Insurance CFO Forum ('CFO Forum') is a high-level discussion group formed and attended by the Chief Financial Officers of major European listed, and some non-listed, insurance companies. Its aim is to influence the development of financial reporting, value based reporting and related regulatory developments for insurance enterprises on behalf of its members, who represent a significant part of the European insurance industry. The CFO Forum was created in 2002.

7. Participating Business

The asymmetry in outcomes for participating business occurs because of the need to satisfy both PRE and the Life Act requirements for profit allocation and distribution. The asymmetric outcomes will emerge when the life company chooses to distribute shareholder retained profits to the policyholders or to allocate to policyholders either more profits or less losses than the standard allocation used by the company. Such actions cannot be reversed, even if profits subsequently emerge.

The timing and scale of such actions is not prescribed but is at the company's discretion, subject to the relevant standards, regulations and PRE. The approach taken by the company in deciding when to make such non-standard profit allocations or distributions will impact the scale of the asymmetry in liability outcomes. The approach taken will be guided by the company's views on matters such as actions required to satisfy PRE, achieving equity in outcomes between groups of policyholders and achieving equity between policyholders and shareholders.

It is important to maintain the distinction between the calculation of profit and the allocation of profit. The requirements for the inclusion of the impact of asymmetry affect the calculation of profit but do not have any direct bearing on the allocation of profit.

Paragraph 30 of LPS 340 allows the life insurer to elect between two methods of valuing policy liabilities: the VSA led method, which grandfathers the previous methodology, and the AASB 17 led method. The method that a life company elects at commencement of reporting under AASB 17 must be used at all future reporting dates.

7.1. The VSA Led Method

Under the VSA led method, the BEL for participating business will use similar considerations as for non-participating business, because the BEL is defined under LPS 340 as only applying to the existing guaranteed benefits. A simple investment mismatch for the assets backing the BEL is no more an asymmetric risk than an equivalent example for a non-participating product with guaranteed benefits.

For participating business, the asymmetric risk does not arise from vested benefits valued in the BEL. Paragraph 41 of LPS 340 is commonly interpreted to mean that there is an asymmetric risk for typical participating business in that the life insurance company may not be able to declare future bonuses to policyholders at rates which meet policyholders' reasonable expectations, and so this risk is to be reflected in the BEL. A less common interpretation of the standard is to mean the asymmetric risk is only to be allowed for to the extent that it arises from vested benefits being valued in the BEL, and hence conclude that no asymmetric risk reserve is required for participating business. Further comments in this regard are provided in Appendix 4.

7.2. The AASB 17 Led Method

Under the AASB 17 led method, paragraph 32(a) of AASB 17 defines the present value of fulfilment cash flows as the sum of:

(i) Estimates of future cash flows; plus

(ii) And adjustment to reflect the time value of money and the financial risks related to the future cash flows, to the extent that the financial risks are not included in the estimates of the future cash flows; and

(iii) A risk adjustment for non-financial risk.

AASB 17 requires that the estimate of future cash flows is a probability weighted mean of the possible outcomes. The liability under AASB 17 reflects the full obligations to policyholders, including bonuses yet to be declared; the liability will therefore implicitly include the equivalent of both the VSA and PRP. Thus, there is greater clarity than under the VSA led method of LPS 340, which is not explicit on whether to consider only guaranteed benefits, benefits supported by the policy liability or benefits supported by the policy liability and retained profits when determining the impact of asymmetry.

Whilst AASB 17 requires an understanding of the full range of potential outcomes, it acknowledges that a variety of methods of calculation could be suitable for arriving at the estimate. AASB 17 requires that the calculation incorporates all reasonable and supportable information available without undue cost or effort and acknowledges that developing explicit scenarios may not be necessary. Consistent with LPS 340, the methods available include stochastic modelling, the use of probability distributions and relatively simple modelling.

