

Chapter 5

Adjustments for Risk and Uncertainty

- 5.1 There is always some **uncertainty** or **risk** about future cash flows from insurance contracts, because of the possibility that the:
- (a) number of insured events will differ from previous expectations (**occurrence risk**);
 - (b) cost of events will differ from expected cost (**severity risk**); and
 - (c) amount of an insurer's obligation may change after the end of a contract period. Such changes may result from the late identification of insured events that occurred during the contract period, the possibility that claims will settle more quickly or in amounts greater than expected, or that courts may interpret the insurer's liability differently than expected, and other factors that may change the insurer's initial estimate of costs to settle incurred claims (**development risk**).
- 5.2 This uncertainty may affect the amount of the future cash flows, their timing, or both. The approach adopted to risk and uncertainty is the second key determinant of present value, alongside estimates of future cash flows (chapter 4) and discount rates (chapter 6). Although some writers distinguish the terms "uncertainty" and "risk", the distinction does not appear to be important for financial reporting purposes. Therefore, this DSOP uses the two terms interchangeably.

Risk and Uncertainty

Principle 5.1

- 5.3 *The entity-specific value and fair value of insurance liabilities and insurance assets should always reflect risk and uncertainty.*
- 5.4 Some believe that entity-specific value, fair value or both should not reflect risk and uncertainty, on the grounds that adjustments to reflect risk and uncertainty:
- (a) cannot be made in practice in an objective, reliable and consistent manner;
 - (b) are inconsistent with IAS 19, Employee Benefits. Paragraph 11 of the Basis for Conclusions published with IAS 19 in 1998 explained that there was not yet sufficient consensus on the conceptual basis for certain effects of risk and uncertainty and that such effects should be excluded from present values until consensus is reached;
 - (c) are a form of mark-up or profit margin that should not be included in entity-specific value, because such adjustments have the effect of including future

cash flows that are not likely to occur if the enterprise retains the asset or liability. Although fair value would reflect the amount that market participants demand for accepting uncertainty, the price of a hypothetical transaction is irrelevant in determining entity-specific value; and

- (d) focus on only one side of the distribution - the possibility that actual results may be worse than the expected present value - and ignore the possibility that actual results may be better than the expected present value. Therefore, measurements incorporating such adjustments are excessively prudent and lack the neutrality that is one of the necessary components of reliable financial information.¹

5.5 For the following reasons, this DSOP argues that the entity-specific value and fair value of insurance liabilities and insurance assets should always reflect risk and uncertainty:

- (a) the pricing of all rational economic transactions takes risk into account. Although adjustments for risk and uncertainty are subjective, their inclusion will give a more useful portrayal of an enterprise's financial position and performance. Adjustments for risk and uncertainty are a means of pricing estimated real cash flows on a basis consistent with market pricing, rather than the inclusion of additional notional cash flows; and
- (b) although the terms "uncertainty" and "risk" refer, in common usage, only to the possibility of an unfavourable outcome, in this DSOP "risk" and "uncertainty" refers to a two-tailed probability distribution, in which the outcome may be either more favourable or less favourable than the expected value. Thus measurements incorporating adjustments for risk and uncertainty do not lack neutrality.

5.6 Because expected values allow for all possible outcomes, it is sometimes thought that expected values already reflect risk. However, this is a misunderstanding: expected values place the same weights on favourable outcomes and unfavourable outcomes; therefore, they do not reflect risk preferences. A risk-averse investor will place more weight on the unfavourable outcomes and less weight on the favourable outcomes.

5.7 An adjustment for risk and uncertainty is not intended to eliminate the possibility that the amount of claims actually paid may exceed the amount previously assumed in measuring the liability. For example, some argue that, in market transactions between insurers, liabilities are sometimes priced at expected value plus a risk adjustment equal to approximately one and a half standard deviations. In such cases, the actual amount paid is likely to exceed the amount assumed in the pricing basis approximately one time in seven. This is not a reason for including more conservative adjustments for risk and uncertainty in general purpose financial statements. As discussed in principle 3.3, it is not the objective of accounting standards to ensure that an insurer holds sufficient assets to meet its liabilities.

¹ Framework, paragraph 36

5.8 Some classify risks in the following three categories:

- (a) **model risk** – the risk that an enterprise has chosen an incorrect model of future cash flows. For example, an enterprise may have assumed that future cash flows are normally distributed, when they actually follow a different distribution. Alternatively, an enterprise may have overlooked a factor that will influence the future cash flows;
- (b) **parameter risk** – the risk that arises because information about an underlying probability distribution needs to be estimated and the estimate may be incorrect. For example:
 - (i) because all information about past experience is based on statistical inference, an enterprise's historical estimates of the parameters of a distribution are subject to sampling errors. For example, an enterprise may estimate that past results were drawn from a distribution with a mean of 100 and a standard deviation of 10, when the distribution actually had a mean of 120 and a standard deviation of 15; and
 - (ii) the parameters of a distribution may change over time. For example, human mortality has changed over time in ways that are not fully predictable. A major mortality risk on the same scale as AIDS may already exist (or may occur before the end of the contract period) but may not yet have been identified; and
- (c) **process risk** – the risk of the unavoidable random statistical fluctuations that will occur even if the enterprise has chosen a model that is totally accurate and has correctly estimated the parameters of the distribution under that model.

5.9 Some believe that rational participants in a market will often require a risk premium to reflect the risk that their investment decisions are based on imperfect information, whether this results from model risk or parameter risk. An adjustment to reflect such a risk premium would reduce the amount attributed to assets and increase the amount attributed to liabilities. Others believe that a risk adjustment to reflect model risk and parameter risk is correct conceptually, but should be prohibited to avoid unacceptable diversity in practice.

5.10 This DSOP is based on the view that it is conceptually preferable for both entity-specific value and fair value to reflect model risk and parameter risk. However, to avoid undue subjectivity, it is appropriate to exclude such adjustments unless there is persuasive evidence that enables an insurer to quantify them by reference to observable market data. Process risk may often be regarded as a diversifiable risk. Principle 5.4 discusses the treatment of diversifiable risk.

