32 Best estimate assumptions

32.1 Summary of Issue

This issue will consider the derivation of the best estimate assumptions prior to any allowance for any risk and uncertainty.

IAS37 paragraph 36 defines “best estimate” in the context of the amount (as opposed to assumption) “recognised as a provision should be the best estimate of the expenditure required to settle the present obligation at the balance sheet date.”

In the DSOP, the term “best estimate assumptions” was used to mean those that would be used to derive the “expected value”, i.e. the “probability weighted average of all cash flows at a given date, without considering any adjustment that a risk-averse investor would make for risk and uncertainty.” The DSOP made a distinction between market assumptions and non-market assumptions. We note and agree with the distinction made between:

- market assumptions which are assumptions about variables which are readily observable in markets. Examples are interest rates and asset prices, that are observable in the financial markets, market commissions observable in intermediary markets; and
- non-market assumptions which are assumptions about variables, such as claim rates, claim severity, lapse rates and mortality, that are not readily observed in the markets.

32.1.1 Initial measurement of financial liabilities

IAS 39 paragraph 66 and 67 states that “When a financial asset or financial liability is recognised initially, an entity shall measure it at its cost, which is the fair value of the consideration given (in the case of an asset) or received (in the case of a liability. Transaction costs that are directly attributable to the acquisition or issue are included in the initial measurement of the financial assets or financial liability.

The fair value of the consideration given or received for a financial instrument is normally determinable by reference to the transaction price or other market prices. If such market prices are not reliably determinable, available, or part of the consideration is for something other than the financial instrument, the fair value of the consideration is estimated as the sum of all future cash payments or receipts, discounted, if the effect of doing so would be material, using the prevailing market rate(s) of interest for a similar instrument (similar as to currency, term, type of interest rate, and other factors) of an issuer with a similar credit rating (see IAS 18, Revenue, paragraph 11). For example, the fair value of an originated long-term loan or receivable that carries no interest is the present value of all future cash receipts discounted using applicable market interest rates at origination (any additional amount lent is an expense or a reduction of income unless it qualifies for recognition as some other type of asset).”

As the initial measurement of a financial liability should be at cost, this appears to indicate that the pricing assumptions should be used initially.
32.1.2 Subsequent measurement of financial liabilities

IAS 39 paragraph 89A states “After initial recognition, an entity shall measure all financial liabilities, other than liabilities that are designated as held for trading and derivatives that are liabilities, at amortised cost using the effective interest method. After initial recognition, an entity shall measure financial liabilities held for trading and derivatives that are liabilities at fair value.”

To estimate fair value where there is no active market, IAS39 paragraph 100c states that “In applying valuation techniques, an entity uses estimates and assumptions that are consistent with available information about the estimates and assumptions market participants would use in setting a price for the financial instrument.”

32.2 Proposed Actuarial Guidance

Fair value should reflect: “estimates and assumptions that are consistent with available information about the estimates and assumptions market participants would use in setting a price for the financial instrument.” It should not reflect future cash flows that would not arise for other market participants if they took over the current insurer’s rights and obligations under the insurance contract. If there is contrary data indicating that market participants would not use the same assumptions as the insurer, fair value should reflect that market information.

The best estimate assumptions should not vary by the measurement basis used under IAS39, be it fair value or amortised cost.

On initial measurement of a financial liability, the assumption should consider on the pricing assumptions. Subsequently, the assumptions derived do not necessarily need to be consistent with those used for pricing purposes or management purposes in for example setting dividends or bonus although any deviation from the original pricing assumptions should be clearly evidenced.

The best estimate assumptions should when taken together reflect all pertinent areas of future experience and are specific to the book of contracts being measured. These assumptions should be comprehensive, internally consistent and represent the future expected experience and should be reasonable, supportable and explicit.

Correlation between best estimate assumptions should be considered. For example, correlation between non-market assumptions (such as lapses) and market assumptions (such as inflation / investment returns) should be incorporated. This will mean that a particular assumption could be related to another either through the use of a deterministic or a probability weighted formulaic approach.

If a single or a series of probability distribution has been derived for an assumption, then this should be translated into a single best estimate assumption for a deterministic projection by using the mean of that distribution.