AASB 17 incorporates the allowance for asymmetry within the equivalent of the policy liability. At transition, it requires that the equivalent of the PV of shareholder profits, the CSM, is reduced by any allowance for asymmetry. Whilst subsequent movements in this allowance may be subject to different treatment, this still narrows the approaches that can be used compared to LPS 340. AASB 17 does require some reduction in the CSM because of asymmetry and it does not allow any offset against policyholder benefits.

AASB 17 requires that the CSM cannot be negative. Once the CSM reduces to zero, onerous conditions apply and movement in the allowance for asymmetry will flow directly to shareholder profit/loss.

Paragraph 32 of LPS340 requires that the Life Act profit allocated to shareholders equals the AASB17 profit if the accounting standard method is used. If a company does not want AASB17 to determine when a non-standard allocation of profits or losses is made to the shareholder, then they will make the total profit a multiple of the AASB17 profit (e.g., 5x for an 80/20 company). Note that this will lead to potentially increased volatility in profit under LPS 340.

8. Capital Calculations and Tail Distributions

Appropriate consideration of extreme events, at the tail of the probability distribution, is particularly important in capital adequacy reporting, as the focus of the analysis is on the likelihood and impact under adverse circumstances.

In some cases, a simple stress test may provide a simple substitute for a more technical stochastic approach. This is particularly the case when investigating the impact of events in the tail of the probability function as the parameters for the stress test can be based on observed events (although Members would also be aware that extreme events may be over- or under-represented in recent available data).

A stochastic approach requires a subjective estimate of future experience that may not be apparent to the users.

The value and capital requirements relating to asymmetric risks may be particularly affected by the distribution of variables in the tails, and correlations between parameters. In particular, correlations in the tails of distributions may be different to overall average correlations.

It is important to note that applying the asset stresses required under the Asset Risk Charge of the regulatory capital requirement is generally not a suitable replacement for an asymmetric risk reserve under LPS 340. The asset stresses represent a single point in the tail of the distribution, whereas the asymmetric risk reserve represents a weighted valuation across the distribution of possible outcomes (which is more consistent with a pricing methodology of an embedded option). In addition to this, asymmetry is required to be captured within the estimate of future cash flows under the accounting liability.

9. AASB 17 Risk Adjustment

The considerations outlined in the previous section relating to capital calculations are also broadly applicable when considering asymmetry in calculating the AASB 17 risk adjustment for non-financial risks, albeit at a lower level of confidence and extreme event.

As an example, consider participating business where the guaranteed liabilities become a greater proportion of the supporting assets. The capacity to share with the policyholder any losses from non-financial risks reduces and the shareholder faces the prospect of incurring more than the standard allocation. This may generate asymmetric outcomes for the risk adjustment.

Chapter 9 of the “Information Note: AASB 17 Insurance Contracts” also includes an example that illustrates asymmetry in the net risk adjustment arising from the treatment of reinsurance.

10. Management Actions, Discretions and Mitigations Strategies

The impact of asymmetric risks may be significantly affected by the exercise of management actions and discretions. Examples include:

- changes to declared bonus and crediting rates for both participating and discretionary non-participating business;
- changes to surrender values;
- discretions to alter fees and to change other policy terms and conditions;
- alterations to premium rate scales;
- decisions regarding profit allocations and distributions;
- changes to asset allocation strategies or implementation of hedging strategies; and
- other mitigation strategies such as expense management, reinsurance and the ability to terminate or refuse to renew contracts.

There are various factors to consider when assessing discretions, including how and when they can be exercised. Past actions or communications may create implied or constructive obligations that may constrain management actions. There may be limited flexibility to change bonus and crediting rate philosophies.

In addition, there may be delays before changes are approved and implemented and they may require policyholder notification. Typically, Members would consider the impact of the exercise of management actions on policyholder actions, especially lapse and take-up rates.