5.11 As uncertainties are resolved over time and the insurer is released from risk, the need for adjustments for risk and uncertainty decreases, and this results in income for the insurer. Principle 13.5 addresses the presentation of this income, among other things. Because the insurer is generally at risk for longer than the premium-paying period, this income will generally be reported over that longer period. Some current accounting

models allocate all income to the premium-paying period, even if the insurer is still exposed to risk after the end of that period.

- 5.12 Principle 13.2 considers, among other things, whether adjustments for risk and uncertainty should be presented as a separate provision or as a component of the overall insurance liability.

Where should Risk and Uncertainty be Reflected?

Principle 5.2

- 5.13 *Adjustments for risk and uncertainty should be reflected preferably in the cash flows, or alternatively in the discount rate(s), without any double counting.***

- 5.14 As an enterprise could reflect risk and uncertainty by making adjustments to either:

- (a) discount rates; or
- (b) cash flows, by adjusting future cash flows to certainty-equivalent cash flows, and then using a risk-free discount rate.

- 5.15 Some believe that adjustments for risk and uncertainty should be included in the discount rate, rather than in the cash flows. They argue that:

- (a) this is the most common method used today and is well understood by preparers, auditors and users;
- (b) at least for certain assets and liabilities, observable market data make it easier to estimate risk-adjusted discount rates than to estimate certainty-equivalent cash flows. For example, it may be possible to find a bond traded in an active market with cash flows that correspond closely to the cash flows from the asset or liability being measured. In such cases, it may be appropriate to use discount rate(s) based on yields derived from the observable market price of the bond. Similarly, it may be possible to make reasonable estimates of the necessary inputs for asset pricing models – for example, for the Capital Asset Pricing Model, these would be based on historical data about the covariance of asset returns with the market, historically observed long-term rates of return on the market and observed current risk-free rates; and
- (c) the disclosure of a risk-adjusted discount rate may give users of financial statements an informative and concise insight into the extent of the adjustment for risk. Among other things, users may be able to benchmark the rates disclosed against interest rates observable in the market. In principle, it may be possible to require disclosure under the certainty-equivalent approach that will show the extent of the adjustment for risk. However, there may be practical problems in aggregating this information in a meaningful way.

- 5.16 Some believe that adjustments for risk and uncertainty should be included in the cash flows, rather than in the discount rate. They argue that:

- (a) the inclusion of risk adjustments in the cash flows will generally require judgments about risk to be more explicit. As a result, judgments about risk are likely to be more thorough and reliable. By contrast, risk adjustments included in discount rates may be based on criteria that lack transparency and may not always be easily explained to users;
- (b) risk adjustments in the discount rate may reflect an implicit assumption that risk runs off evenly over time. For certain risks, this assumption may not be appropriate. For example, the risk of unexpected changes in mortality may not remain constant as a group of existing policyholders become older. Although this may not be a problem if any risk adjustment included in the discount rate is re-assessed carefully at each reporting date, the inclusion of the risk adjustment in the cash flows will direct more attention to the pattern of risk run-off. This is likely to reduce the danger that erroneous assumptions about the pattern of risk run-off will remain undetected;
- (c) risk-adjusted discount rates for assets may differ from risk-adjusted discount rates for liabilities. Thus, if the risk adjustments are built into discount rates, the resulting present value may depend on the level of aggregation of cash inflows and outflows. This would be undesirable;
- (d) the inclusion of risk adjustments in the cash flows is consistent with the risk-neutral methods generally used to value financial options (see principle 5.6 for further discussion); and
- (e) it is difficult to use a discount rate to price insurance risk because there is generally little or no secondary market for insurance risk.

5.17 This DSOP takes the view that the cash flow adjustment approach is generally preferable. In particular, when an insurance contract includes significant options that derive their value from the prices of traded instruments, it will be desirable to adjust the cash flows using techniques such as risk-neutral probabilities or deflators (see principle 5.6). However, it may be preferable to reflect risk and uncertainty by adjusting the discount rate(s), rather than the cash flows, if an insurance contract has cash flows that are very similar to cash flows from a bond traded in an active market. In this case, the discount rate(s) would be based on yields derived from the observable market price of the bond. Similarly, when the replicating portfolio approach is used (paragraphs 5.33-41), there may be no need to make explicit adjustments for those risks that are captured by the replicating portfolio.

5.18 The JWG Draft does not prescribe which of the two approaches to use. Neither the JWG Draft nor principle 5.2 precludes using a combination of the two, with some risks reflected in cash flows and others in discount rates.²

5.19 Principle 4.3 prohibits the inclusion of cost of capital in measuring insurance liabilities. However, some have suggested that an insurer should determine an

² JWG Draft, paragraph 354

adjustment for risk and uncertainty by referring to the cost of risk-based capital. For example, some argue that the UK capital markets judge insurers in these terms. Risk-based capital refers to the level of capital that an insurer would deem appropriate to hold in the light of the risk associated with its insurance activities. It is not necessarily the amount of capital required by a regulator.

- 5.20 Principle 14.XXX addresses disclosure about risk adjustments. It will be necessary to ensure that these disclosures give similar information, regardless of whether those risk adjustments are included in the discount rate(s) or in cash flows.

Risk Preferences

Principle 5.3

- 5.21 *Estimates of both entity-specific value and fair value should reflect the market's risk preferences, inferred, as far as possible, from observable market data. Inferences about the market's risk preferences should be determined using a consistent methodology over time. Changes in the inferred level of risk preferences should be made only in response to observable market data.***

- 5.22 Most individuals and most enterprises are risk-averse. In other words, they would rather avoid a loss of a given amount than make a gain of the same amount. The extent of that risk-aversion varies from person to person and is sometimes described as a risk preference. Risk preferences affect the amount that rational investors would pay for a set of uncertain cash flows. The following discussion deals with risk preferences in determining entity-specific value (paragraphs 5.23-5.27) and fair value (paragraph 5.28) and with reliability (paragraph 5.29-5.32). Paragraphs 5.33-41 consider one way of reflecting risk margins – by using a replicating portfolio.