In respect of future events including changes in legislation and future technological changes events that may affect the amount timing and timing of future cash flows under an insurance contract, a distinction should be made between reflecting events where there is sufficient objective evidence that they will happen and events that may happen in future.

- Similar to IAS 37, best estimate assumptions should reflect those events where there is sufficient objective evidence that they will occur. Thus possible new legislation is taken into consideration in measuring an existing obligation only when sufficient objective evidence exists that the legislation is
virtually certain to be enacted. Similarly, it is not appropriate to anticipate the development of new technology unless it is supported by sufficient objective evidence.

- Future events that may occur should be reflected within the adjustment for risk and uncertainty. Each scenario [with and without the future event] is weighted by the estimated probability that it the scenario will occur. Only events where there is at least some market expectation that it will happen should be taken into account. This would mean that there should be independent evidence that market participants are generally in agreement that there is a possibility that such an event may occur. Remote events which, should they happen, could have a material impact on future cash flows should be taken into account only with due care and with a suitable low probability weighting.

32.2.1 Market assumptions

Market assumptions are assumptions about variables, such as interest rates and asset prices that are readily observable in the financial markets. Some assumptions are mixed between market assumptions and non-market assumptions.

The market assumptions should be consistent with current market prices and other market data unless there is reliable and well-documented evidence that current market experience and trends will not continue. Such evidence may exist if, for example, a single, objectively identifiable event causes severe and short-lived disruption to market prices. In such exceptional cases, the assumptions should be based on this reliable evidence.

The discount rate should be consistent with other market assumptions. IAS 37 states that the “discount rate should be a pre-tax rate that reflect current market assessments the time value of money and the risks specific to the liability”. It should also “not reflect risks for which future cash flows have been adjusted”

32.2.2 Non market assumptions

Non-market assumptions are assumptions about variables such as lapse rates that are not readily observed in the financial markets. Non market assumptions should reflect:

(a) information about claims already reported by policyholders;
(b) other information about the known or estimated characteristics of the book of insurance contracts; and
(c) historical data about the insurer’s own experience, supplemented where necessary by historical data from other sources. Historical data is adjusted to the extent that the characteristics of the book differs (or will differ, as a result of anti-selection) from that of the population used as a basis for the historical data. It is also adjusted where there is reliable evidence that historical trends will not continue.

Use of Prior Experience

Non-market assumptions about future experience should be based upon actual past experience as a starting point. To the extent possible and appropriate, the actuary should consider data specific to the book of contracts for which the assumptions are being made. If the experience of the book of contracts lacks full credibility or such data are not available, the actuary could construct assumptions by weighting the experience of that book of contracts with other experience that is more credible. For example, this may be based on other book of
contracts which are subject to substantially the same risk for the assumption being considered; similarly situated companies; industry experience in the same country or from elsewhere.

If the actuary is to rely on published tables, then the actuary should give consideration to the characteristics of the table, including the makeup of the risks whose experience forms the basis of the table, the exposure period and margins within the table, if any are present. The actuary should be aware of assumptions and methods used in developing published tables and should make modifications where appropriate. However, any modification should be based on reliable evidence only.

The actuary is required to apply judgment to determine the extent to which prior experience is a guide to future experience. For example, adjustments may need to be made for changes in circumstances or, for example, changes in the manner that past data was established compared to that required to determine assumptions about future experience.

When assessing the basis for non-market assumptions, there should be an underlying assumption that the insurer is a going concern, unless otherwise disclosed.

Trends

Non-market assumptions should consider established historical trends. It is recognized that it takes time to discern trends in emerging experience, and to distinguish them from random fluctuations. On the other hand, long-term averaging or smoothing of past experience is inappropriate. It is only appropriate to allow for the continuation of long-term trends if there is clear evidence that such trends exist and that such trend will continue or otherwise not continue.

In analyzing experience data, it is appropriate to remove the effects of statistical fluctuations and cyclical influences. To the extent that the experience so adjusted reveals an underlying trend, the actuary should apply judgment to the projection of that trend in setting the expected assumption.