Companies will also be aware of the ability of reinsurers or other companies (including other companies within the same overall group as the life company) to exercise discretions against them, and the impact of this on their mitigation strategies – for example their reinsurers' ability to terminate cover or refuse to renew. In addition, there may be limited ability to implement other asset based mitigation strategies (for example, reflecting market illiquidity or volatility adversely impacting market cost of options), which may also need to be considered.

Factors that can provide comfort that proposed management actions will be followed in various scenarios include: any precedents created through previous company actions and industry practices; systems, processes and documentation being in place to monitor key drivers, risk indicators and risk limits and react to changes in circumstances; and any pre-existing approval by the board to act in a certain way under certain conditions.

Rules for management actions and discretions can be included in scenarios or dynamic stochastic models, to enable a more realistic impact to be considered of a range of outcomes.

11. Policyholder Behaviour

Additional variability in potential outcomes arises from the uncertainty of policyholders' responses.

Developing a probability distribution of policyholder behaviours may be appropriate with the mean outcome being used for best estimate reporting and the tail being used for capital reporting. Different correlations between policyholder behaviour and the other risks may however affect both the mean value and the required capital.

Typically, the Member would very carefully consider any dynamic policyholder behaviours that serve to benefit the shareholder to ensure this is a reasonable outcome in the circumstances.

Presenting a range of possible outcomes may also be appropriate to indicate the impact of different policyholder behaviours.

12. Communicating Asymmetric Risks

The following aspects could be considered when communicating asymmetric risks:

- **Regulatory Guidance:** The communication of asymmetric risks is driven by the purpose of the exercise. In financial reporting, Accounting Standard AASB 7 (Financial Instruments: Disclosures) has certain requirements for sensitivities to be disclosed.

- **Confidence intervals & scenarios:** In other circumstances, such as pricing or risk management, it may not be sufficient to put a single value on an asymmetric risk, particularly where the risk being quantified is subject to significant uncertainty. It may be more appropriate to support any best estimate number produced with a number of scenarios to give an idea of the variability and importance of the risk being considered.

- **Medium for communication:** In a life insurance environment, it would be expected that material asymmetric risks would be discussed in the Financial Condition Report.

- **Context:** Consider asymmetric risks anticipated or arising in other counties, industries or time periods

- **Managing the risk:** Depending on the use of the report, it may be appropriate to describe risk mitigation strategies. Asymmetric risks can be reduced, transformed or transferred in a large number of ways, including through policy design before the risk is written, or through changing investment strategy and reinsurance afterwards.

- **Tailoring to the audience:** The communication of risks that are quantified using stochastic techniques in particular needs care to balance the amount of information available and the amount of information being presented such that it is appropriate for the intended audience.

Appendix 1 – Examples of Asymmetric Financial Risks

(a) Conventional participating business and Investment account business. All the upside is generally split using a certain profit participation percentage, while the downside may require the company to meet the underlying guarantees and take 100% of the loss after a certain point.

(b) Extra cost guarantees on investment linked products may also require the company to meet 100% of the loss after a certain point.

(c) Guaranteed annuity conversion options, where the annuity rate is guaranteed, can create a large difference between market rates and guaranteed rates, leading to significant financial selection effects.

(d) Caps on fees and other inflation risks may provide losses in times of high inflation.

(e) Policyholder free look period can be a short option to the policyholder, for example investment products involving a guarantee.

(f) Profit sharing formulae (reinsurance and group risk) may give away most of the upside but little of the downside. This occurs in par business as noted in (a) and non-par business with a specified profit sharing formula, particularly where losses are not carried forward.

(g) Tax is asymmetric as the company will always need to pay tax on profits but may not be able to claim tax losses in all adverse scenarios.

(h) Non-proportional forms of reinsurance, such as stop loss and catastrophe insurance, are asymmetric.