Risk Preferences - Entity-specific Value

- 5.23 Some believe that entity-specific measurements should reflect an insurer's own risk preferences. They argue that this is consistent with using the insurer's own estimates of future cash flows, and with the desire of users to see the activities of an enterprise "through the eyes of its management". They also argue that it would be difficult to apply the market's risk preferences to an enterprise's own assessment of cash flows, because it is not usually possible to determine the underlying pattern of cash flows and associated risk preferences that the market has assumed in setting market prices.
- 5.24 This DSOP takes the view that entity-specific value should reflect the market's risk preferences. The objective of general purpose financial statements is to give decision-useful information to users. It is more useful to report measures that reflect the overall risk preferences in the market because this both creates comparability between different enterprises and reports information using a reasonably common benchmark based on the degree of risk aversion present in the market as a whole. The use of a market benchmark eliminates the need to consider the possibility of conflicts between the risk preferences of the enterprise's managers, its owners and other users of its financial statements. Information based on the risk preferences of an individual insurer is of:

- (a) limited relevance because users have no way of knowing whether the insurer is more or less risk-averse than the users are; and
 - (b) limited reliability because it is not easy to substantiate assertions about an individual insurer's appetite for risk.
- 5.25 As illustrated in example 5.1 below, it follows from principles 4.4 and 5.3 that entity-specific value should reflect:
- (a) an insurer's own estimates of the cash flows and associated risks, so that entity-specific value reflects the cash flows that the insurer expects, on reasonable grounds, to occur; and
 - (b) the adjustment for risk and uncertainty that the market (rather than the insurer) would make for cash flows with that risk profile and time pattern, as information reflecting the market's risk preferences is more helpful to users of financial statements than information reflecting the insurer's own risk preferences.
- 5.26 In other words, the insurer should make its own estimate of the amount, timing and risk profile (uncertainty) of future cash flows, and should then price those cash flows in the same way that the market would price cash flows of the same amount, timing and risk profile (uncertainty). This approach prices the insurer's estimates of future cash flows using a common benchmark that will be useful to users of financial statements. If an insurer is more or less risk-averse than other market participants, neither entity-specific value nor fair value will reflect this difference. It may be helpful to think of entity-specific value as equal to the fair value of a security that generates cash flows equal to the entity-specific cash flows (with the possible exception that principle 4.8 excludes the effect of the issuer's own credit standing from the entity-specific value of a liability).
- 5.27 This approach is consistent with IAS 36, Impairment of Assets, which states that value in use³ is based on reasonable and supportable assumptions that represent management's best estimate of the set of economic conditions that will exist over the remaining useful life of the asset. In other words, value in use reflects management's expectations of the future cash flows for an asset. However, the discount rate reflects the market's assessment of the time value of money and the risks specific to the asset.

Risk Preferences - Fair Value

- 5.28 The definition of fair value refers to an arm's length transaction between knowledgeable, willing parties. It follows that fair value reflects the market's risk preferences and is independent of factors that are specific to the particular enterprise that holds the asset or liability.

³ As explained in paragraph 3.13, value in use may be regarded as a form of entity-specific value.

Reliability

- 5.29 Inferences about the market's risk preferences will inevitably be subjective. Some suggest that a specific benchmark should be established for the level of confidence. For example, the Australian Prudential Regulatory Authority has proposed a 75% confidence level for general insurers.⁴ This DSOP does not propose any such benchmark, which would be arbitrary.
- 5.30 To foster comparability, this DSOP proposes that:
- (a) as far as possible, the market's risk preferences should be inferred from observable market data. Such data might include prices for financial instruments with similar risk characteristics, current market insurance premiums, current market reinsurance premiums, and recent market prices for portfolio transfers. In many cases, such data may need adjustment if it reflects transactions or instruments that differ in some, possibly material, respects from the insurance liability being measured;⁵ and
 - (b) to avoid arbitrary changes in methodology or assumptions, inferences about the market's risk preferences should be determined using a consistent methodology over time. Changes in the inferred level of risk preferences should be made only in response to observable market data.

Example 5.1 – Market Assessment and Enterprise Assessment Compared

An insurer believes that a liability will generate cash flows that follow a normal distribution with an expected present value (EPV) of 100 and a standard deviation of 20. The consensus view in the market is that a similar liability would generate cash flows that follow a normal distribution with an EPV of 125 and a standard deviation of 35. The risk adjustment that the market and the insurer would require are set out below. For the purpose of illustration, this example assumes that the risk adjustment will increase the liability (see paragraphs 5.52-58 for further discussion) and that the standard deviation is an appropriate measure of the amount of risk.

	Risk adjustment required by the:	
	<u>insurer</u>	<u>market</u>
Insurer's estimate - EPV of 100 and standard deviation of 20	5	3
Market estimate - EPV of 125 and standard deviation of 35	6	4

Clearly, fair value will reflect an EPV of 125 and the risk adjustment (4) that the market requires for cash flows with an EPV of 125 and a standard deviation of 35. Thus, the fair value of this liability will be 129 (125 plus 4). However, entity-specific value could be based on either:

⁴ APRA Draft Prudential Standard GPS 210, Liability Valuation for General Insurers, March 2001

⁵ Paragraphs 77-78 and 320-327 of the JWG Draft discuss some factors that may be relevant in considering the appropriateness of such market data.

- (a) an EPV of 100, with the risk adjustment (5) that the **insurer** requires for cash flows with an EPV of 100 and a standard deviation of 20. This would lead to an entity-specific value of 105 (100 plus 5); or
- (b) an EPV of 100, with the risk adjustment that the **market** requires for cash flows with an EPV of 100 and a standard deviation of 20. This would lead to an entity-specific value of 103 (100 plus 3).

In this example, the proposals in this DSOP would lead to a fair value of 129 and an entity-specific value of 103. The difference arises solely because the insurer expects lower cash flows than the market as a whole (perhaps because of an unusually effective claims management system). Although this insurer is also more risk-averse than the market, the fair value of 129 and the entity-specific value of 103 do not reflect this difference in risk aversion. An entity-specific value of 105 would reflect the greater risk aversion of this insurer.

