

Chapter 1

Capital resources requirements and technical provisions for insurance business

1.2 Mathematical reserves

Application

- 1.2.1R
- INSPRU 1.2 applies to a *long-term insurer* unless it is:
- (1) a *non-directive friendly society*; or

(2) [deleted]

(3) [deleted]

(4) a *Solvency II firm*.

Purpose

- 1.2.6G
- A number of the *rules* in this section require a *firm* to take into account its regulatory duty to treat *customers* fairly. In this section, references to such a duty are to the duty of a *firm* regulated by the *FCA* to pay due regard to the interests of its *customers* and to treat them fairly (see the *FCA's Principle 6* in *PRIN*). This duty is owed to both *policyholders* and potential *policyholders*.
- 1.2.6AG
- Some of the rules made by the *FCA* contain references to, or are reliant on, *rules* that are only made by the *PRA*. *Firms* should consider ■ GEN 2.2.13A R (cross-references in the *Handbook*) and ■ GEN 2.2.23 R to ■ GEN 2.2.25 G (cutover: application of provisions made by both the *FCA* and the *PRA*) when applying these *rules*. In the context of mathematical reserves, the *FCA rules* ensure a *firm* takes into account its regulatory duty to treat *customers* fairly.

Methods and assumptions

- 1.2.10R
- In the actuarial valuation under *PRA Rulebook: Non Solvency II firms: Insurance Company – Mathematical Reserves, 2.1*, a *firm* must use methods and prudent assumptions which:
- (1) are appropriate to the business of the *firm*;

(2) are consistent from year to year without arbitrary changes (see ■ INSPRU 1.2.11 G);

(3) are consistent with the method of valuing assets (see *PRA Rulebook: Non-Solvency II firms: Insurance Company – Overall Resources and Valuation, 3*);

(4) include appropriate margins for adverse deviation of relevant factors;

- (5) recognise the distribution of profits (that is, emerging surplus) in an appropriate way over the duration of each *contract of insurance*;
- (6) take into account its regulatory duty to treat its *customers* fairly (see *FCA's Principle 6*); and
- (7) are in accordance with generally accepted actuarial practice.

1.2.11 G ■ **INSPRU 1.2.10R (2)** prohibits only arbitrary changes in methods and assumptions, that is, changes made without adequate reasons. Any such changes would hinder comparisons over time as to the amount of the *mathematical reserves* and so obscure trends in solvency and the emergence of surplus.

Record keeping

1.2.20 R A *firm* must make, and retain for an appropriate period, a record of:

- (1) the methods and assumptions used in establishing its *mathematical reserves*, including the margins for adverse deviation, and the reasons for their use; and
- (2) the nature of, reasons for, and effect of, any change in approach, including the amount by which the change in approach increases or decreases its *mathematical reserves*.

1.2.21 G For the purposes of ■ **INSPRU 1.2.20 R**, records should be maintained for a period of longer than three years for a *firm's long-term insurance business*. In determining an appropriate period, a *firm* should have regard to:

- (1) [deleted]
- (2) the nature and term of the *firm's* long-term insurance business; and
- (3) any additional provisions or statutory requirements applicable to the *firm* or its records.

Cash flows to be valued

1.2.28 R In a prospective valuation, a *firm* must:

- (1) include in the cash flows to be valued the following:
 - (a) future *premiums*;
 - (b) expenses, including *commissions*;
 - (c) benefits payable (see ■ **INSPRU 1.2.29 R**); and
 - (d) subject to (2), amounts to be received or paid in respect of the *long-term insurance contracts* under contracts of *reinsurance* or analogous non-*reinsurance* financing agreements; but
- (2) exclude from those cash flows amounts recoverable from an *ISPV*.

1.2.28A	G	A <i>firm</i> may include amounts recoverable from an <i>ISPV</i> in the cash flows to be valued in a prospective valuation if it obtains a <i>waiver</i> of ■ INSPRU 1.2.28 R under sections 138A and 138B of the Act.
1.2.29	R	For the purpose of ■ INSPRU 1.2.28R (1)(c), benefits payable include: <ul style="list-style-type: none"> (1) all guaranteed benefits including guaranteed <i>surrender values</i> and paid-up values; (2) vested, declared and allotted bonuses to which the <i>policyholder</i> is entitled; (3) all options available to the <i>policyholder</i> under the terms of the contract; and (4) discretionary benefits payable in accordance with the <i>firm's</i> regulatory duty to treat its <i>customers</i> fairly.
1.2.30	G	All cash flows are to be valued using prudent assumptions in accordance with generally accepted actuarial practice. Cash flows may be omitted from the valuation calculations provided the reserves obtained as a result of leaving those cash flows out of the calculation are not less than would have resulted had all cash flows been included. Provision for future expenses in respect of <i>with-profits insurance contracts</i> (excluding <i>accumulating with-profits policies</i>) may be made implicitly, using the <i>net premium</i> method of valuation. For the purposes of ■ INSPRU 1.2.28R (1)(b), any charges included in expenses should be determined in accordance with the <i>firm's</i> regulatory duty to treat its <i>customers</i> fairly.
1.2.31	G	■ INSPRU 1.2.29R (4) requires <i>firms</i> to make allowance for any future <i>annual bonus</i> that a <i>firm</i> would expect to grant, assuming future experience is in line with the assumptions used in the calculation of the <i>mathematical reserves</i> . <i>Final bonuses</i> do not have to be taken into consideration in these calculations except in relation to <i>accumulating with-profits policies</i> . The calculations required for <i>accumulating with-profits policies</i> are set out in ■ INSPRU 1.2.71R (1).
Mortality and Morbidity		
1.2.59	R	A <i>firm</i> must set the assumptions for mortality and morbidity using prudent rates of mortality and morbidity that are appropriate to the country or territory of residence of the person whose life or health is insured.
1.2.60	G	The rates of mortality or morbidity should contain prudent margins for adverse deviation. In setting those rates, a <i>firm</i> should take account of: <ul style="list-style-type: none"> (1) the systems and controls applied in underwriting <i>long-term insurance contracts</i> and whether they provide adequate protection against anti-selection (that is, selection against the <i>firm</i>) including: <ul style="list-style-type: none"> (a) adequately defining and identifying non-standard risks; and (b) where such risks are underwritten, allocating to them an appropriate weighting;