Appendix 2 – Potential Inconsistencies When Valuing Liabilities with Asymmetric Risks

Both AASB 17 and LPS 340 require the use of discount rates that reflect the market risk inherent in the policyholder benefits. Hence liabilities in respect of products whose benefits are contractually linked to assets values (for example, participating products) are normally valued using best estimate earning rates for at least part of the liability (ignoring the liability threshold) and liabilities in respect of other products (for example, pure risk products) are valued using risk free discount rates.

LPS 340 states that the best estimate liability must include the value of any options that may be exercised against the company. This value is typically determined using a suitable option price method.

There is likely to be an inconsistency between option values determined using a risk neutral valuation and a best estimate liability that is based on real world distribution assumptions and discounted at either risk free discount rates or best estimate earning rates, if the best estimate is the mode of the distribution. It is, however, possible to use real world probabilities and discount at a risk adjusted rate to produce market consistent present values. Given that the real world probabilities are based on the market returns of the underlying assets, it can be argued that the standards permit the use of fair value.

Because LPS 340 does not require the calculation of market consistent liabilities, two solutions suggest themselves:

- one possible solution would be to value the entire life insurance liability using market consistent techniques. (This method may include separating the life insurance liability into components dependent on the performance of the assets supporting the liability, as well as a guaranteed component.) This approach would seemingly be consistent with the fair value measurement approach required for financial instruments (including life investment contracts); and

- an alternative solution would be to value the options using real world probabilities and an appropriate risk adjusted rate for discounting. It may, however, be difficult to find an appropriate distribution of real world outcomes and appropriate discount rates that reflect the nature, structure and term of the liabilities.

- This alternative applies if the liabilities are not linked to investment performance. If they are related to investment returns, then the discount rate is typically the same for both assets and liabilities. In such cases, the options can either be valued using risk neutral rates or real world deflator methods.

- A further alternative is to value the asymmetric risk reserve only using market consistent option techniques, although this creates a potential inconsistency when combined with a liability determined on a real world basis.

The LIPC is not aware of this inconsistency being a material issue for any practitioners. It notes that either approach appears to be theoretically justifiable. As the increase in BEL (due to the inclusion of the value of options) will normally be offset against profit margins, this is only likely to be an issue when products are in, or close to, loss recognition. Examples of how the inclusion of the value of options can impact the policy liability are provided in Appendices 5 and 6.

The LIPC notes that capital reserving requirements under LPS 110 are based on adverse real world scenarios. As discussed in Section 5.3.2, real world methods are required for determining the appropriate capital reserves in respect of asymmetric risks and so the inconsistency described above does not seem to arise in this case.

Appendix 3 – Examples of Possible Inconsistencies Between Asymmetric Risk Valuations and Deterministic Best Estimate Liability Valuations

Following is a simple artificial example to demonstrate the principles and possible pitfalls.

Consider a profit share arrangement on a pure risk policy. The example ignores discounting and assumes a 1 year time period only. The profit share terms are

Max {0, 60% * [75% Premiums – Claims]}.

The profit share represents an asymmetry as the policyholder shares in the upside only.

Example 1 – "Out-of-the-Money" Scenario

Assume claims have three possible scenarios:

Claim Scenario	Payment at t=1	Probability
A	1,000	40%
B	2,000	40%
C	3,000	20%
		100%

The premium charged is 2,000. The financial outcomes are shown in the table below.

Table 1 – Asymmetry Cost Based on Upside Paid Away

Claim Scenario	**Premium at 0**	**Claims at 1**	**Profit Share at 1**	**BEL at 0**	**Probability**
A	2,000	1,000	300	(700)	40%
B	2,000	2,000	0	0	40%
C	2,000	3,000	0	1,000	20%
Mean outcome	2,000	1,800	120	(80)	
Outcome using mean inputs	**2,000**	**1,800**	**0**	**(200)**	

The cost of the profit share is estimated using two different methods in Table 1:

- as the mean of the cost estimated in each scenario (120); and

- as the cost using the deterministic mean input assumption

that is, 60%* (75% * 2,000 – 1,800) = 0, which clearly understates the true expected cost.