- 5.31 This DSOP uses the term **market value margin** to refer to a risk adjustment that is consistent with market risk preferences.
- 5.32 In some cases, a significant change in the observable frequency of market transactions may be an indication of a change in market risk preferences.

Replicating Portfolio

- 5.33 Some believe that the most practical way to determine the risk adjustment for a liability is by looking to the market price of a replicating portfolio. This is a portfolio of assets with observable market prices whose cash flows closely match a significant and identifiable portion of the cash flows from a book of insurance contracts in all possible, or at least reasonably feasible, future scenarios. For example:
 - (a) if the amount and timing of payments under a liability are fixed, a replicating portfolio would comprise a portfolio of default-risk-free zero coupon bonds maturing at the dates when the payments fall due;
 - (b) if the amount and timing of payments under an uncertain liability vary in a completely predictable way in parallel with variations in the amount and timing of the cash flows from an asset traded in liquid markets, that asset would constitute the replicating portfolio for that liability. An example would be where an enterprise has issued a floating rate note with an interest rate that exactly corresponds to the interest rate on a default-risk-free asset of the same maturity. Similarly, if payments under a contract are denominated in units of an actual or notional investment fund, that fund is the replicating portfolio for those payments; and
 - (c) if the amount and timing of payments under a liability are uncertain, and vary partly in response to factors that cause changes in the cash flows from an asset traded in liquid markets and partly in response to other factors, then a more complex approach is required. First, the cash flows from the liability must be adjusted to reflect the risks that are not correlated with risks affecting the cash

flows from assets traded in liquid markets. Second, the traded assets whose cash flows are correlated with the liability cash flows constitute the replicating portfolio for the adjusted cash flows determined in the first step.

- 5.34 A paper⁶ submitted by the International Actuarial Association in response to the Issues Paper describes the application of the replicating portfolio approach to insurance liabilities.
- 5.35 The portfolio actually held by an insurer need not necessarily be a replicating portfolio in this sense. Indeed, in some countries, supervisory constraints may prevent insurers from holding a replicating portfolio. For example, in some countries, insurers are required to hold a certain proportion of their assets in certain types of assets, which may not necessarily reflect the characteristics of the liabilities.
- 5.36 Those who oppose the replicating portfolio approach argue that:
- (a) as noted in principle 3.2, it is incorrect to look at returns on assets and asset prices in measuring liabilities;
 - (b) the replicating portfolio approach relies on the assumption that markets are efficient. This assumption is unrealistic. For example, transaction costs can lead to differences between asset values and liability values even if the asset and liability have otherwise identical cash flows, particularly if the cash flows are non-linear;
 - (c) in order to evaluate a liability with uncertain cash flows, an enterprise would normally use a discount rate lower than the risk-free rate, yet the expected return on a replicating portfolio is likely to be higher than the risk-free rate;
 - (d) the pay-outs under insurance contracts reflect diversifiable risks, such as variability in mortality and the frequency and severity of natural disasters, that are not correlated with the financial risks arising from instruments traded in the capital markets. Accordingly, it is not possible to find a replicating portfolio for many insurance liabilities;
 - (e) even if the replicating portfolio exists, it cannot be used sufficiently objectively in practice to provide an adequate basis for an accounting standard. The practical difficulties include specifying the characteristics of the replicating portfolio, identifying the replicating portfolio, selecting the time horizon for estimating returns on the replicating portfolio and estimating those returns; and
 - (f) even if a replicating portfolio can be constructed in some more developed markets, it will be much more difficult to apply this techniques in emerging markets where a narrower range of instruments are traded.

⁶ Valuation of Risk Adjusted Cash Flows and the Setting of Discount Rates – Theory and Practice, http://www.iasc.org.uk/docs/in_c103e.pdf

- 5.37 Supporters of the replicating portfolio approach argue that:
- (a) in efficient markets, assets and liabilities whose cash flows respond in the same way to all future scenarios must have the same value. If this were not the case, it would be possible to make risk-free arbitrage profits. The activities of arbitrageurs would soon move market prices until the arbitrage possibility were eliminated. If a liability and the replicating portfolio have the same value, that value will incorporate the same adjustment for risk and uncertainty;
 - (b) the replicating portfolio approach lies at the heart of widely accepted methods generally used to value financial options (see principle 5.6 for further discussion); and
 - (c) the replicating portfolio approach does not imply that the measurement of assets should affect the measurement of liabilities. The measurement of liabilities should reflect the characteristics of the liabilities. If liabilities and assets have similar characteristics, then they may, under certain conditions and under certain assumptions about market prices, have similar measurement.
- 5.38 The replicating portfolio approach may be one way of complying with the proposals in this DSOP. However, there may be other ways of achieving the same objective.
- 5.39 To the extent that cash flows from a book of insurance contracts closely match the cash flows from a replicating portfolio, there is no need to make explicit adjustments for risk and uncertainty. Those cash flows are measured simply by taking the observed market price of the replicating portfolio. To the extent that cash flows are not closely matched by the replicating portfolio, it will be necessary to use the principles set out elsewhere in this DSOP in order to estimate their entity-specific value or fair value.
- 5.40 The concept of a replicating portfolio may be particularly relevant for some performance-linked insurance contracts (see chapter 7).
- 5.41 The replicating portfolio approach determines the entity-specific value or fair value directly without supplying separate estimates of the cash flows, risk adjustments and discount rates. Accordingly, further analysis may be needed to determine some of the disclosures required by principle 14.XXX.

Diversifiable and Undiversifiable Risks

Principle 5.4

- 5.42** *The entity-specific value or fair value of an insurance liability or insurance asset should always reflect both diversifiable and undiversifiable risk.*

Background

- 5.43 Some risks have a significant effect on only one enterprise, a few enterprises or a single sector or industry. For example, there is a risk that an enterprise's management

may make a decision that causes a major loss for the enterprise. All enterprises are subject to risks of losses of this kind. However, such losses in one enterprise are not necessarily strongly correlated with similar losses in other enterprises. Therefore, in a well-diversified portfolio, such enterprise-specific losses will tend to be offset by gains that are equally enterprise-specific. The more companies an investor has in its portfolio, the more likely it is that enterprise-specific risks will be offset. These enterprise-specific risks are **diversifiable risks** (sometimes known as **specific** or **idiosyncratic** risk).