Updating assumptions

As they are not based on observable market prices, non-market assumptions are inevitably more subjective than market assumptions. Therefore, it is important to determine whether an insurer should adjust its non-market assumptions when there are differences between actual experience and previous non-market assumptions. These differences, sometimes called experience adjustments, may arise for three reasons:

(a) an insurer may have chosen an incorrect model of future cash flows. For example, it may have assumed that future cash flows are normally distributed, when they actually follow a different distribution. Alternatively, an insurer may have overlooked a factor that will influence the future cash flows;

(b) an insurer’s estimate of the parameters of an underlying probability distribution may differ from the actual parameters. For example, an insurer may estimate that a distribution has a mean of 100 and a standard deviation of 10, when the distribution actually has a mean of 120 and a standard deviation of 15; and

(c) random statistical fluctuations are likely even if the insurer has chosen a model that is totally accurate and has correctly estimated the parameters of the distribution under that model. If the risks are uncorrelated, such random fluctuations are smaller for a large population than for a small population.
An insurer needs to investigate and understand the reasons for experience adjustments. If experience adjustments suggest that the insurer has used the wrong model, or estimated parameters that differ from the true parameters, the insurer will adjust the model or parameters. If experience adjustments arise solely from random statistical fluctuations, the insurer will not adjust the model or parameters."

Assumptions should not be changed from one valuation to another solely if the actuary’s judgment or perception of risk has changed unless there is clear and supportable evidence that justifies a change in assumption assumptions. For example, a change in assumption is not justified due to a change in approach in deriving assumptions without evidence that the previous approach led to inadequate results.

32.2.3 Setting non market assumptions
When setting non-market assumptions for investment contracts the following guidelines should be borne in mind. For investment contracts, mortality or morbidity elements of the basis should be trivial or irrelevant.

Discontinuances

Discontinuance assumptions are required because the insurer is exposed to risk from the fact that the policyholder has the option to withdraw or persist, or to select the timing or the amount of withdrawal. Discontinuance can take the form of ceasing premium payments (this does not mean that the insurer’s liability has necessarily been removed) or ceasing the contract and may give rise to the payment of a surrender or transfer value, to the granting of a paid up policy or to lapse without value.

The following considerations can affect the selection of expected assumptions for future discontinuances experience:

- plan of insurance and the benefits and options provided;
- policy duration or attained age;
- premium frequency and payment method;
- premium paying status;
- size of policy;
- relative advantages of lapsation/withdrawal and persistency to the policyholder,
- surrender charges and/or persistency bonuses;
- sophistication of policyholder and intermediary;
- competitive situation for the product
- claims management practice;
- interest rate scenario and other economic factors; and
- distribution system and other marketing practices.

To determine the surrender value or transfer value payable on withdrawal, these should take account at least the following:

- market assumptions assumed in the projection;
• any guaranteed surrender or transfer value scale; and
• constructive obligations within the plan.

Discontinuance experience can normally be a major determinant of overall profitability to the insurer for many contract types. The actuary should use credible and pertinent discontinuance experience to the extent possible. In the absence of reliable experience data for the class of risk under consideration (e.g. new products or later durations in the policy), the actuary should seek to minimize recognition of future profits from discontinuances.

**Expenses**

Assumptions are required with respect to the future expenses associated with insurance obligations arising from commitments the insurer has made on, or prior to, the valuation date including overheads.

When setting expense assumptions, it may be useful to differentiate between:

(a) the insurer’s strategy for determining the level of service provided to policyholders and its approach to claims management; and

(b) the insurer’s efficiency in providing that level of service and implementing its approach to claims management.

As the level of service and approach to claims management will have implications for both expense levels and lapse rates, fair value should reflect an insurer’s strategy for determining the level of service provided to policyholders and its approach to claims management. Given its particular service-level strategy and its approach to claims management, an insurer may be more or less efficient than other market participants and fair value should reflect the general level of efficiency in the market. It also means that it is not appropriate for the fair value to reflect management plans to improve efficiency for their existing service level and claims management strategy.

Generally all administrative cost and consequent commissions should be considered. Where future premiums are a factor in the determination of the liabilities, expenses related to the premiums should also be taken into consideration. In addition to the expenses of administering investments, expenses relating to investment earnings should also be taken into consideration.

The actuary should be familiar with the process by which the expenses are allocated. The actuary should also ensure that expenses pertinent to the valuation include both direct expenses and an appropriate provision for general overhead expenses reasonably allocable thereto.