The correct BEL at time 0 is -80 (calculated as the mean of the scenario outcomes for the BEL). The same result can be obtained by adding the cost of the profit share from the scenario analysis (120) to the BEL calculated ignoring the profit share (-200).

The "intrinsic value" of the asymmetry (defined as the value using mean inputs) can be considered to be zero and the "time value" of the asymmetry (the balancing item) can be taken to be 120.

The discussion so far has examined the value of the profit share by reference to the amount of upside profit given away to the policyholder in each scenario. An alternative approach is to consider the cost of the profit share as the amount of downside that is not able to be passed onto the policyholder in each scenario. The two approaches typically provide the same answer (using the same logic as underlies put-call parity in option pricing). However, care needs to be taken to ensure this outcome arises as shown below.

Table 2 – Asymmetry Cost Based on Downside NOT Shared

Claim Scenario	Premium at 0	Claims at 1	Losses unable to be shared at 1	Probability
A	2,000	1,000	0	40%
B	2,000	2,000	300	40%
C	2,000	3,000	900	20%
Mean outcome	**2,000**	**1,800**	**300**	

Note: the "losses unable to be shared at 1" represent the losses under the profit share formula that the insurer would pass onto the policyholder if the profit share formula was not subject to a minimum payment of zero.

The cost of the profit share (300) is seemingly overstated in Table 2 compared to Table 1. However, the cost under this approach represents the time value only and ignores the intrinsic value. The intrinsic value is -180 (= 60% * [75% * 2,000 – 1,800]). Hence the correct adjustment to the deterministic BEL (120) is only obtained once both components are taken into account.

Example 2 – "In-the-Money" Scenario

An example is now considered where the intrinsic value of the option is positive at time 0 (that is, a profit share is expected to be paid under deterministic best estimate inputs).

The assumed claims distribution is revised to be:

Claim Scenario	Payment at t=1	Probability
A	1,000	45%
B	2,000	35%
C	3,000	20%
		100%

The premium charged is now assumed to be 2,500 and the revised outcomes are below.

Table 3 - Asymmetry Cost Based on Upside Paid Away

Claim Scenario	**Premium at 0**	**Claims at 1**	**Profit Share at 1**	**BEL at 0**	**Probability**
A	2,500	1,000	525	(975)	45%
B	2,500	2,000	0	(500)	35%
C	2,500	3,000	0	500	20%
Mean outcome	2,500	1,750	236	(514)	
Outcome using mean inputs	**2,500**	**1,750**	**75**	**(675)**	

The correct BEL at time 0 is now -514. However, it is noted that an incorrect result (of -439) can be obtained if the mean profit share cost (236) from the scenario analysis is added to the deterministic BEL of -675.

That is, the scenario analysis does not provide the correct adjustment to apply to the BEL using deterministic mean inputs. This is because the intrinsic value (75) is double counted (it is in both the deterministic cost and the scenario based cost). (The correct adjustment is 236 – 75 = 161.)

The revised outcomes when the cost of the profit share is viewed as the amount of downside not able to be passed on are shown below.

Table 4 – Asymmetry Cost Based on Downside NOT Shared				
Claim Scenario	**Premium at 0**	**Claims at 1**	**Losses unable to be shared at 1**	**Probability**
A	2,500	1,000	0	45%
B	2,500	2,000	75	35%
C	2,500	3,000	675	20%
Mean outcome	**2,500**	**1,750**	**161**	

The cost using this approach (161) is now the correct adjustment to apply to the BEL, ignoring any asymmetry in the profit share calculation - although the asymmetry does not apply when using deterministic mean inputs - to give the correct overall BEL.

Discussion

The above two examples are intended to illustrate some of the basic principles when allowing for asymmetric risks in liability valuations. In particular, the liability adjustment to allow for an asymmetric risk needs to be consistent with any existing allowances for this risk.