- 5.44 Other risks tend to affect all investments. For example, all companies are affected to some extent by general economic trends, such as inflation, interest rates and unemployment. Although different companies are affected by these risks to a different extent, an investor cannot avoid these risks simply by investing in a larger number of enterprises. Losses caused in one enterprise from these factors are correlated with similar losses in other enterprises. These risks are **undiversifiable risks** (sometimes known as **systematic** risks).
- 5.45 Some asset pricing models, notably the Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT), argue that market prices reflect undiversifiable risks but do not reflect diversifiable risks. If market prices for some assets compensated investors for risks that could be eliminated by diversification, these assets would be worth more to those investors who were willing to hold a diversified portfolio. Consequently, these investors would bid up the market prices of those assets until they no longer reflected a return for diversifiable risks. Although empirical tests of these models have shown mixed results, supporters of these models note that they are quite widely used by institutional investors as a guide to investment decisions. Therefore, supporters of these models believe that fair value (and also entity-specific value if it reflects market risk preferences), should not reflect diversifiable risk.
- 5.46 Some believe that diversifiable risk is not relevant in determining fair value (for the reason given in the previous paragraph) but may be relevant in determining entity-specific value, because an individual enterprise may not be able to achieve the high level of diversification that these models assume to exist for the market as a whole.
- 5.47 Some risks may not be fully diversifiable from the perspective of a particular enterprise (perhaps because the enterprise is relatively small) or industry, but are diversifiable from the perspective of a large investor, because the investor can diversify risk across its entire portfolio. Some believe that the effect of such risk should be treated as diversifiable risk and excluded from the measurement of entity-specific value or fair value. They argue that the most relevant information for investors is information which acknowledges that investors can diversify such risk away, even if the enterprise cannot. Others argue that such risk should be treated as undiversifiable risk. They argue that investors are most interested in whether the enterprise can diversify the risk.
- 5.48 Different user groups may have different perspectives on what risks are diversifiable. For example, certain risks may be diversifiable from the perspective of large institutional investors, but may not be diversifiable from the perspective of

policyholders, employees or suppliers. Some believe that it may be necessary to determine different measures of risk for different users.

- 5.49 Others note the Framework's statement that financial statements are intended to meet the common information needs of a wide range of users. They take the view that the most appropriate way to meet those common needs is to:
- (a) develop a single measure of risk, based on the perspective of a large institutional investor; and
 - (b) give additional disclosure about risks that are not diversifiable from the perspective of other user groups (particularly policyholders or intermediaries acting for policyholders) who have different perspectives on the extent to which risks are diversifiable.
- 5.50 Paragraph 5.8 identified three types of risk: model risk, parameter risk and process risk. Conceptually, at least, process risk is a diversifiable risk from the perspective of a large institutional investor. Some believe that model risk and parameter risk are also diversifiable risks because they relate to information about individual investments. Others believe that at least model risk, and perhaps also parameter risk, are undiversifiable because there is a risk that the market as a whole may make systematic errors in gathering, processing and using information used in pricing assets and liabilities.
- 5.51 Some take the view that there is no clear generally-applicable evidence that market prices would be significantly affected by risks that are diversifiable from the perspective of a large institutional investor. However, in exceptional cases when there is persuasive empirical evidence that such diversifiable risk would affect market pricing, they believe that it is appropriate to consider its effect.

Liability Measurement: Effect of Diversifiable and Undiversifiable Risk

- 5.52 If diversifiable risk is relevant, it will always increase the measurement of a liability – either by decreasing the discount rate or adjusting the expected cash outflows upwards.
- 5.53 There are two different views of the effect of undiversifiable risk. The first view is that undiversifiable risk will always increase the measurement of the liability – either by decreasing the discount rate or adjusting the expected cash outflows upwards. This view is based on the argument that a liability with uncertain cash flows is always more onerous than a risk-free liability with the same expected (mean) timing and amount.
- 5.54 Under the second view, based on portfolio theory, undiversifiable risk will:
- (a) **decrease** the measurement of the liability – either by increasing the discount rate or adjusting the expected cash outflows downwards - if payments under the liability are **positively** correlated with the return on the market portfolio; and

- (b) **increase** the measurement of the liability – either by decreasing the discount rate or adjusting the expected cash outflows upwards if payments under the liability are **negatively** correlated with the return on the market portfolio.
- 5.55 One way of implementing the second view is to measure the liability by measuring the replicating portfolio, if it can be identified (see principle 5.3).
- 5.56 Some point to the example of a short position in a traded financial instrument. They argue that the holder of the short position would value it at the same price (subject, perhaps, to transaction costs) as the holder of the long position. They conclude that this supports the second view of undiversifiable risk.
- 5.57 Some believe that an insurance contract is one example of a transaction in which the two parties would not value the transaction at the same amount. The policyholder in an insurance contract is willing to pay more than the expected value of the policyholders' future cash flows from claims payments because the policyholder's main concern is not to minimise the expected present value of cash outflows or other losses. Rather, the policyholder is willing to pay more than the expected value of losses in order to secure protection against an unacceptable loss. This is because cash flows from the insurance policy are (negatively) correlated with the underlying loss event. Thus, insurance protects the policyholder against declines in wealth. Therefore, a policyholder values an insurance contract more highly than an asset that provides the same return in all scenarios (a risk-free asset).
- 5.58 Empirical evidence may give some information about the pricing of liabilities that are traded in liquid markets. However, empirical evidence may not give enough information to choose between the two views of undiversifiable risk, because it would be necessary to find evidence that shows whether debtors and creditors attribute the same value to the same instrument. Market prices will always show that some debtors and some creditors agreed enough to agree on a transaction price. Some consider the fact that markets exist at all as support, admittedly weak, for the second view; the first view implies that debtors and creditors will tend to value the same instrument quite differently and this might make it so difficult for buyers and sellers to agree on an acceptable transaction price that transactions would be rare.