The expense assumptions will normally assume that the company will uphold a reasonable level of new business and therefore the assumptions for the closed book can normally be based on the current economies of scale. To project improvements in economies of scale beyond the valuation date should be dependent on management expectations and plans and may be appropriate in certain circumstances but only if there is clear and reliable evidence that such plans are likely to be met.

In some circumstances, such as start-up or wind-down of an insurer, or where the allocation of expenses is unusual, the experience data may not serve as an appropriate basis for future expense assumptions. The actuary should examine the experience data carefully, and ensure that the resulting assumptions provide for a
reasonable level of expenses that do indeed pertain to the administration of contracts, of investments and claim settlement, and serve the objective of the valuation.

Future expense cash flows should be assumed to vary with assumed rates of general level of expense inflation in a reasonable manner. The starting point will normally be market price level of inflation as determined within the market assumption. To this a factor for the insurer’s level of expense inflation relative to the market level of price inflation needs to be added.

Where services such as policy administration or fund management are provided by external parties, consideration should be given to the terms of these agreements including the possibility of termination of the agreement.

32.3 Discussion
32.3.1 Distribution of an assumption

Typically, in the majority of actuarial calculations, best estimate assumptions have normally been considered to be deterministic and could be a single estimate over the “term of a liability” or spot rates i.e. estimates over specific period(s). It is important to recognise that best estimate assumptions could be:

- probability weighted assumptions with distribution derived either at specific points of time or a single distribution over the term of the liability; or

- allowed for using a stochastically determined method.

If a single or a series of probability distribution has been derived for an assumption, there are a number of ways that this distribution could be reflected in a best estimate assumption for a deterministic projection. For example, the best estimate assumption could be defined as the mean, median or mode of the distribution or could be the most reliable estimate that an enterprise can make of items such as the risk adjusted mean. It is recommended that the mean of the distribution is used to derive the best estimate assumption.

The distribution used to derive the mean is based on prior experience taking into account any future trends and developments as discussed below. The prior experience is in itself only a sample. As such, the measurement of the mean is only the mean of a sample. We note here the concept of “prudence”, as defined under paragraph 37 of the IAS Framework document, where it is defined that “prudence is the inclusion of a degree of caution in the exercise of judgements needed in making the estimates required under conditions of uncertainty, such that assets or income are not overstated and liabilities or expenses are not understated.” This concept has been interpreted to imply that the statistical techniques used to estimate the distribution from the sample data observed should reflect a degree of prudence to reflect the uncertainty within the sample. We believe that this reference to prudence is appropriate to recognise the fact that the true value of the assumption is unknown.

The use of the mean of this distribution will ensure that the estimated value of the assumption is neutral that is it, free from bias (an unbiased estimator).

The difference between the concept of allowance for prudence within the statistical techniques used to derive the best estimate assumption and the allowance for risk and uncertainty within the cash flows should be appreciated. The allowance for risk and uncertainty relates to the fact that the actual outcome may deviate from the true but unknown mean value. Prudence addresses the issue of whether the reported amount (i.e. the mean of the distribution of the sample) deviates from the amount that should have been reported. Actuarial practice follows the accounting convention, that in two situations deemed equally likely, the one that should be selected
is the one that produces the larger liability or smaller asset, consistent with this definition of prudence. This implies that estimations should be made in a manner that the estimation results at least in 50% of cases to an asset or liability that is not larger or smaller respectively than that which would result from the true amount.

### 32.3.2 Assumptions set by national associations

We would encourage national actuarial associations to derive best estimate assumptions for their territory for fair value and amortised cost purposes where possible, particularly for the following market assumptions:

- Risk free yield curve
- Market consistent price inflation

However, we note that it would be difficult to prescribe certain market assumptions such as volatility, for example, equity price volatility. This is because such assumptions would be dependent on the underlying asset model used to project equity prices.

For non-market assumptions, we would encourage national associations to derive industry tables providing as much information as possible to explain the characteristics of the table, including the make up of the risks whose experience forms the basis of the table, the exposure period, margins and assumptions and methods used in developing the table.