Summary

- 5.59 This DSOP takes the view that market prices reflect both diversifiable and undiversifiable risk. CAPM and similar models are based on idealised assumptions, such as a perfect and liquid market, rational behaviour by investors, minimal transaction costs and the existence of arbitrage traders whose activities will force market prices to converge rapidly to levels that eliminate arbitrage opportunities. These assumptions do not reflect reality, particularly for inefficient markets, such as some insurance markets. Also, because there is a cost to obtaining information, risks that are diversifiable in theory may not be fully diversifiable in practice. Therefore, fair value and entity-specific value should reflect both diversifiable and undiversifiable risk. The main implication of this is that it becomes more important to define the unit of the account, as discussed in principle 5.5, because the impact of risk and uncertainty will depend on the size of the book.

- 5.60 The discussion in principle 5.4 distinguished diversifiable risk from undiversifiable risk for the purpose of analysing whether the measurement of insurance liabilities and insurance assets should reflect diversifiable risk. As principle 5.4 concludes that such measurement should reflect both diversifiable and undiversifiable risk, there is no need to distinguish these two forms of risk. Consequently, this DSOP does not require insurers to make such a distinction.

Unit of Account

Principle 5.5

5.61 *Measurement of insurance contracts should focus on books of insurance contracts that are subject to substantially the same risks, rather than on individual insurance contracts. Measurement of the book of contracts should reflect all benefits of diversification and correlation within that book of contracts (to the extent that they are readily determinably), but should not reflect the benefits of diversification and correlation outside that book of contracts.*

- 5.62 Some argue that entity-specific value or fair value determined for a book of contracts is likely to be lower than when it is determined individually for each contract and then aggregated. Possible reasons for such differences include the following:

- (a) a small book is more exposed than a large book to diversifiable risk caused by random statistical fluctuations because, from the perspective of the insurer, there is less opportunity for random fluctuations to cancel each other out in a smaller book;
- (b) for a small book, there is less statistical evidence about the model that should be used to simulate the underlying process driving future cash flows (model risk) and about the parameters of that process (parameter risk);
- (c) there may be economies of scale in a book. For example, transaction costs for assembling the components of a book may be higher than the transaction costs for acquiring the book as a whole from another party who has already assembled it;
- (d) books may not be traded in the same markets as their components. For example, transactions with policyholders occur in retail or primary markets and transactions between insurers occur in wholesale or secondary markets;⁷
- (e) joint effects may arise if contracts are combined. For example, commission, premium taxes or levies may be paid on a sliding scale at rates that depend on transaction volumes. The amount paid for a book of contracts will differ from the aggregate of the amounts that would be payable on individual contracts;

⁷ The JWG Draft proposes that fair value of financial instruments should reflect disposal or settlement on the market that would give the most advantageous price to the enterprise that holds the asset or liability.

- (f) some performance-linked contracts generate a surplus that will be distributed partly to current policyholders and partly to future policyholders. The part that will be distributed to future policyholders is, arguably, attributable to the book of existing contracts as a whole, rather than to individual existing contracts;
- (g) the level at which cash flows are aggregated may affect measurement. For example, if present value reflects directly attributable overhead, more overhead is likely to be included for a larger book;
- (h) market prices for some assets and liabilities do not respond linearly to changes in the underlying value-drivers (for example, interest rates or commodity prices). This is the case for some derivative financial instruments and for some other items that contain options. If the response is non-linear, a book will not necessarily respond to changes in value drivers in the same way as individual components of the book;
- (i) an insurer may be willing to pay a premium for a large book to secure market share and increased visibility in the market; and
- (j) synergies may arise from lines of business that complement each other or are negatively correlated with each other. For example, term life insurance exposes the insurer to the risk that policyholders will die prematurely, whereas annuities expose the insurer to unexpected longevity. An insurer issuing both kinds of policy is likely to suffer less fluctuation than an insurer that issues only one kind of policy.⁸

5.63 For the following reasons, some argue that the measurement of a small book should be proportionate to the measurement of an otherwise identical large book:

- (a) the undiversifiable risk of a book is simply the aggregate of the undiversifiable risk of the components of the book. Therefore, if diversifiable risk were excluded, the risk adjustment for the book would be additive;
- (b) although many policyholders may be unable to diversify risks that would be diversifiable for a large institutional investor, the most transparent way to protect their interests is through appropriate solvency or risk-based capital requirements, rather than through adjustments to reported liabilities;
- (c) there is no reasonably objective and consistent way to determine the amount of any adjustment to reflect the size of the book;

⁸ Under principle 5.5, term life insurance and annuities would not qualify for inclusion in the same book of contracts. Therefore, the proposals in this DSOP would not capture the effects of any synergies between these two lines of business. The Canadian Institute of Actuaries takes a different approach in its *Standards of Practice for the Valuation of Policy Liabilities of Life Insurers*, which state: “In situations where it is reasonable to expect that changes in one assumption would be correlated with changes in other assumptions, the actuary should take care to ensure that the overall provision for adverse deviations resulting from the combine application of margins for adverse deviation is appropriate”.

- (d) there is no objective way to determine how large the book of contracts should be. As a result, the definition of the book of contracts is unavoidably imprecise and arbitrary. Consequently, measurement would reflect diversification and correlation benefits up to an arbitrary level of aggregation and would exclude diversification and correlation benefits beyond that level. There is no principled basis for this distinction, which is unlikely to be helpful to users, especially as investors (and perhaps also policyholders) are mainly interested in the correlation of the insurer's cash flows with their other assets and liabilities. If the decision is taken to reflect diversification and correlation effects within a single book, there is no obvious reason not to reflect such effects between different books, between insurance liabilities or even between insurance liabilities and assets; and
 - (e) this is consistent with the JWG Draft. This acknowledges that, if agreed-upon methods were to be developed for reliably estimating the fair value of large blocks of financial instruments, there would be merit in requiring an adjustment to the price of the security sold individually or in small blocks. However, the JWG argues that market information necessary to estimate the adjustment is not likely to be available. Thus the JWG has concluded that the most useful representation of fair value is the observable fair value for the quantities that are actually traded. The JWG proposes that enterprises should be required to disclose the existence of large blocks and the fact that they may not be capable of liquidation immediately at their quoted market prices.
- 5.64 For the reasons given in paragraph 5.62, this DSOP concludes that it is appropriate to capture the diversification and correlation effects within a book of contracts, but not broader diversification and correlation effects with other books of contracts, or with other assets or liabilities.
- 5.65 Some distinguish pooling (the aggregation of a large number of homogeneous contracts or other risk exposures) from diversification (the aggregation of different risk exposures that are uncorrelated, or not perfectly correlated). They argue that pooling lies at the heart of risk management by insurers and that it differs from techniques used in the capital markets that rely more on diversification. As both pooling and diversification rely largely on the "law of large numbers", this DSOP treats these two terms as interchangeable for accounting measurement purposes.
- 5.66 Principle 5.4 states that the entity-specific value or fair value of an insurance liability or insurance asset should always reflect both diversifiable and undiversifiable risk. It follows that measurement of insurance liabilities and insurance assets will depend on the unit of account chosen. The Issues Paper proposed that the unit of account should be a book of insurance contracts that have substantially the same contractual terms and were priced on the basis of substantially the same assumptions, rather than an individual insurance contract. In response to comments received, this DSOP retains the focus on books of contracts, but principle 5.5 proposes a revised definition that is more consistent with criteria that insurers commonly use to price and manage their books.

- 5.67 Some consider that the definition of the unit of account should be aligned with the level of aggregation used in an insurer's internal reporting systems, somewhat in the manner that segments are identified under US GAAP. They argue that this would promote desirable consistency between internal and external reporting. To limit diversity of practice, this DSOP does not accept this approach. Nevertheless, in practice, internal reporting systems may provide a useful starting point for determining the unit of account. Similarly, IAS 14, Segment Reporting, acknowledges that internal reporting systems are often a good starting point for identifying reportable segments, although this needs to be supplemented by considering differences in risks and returns.

Mismatch Risk

- 5.68 Principle 3.2 concluded that the entity-specific value or fair value of insurance liabilities should not be affected by the type of assets held or by the return on those assets (except where the amount of benefits paid to policyholders is directly influenced by the return on specified assets, as with certain performance-linked contracts). It follows that the measurement of liabilities does not reflect any mismatch risk arising from differences between the characteristics of those insurance liabilities and the characteristics of the insurer's assets. Principle 14.XXX addresses disclosure about mismatch risk.

Options and Guarantees Contained in Insurance Liabilities and Insurance Assets

Principle 5.6

- 5.69 *Option pricing models should be used to measure options and guarantees contained in insurance contracts.***

- 5.70 Many insurance contracts contain options that may be complex and difficult to value. As there is a well-developed literature on the valuation of financial options, this DSOP does not include detailed guidance on this subject.
- 5.71 Much of the literature on financial options assumes that the holder of the option will always exercise an in-the-money option and will never exercise an out-of-the money option. Many options contained in insurance contracts are significantly dependent on policyholder behaviour in the sense that some policyholders may fail to exercise an in-the-money option and others may exercise an out-of-the money option. Although there is some literature on such behavioural features, for example, in relation to mortgage-backed securities in North America, the literature is not yet as extensive as for those financial options that lack significant behavioural features. As a result, some believe that it may be several years before it will be possible to implement option-pricing models to measure insurance liabilities and insurance assets.
- 5.72 Principle 5.6 does not require an insurer to account separately for options contained in insurance assets and insurance liabilities. However, it does require an insurer to use option pricing methods to measure cash flows that contain options. This is because conventional cash flow techniques do not deal very well with cash flows that have significant option-like characteristics, for the following reasons.

- (a) The payoff on an option is a non-linear function of the changes in the underlying.⁹ It would conceptually be possible to capture this non-linearity by changing risk adjustments at each decision point. However, the only reliable way to generate the required risk adjustments is by using option pricing techniques to determine the values and then using the internal rate of return as a risk-adjusted discount rate. Furthermore, the required risk-adjusted discount rates will sometimes be negative, which many would find counter-intuitive.
 - (b) Option pricing methods reflect non-linearity by either using a replicating portfolio that changes dynamically at frequent intervals, or by risk-neutral pricing approaches that use so-called risk-neutral probabilities, instead of the (estimated) real probabilities used in standard discounted techniques.¹⁰ Risk-neutral probabilities are the probabilities that would have to exist in a hypothetical risk-neutral world (a world where all investors were risk-neutral) in order for the observed option price to be consistent with the observed values for factors that influence option prices. Risk-neutral probabilities are not real probabilities. In essence, risk-neutral pricing is a computational short-cut that provides a relatively straightforward way to value certain types of option.¹¹
- 5.73 For many life insurance contracts, one of the most significant embedded options in recent years has been an interest rate guarantee. In recent years, interest rates in many countries have fallen well below the guaranteed levels, leading to significant losses for many insurers. Under most existing national requirements, financial statements do not reflect the insurer's exposure to such guarantees at all until they come into the money.
- 5.74 In general, the most significant option features of insurance contracts arise from embedded options held by the policyholder. However, some insurance contracts grant options to the insurer. Principle 5.6 covers both options held by the insurer and options held by the policyholder.

Reliability

Principle 5.7

- 5.75 ***In the exceptional cases when no reliable estimate can be made of the market value margin at initial recognition of an insurance liability or insurance asset, an insurer should set the market value margin at a level that leads to no net underwriting profit or loss from the contract, until a reliable estimate of the market value margin becomes possible.***¹²

⁹ The underlying is the price of the instrument or index on which the option is written.