### 32.4 Background to issue

In the DSOP, principle 4.4 stated that:

"In determining entity-specific value, each cash flow scenario used to determine expected present value should be based on reasonable, supportable and explicit assumptions that:

(a) reflect:
   (i) all future events, including changes in legislation and future technological change, that may affect future cash flows from the closed book of existing insurance contracts in that scenario;
   (ii) inflation by estimating discount rates and cash flows either both in real terms (excluding general inflation, but including specific inflation) or both in nominal terms; and
   (iii) all future cash flows that would arise in that scenario for the current insurer, even cash flows that would not arise for other market participants if they took over the current insurer’s rights and obligations under the insurance contract;

(b) in relation to market assumptions, are consistent with current market prices and other market-derived data, unless there is reliable and well-documented evidence that current market experience and trends will not continue. Such evidence is likely to exist only if a single, objectively identifiable, event causes severe and short-lived disruption to market prices. In such exceptional cases, the assumptions should be based on this reliable evidence; and

(c) in relation to non-market assumptions, are consistent with the market assumptions discussed in (b) and with the most recent financial budgets/forecasts that have been approved by management. To the extent that those budgets and forecasts are not current and not intended as neutral estimates of future events, the insurer should adjust those assumptions. If the budgets and forecasts are deterministic, rather than stochastic, the entire package of scenarios should be consistent with the budgets and forecasts.”
Principle 4.5 stated:
“When fair value is not observable directly in the market, fair value should be estimated by using the guidance shown above, but with the following two differences.

(a) Fair value should not reflect future cash flows that would not arise for other market participants if they took over the current insurer’s rights and obligations under the insurance contract.

(b) If there is contrary data indicating that market participants would not use the same assumptions as the insurer, fair value should reflect that market information.”

IAS37 states:

**Best Estimate**

36. **The amount recognised as a provision should be the best estimate of the expenditure required to settle the present obligation at the balance sheet date.**

37. The best estimate of the expenditure required to settle the present obligation is the amount that an enterprise would rationally pay to settle the obligation at the balance sheet date or to transfer it to a third party at that time. It will often be impossible or prohibitively expensive to settle or transfer an obligation at the balance sheet date. However, the estimate of the amount that an enterprise would rationally pay to settle or transfer the obligation gives the best estimate of the expenditure required to settle the present obligation at the balance sheet date.

38. The estimates of outcome and financial effect are determined by the judgement of the management of the enterprise, supplemented by experience of similar transactions and, in some cases, reports from independent experts. The evidence considered includes any additional evidence provided by events after the balance sheet date.

39. Uncertainties surrounding the amount to be recognised as a provision are dealt with by various means according to the circumstances. Where the provision being measured involves a large population of items, the obligation is estimated by weighting all possible outcomes by their associated probabilities. The name for this statistical method of estimation is ‘expected value’. The provision will therefore be different depending on whether the probability of a loss of a given amount is, for example, 60 per cent or 90 per cent. Where there is a continuous range of possible outcomes, and each point in that range is as likely as any other, the mid-point of the range is used.

**Example**

An enterprise sells goods with a warranty under which customers are covered for the cost of repairs of any manufacturing defects that become apparent within the first six months after purchase. If minor defects were detected in all products sold, repair costs of 1 million would result. If major defects were detected in all products sold, repair costs of 4 million would result. The enterprise’s past experience and future expectations indicate that, for the coming year, 75 per cent of the goods sold will have no defects, 20 per cent of the goods sold will have minor defects and 5 per cent of the goods sold will have major defects. In accordance with
paragraph 24, an enterprise assesses the probability of an outflow for the warranty obligations as a whole.

The expected value of the cost of repairs is: \((75\% \text{ of } \text{nil}) + (20\% \text{ of } 1\text{m}) + (5\% \text{ of } 4\text{m}) = 400,000\)

40. Where a single obligation is being measured, the individual most likely outcome may be the best estimate of the liability. However, even in such a case, the enterprise considers other possible outcomes. Where other possible outcomes are either mostly higher or mostly lower than the most likely outcome, the best estimate will be a higher or lower amount. For example, if an enterprise has to rectify a serious fault in a major plant that it has constructed for a customer, the individual most likely outcome may be for the repair to succeed at the first attempt at a cost of 1,000, but a provision for a larger amount is made if there is a significant chance that further attempts will be necessary.

41. The provision is measured before tax, as the tax consequences of the provision, and changes in it, are dealt with under IAS 12, Income Taxes.

32.5 Proposal for Form

The topic should be incorporated in an IAA guidance.