¹⁰ An alternative form of risk-neutral pricing uses deflators to adjust the real probabilities (see *Modern Valuation Techniques*, Stuart Jarvis, Frances Southall and Elliot Varnell, <http://www.sias.org.uk/papers/mvt.pdf>)

¹¹ Risk-neutral pricing techniques and deflators may need some adjustment to cope with aspects of policyholder behaviour.

¹² Principle 14.XXX considers possible disclosures about these exceptional cases.

- 5.76 In exceptional cases, an insurer may be unable, despite reasonable efforts, to quantify the market value margin reliably at initial recognition of an insurance liability or insurance asset. In such cases, this DSOP proposes that an insurer should:
- (a) set the **market value margin** at a level that leads to no gain and no loss on initial recognition of the insurance liability or insurance asset;
 - (b) review the circumstances carefully at later dates. If the insurer now has sufficient information to quantify the market value margin, the insurer applies that adjustment. If the insurer still has insufficient information to quantify the market value margin, the insurer adjusts the market value margin to reflect any reasonably expected change in the level of risk, for example if the risk is expected to run off rateably over time; and
 - (c) increase the carrying amount of the liability to reflect the unwinding of discount on the liability, by applying the risk-free discount rate to the opening balance of the liability, after adjustment for any payments or receipts during the current period.
- 5.77 This proposal is somewhat comparable to an approach prescribed by IAS 18, Revenue, when the outcome of a transaction involving the rendering of services cannot be estimated reliably: revenue should be recognised only to the extent of the expenses recognised that are recoverable. As a result, the enterprise recognises no net profit or loss in such cases until the outcome can be measured reliably. However, the proposal in this DSOP is different because it requires subsequent adjustments to reflect any reasonably expected change in the level of risk and to reflect accretion of discount. This is consistent with the amount attributed to the insurance liability at initial recognition. This is also consistent with common current practice.
- 5.78 Some argue that it may be just as difficult to determine the expected value of future cash flows reliably at initial measurement as to determine an appropriate market value margin. However, this DSOP assumes that an insurer would generally be able to make sufficient assessment of the cash flows and risks for pricing purposes. It follows that any inability to quantify the impact of risk must relate to an inability to quantify the appropriate market price for that risk. Principle 5.7 amounts to an assumption that the insurer is not pricing the contract on a basis that is known to be out of line with the profit required by the market for contracts that generate similar cash flows and risks.

Illiquidity and Market Imperfections

Principle 5.8

- 5.79 *Both fair value and entity-specific value should exclude the effect of illiquidity and market imperfections, unless there is persuasive evidence that enables these items to be quantified by reference to observable market data.*
- 5.80 Some argue that the entity-specific value or fair value of an asset is reduced (and that of a liability is increased) if the asset (or liability) is not traded in a deep and liquid market. They argue that concerns about the liquidity of a market would cause

investors to demand a liquidity premium and this would affect the fair value of the asset or liability. Some would also argue that similar adjustments may be needed where a market is clearly inefficient, or suffers from other market imperfections.

- 5.81 Others argue that a liquidity premium arises only in a thin or non-existent market. In such cases, there will be no market-based information as a basis for making reliable and consistent estimates of the required premium.
- 5.82 Some believe that it may be appropriate to incorporate adjustments for illiquidity and market imperfections in fair value, but that such adjustments are irrelevant when the objective is to determine entity-specific value, especially if an enterprise does not intend to dispose of an asset or liability. Others believe that a liquid asset contains an embedded option comprising the ability to dispose of a liquid asset, even if the holder of the asset does not currently intend to exercise that option. They believe that this option is less valuable in the case of a less liquid asset and that financial statements should capture this difference, even if the holder does not currently intend to exercise the option. The discussion in this paragraph focused in assets, but similar arguments apply to liabilities.
- 5.83 This DSOP is based on the view that it is conceptually preferable for both entity-specific value and fair value to reflect illiquidity and market imperfections. However, to promote comparability, it is appropriate to exclude adjustments for such items unless there is persuasive evidence that enables an insurer to quantify them by reference to observable market data.

Foreign Currency Risk

Principle 5.9

- 5.84 *When all the future cash inflows and outflows from an insurance contract are denominated in a single foreign currency, the entity-specific value and fair value of that insurance contract should not reflect foreign currency risk arising from the possibility of future changes in the foreign exchange rate for that currency (consistent with IAS 21, The Effects of Changes in Foreign Exchange Rates). When future cash flows are in more than one currency, or where the policyholder can choose the currency in which premiums or benefits are paid, at a pre-determined exchange rate, entity-specific value and fair value should reflect the resulting foreign exchange risk.*
- 5.85 Some insurance contracts expose the insurer to foreign currency risk, which may arise in two ways. The first way is when an insurer issues an insurance contract under which all cash inflows and outflows occur in a single foreign currency. In current practice under IAS 21, The Effects of Changes in Foreign Exchange Rates, financial statements do not generally reflect such foreign currency risk directly. Instead, monetary assets and liabilities are determined in foreign currency and are then translated into the reporting currency at the closing spot rate. For the following reasons, this DSOP supports a continuation of this approach:

- (a) an adjustment to reflect foreign currency risk would mean that different enterprises would report present values at different amounts, depending on their measurement currencies. This would be particularly problematic where assets and liabilities are held by a subsidiary, as the amount that is consolidated might vary depending on the measurement currency of the enterprise that happens to hold it; and
- (b) an adjustment to reflect foreign currency risk would have the undesirable consequence that the two parties to a forward foreign exchange transaction would measure the present value of the contract at different amounts, because both parties would measure foreign currency risk by reference to their own measurement currency.

5.86 The second form of foreign currency risk arises when, for example:

- (a) the premiums are fixed in one currency but claims arise in another currency (such as under some travel insurance contracts); or
- (b) the policyholder can choose the currency in which premiums or benefits are denominated, at a pre-determined exchange rate.

5.87 This form of foreign currency risk arises from the contract itself, and is not merely a by-product of having a reporting currency that differs from the currency in which the cash flows are denominated. Accordingly, this DSOP requires that entity specific value and fair value should reflect this second form of foreign currency risk.