- (2) the nature of the contractual exposure to mortality or morbidity risk including:
 - (a) whether lower mortality increases or decreases the *firm's* liability;
 - (b) the period of cover and whether risk charges can be varied during that period and, if so, how quickly; and
 - (c) whether the options in the contract give rise to a significant risk of anti-selection (for example, opportunities for voluntary discontinuance, guaranteed renewal at the option of the *policyholder* and rights for conversion of benefits);
- (3) the credibility of the *firm's* actual experience as a basis for projecting future experience including:
 - (a) whether there is sufficient data (especially for medical or financial risks and for new types of benefit or new methods of distribution); and
 - (b) whether the data is reliable and has been appropriately validated;
- (4) the availability and reliability of:
 - (a) any published tables of mortality or morbidity for the country or territory of residence of the person whose life or health is insured; and
 - (b) any other information as to the industry-wide insurance experience for that country or territory;
- (5) anticipated or possible future trends in experience including, but only where they increase the liability:
 - (a) anticipated improvements in mortality;
 - (b) changes arising from improved detection of morbidity (including critical illnesses);
 - (c) diseases the impact of which may not yet be reflected fully in current experience; and
 - (d) changes in market segmentation (such as impaired life annuities) which, in the light of developing experience, may require different assumptions for different parts of the policy class.

1.2.61 G An additional provision for diseases covered by ■ [INSPRU 1.2.60G \(5\)\(c\)](#) may be needed, in particular for unit-linked policies. In determining whether such a provision is needed a *firm* may take into consideration any ability to increase product charges commensurately (provided that such increase does not infringe on its regulatory duty to treat its *customers* fairly), but a provision would still be required for the period until such an increase could be brought into effect.

Options

1.2.62 R When a *firm* establishes its *mathematical reserves* in respect of a *long-term insurance contract*, the *firm* must include an amount to cover any increase in liabilities which might be the direct result of its *policyholder* exercising an option under, or by virtue of, that *contract of insurance*. Where the *surrender value* of a contract is guaranteed, the amount of the *mathematical*

- reserves for that contract at any time must be at least as great as the value guaranteed at that time.
- 1.2.62A** G A contract has a guaranteed *surrender value* where the *policy* wording states that a *surrender value* is payable and either provides for a minimum amount payable on surrender or sets out a method for calculating such an amount. For example, where a unit-linked contract provides for a *surrender value* equal to the value of the units allocated to the contract, the *firm* must establish *mathematical reserves* for that contract greater than or equal to the value of the units allocated at the valuation date.
- 1.2.63** G An option exists where a *policyholder* is given a choice between alternative forms of benefit, for example, a choice between receiving a cash benefit upon maturity or an annuity at a guaranteed rate. In some cases, the contract may designate one or other of these alternatives as the principal benefit and any other as an option. This designation, in itself, is not one of substance in the context of reserving since it does not affect the *policyholder's* choices. Other forms of option include:
- (1) the right to convert to a different contract on guaranteed terms;
 - (2) the right to increase cover on guaranteed terms;
 - (3) the right to a specified amount on surrender; and
 - (4) the right to a paid up value.
- 1.2.64** G The *firm* should provide for the benefit which the *firm* anticipates the *policyholder* is most likely to choose. Past experience may be used as a guide, but only if this is likely to give a reasonable estimate of future experience. For example, past experience of the take-up of a cash payment option instead of an annuity would not be a reliable guide, if, in the past, market rates exceeded those guaranteed in the annuity but no longer do so. Similarly, past experience on the take-up of options may not be relevant in the light of the assumptions made in respect of future interest rates and mortality rates in the valuation of the benefits.
- 1.2.65** G Many options are long-term and need careful consideration. Improving longevity, for example, can increase the value of guaranteed annuity options vesting further in the future. *firms* also need to have regard to the fact that *policyholder* behaviour can change in the future as *policyholders* become more aware of the value of their options. The impact on *policyholder* behaviour of possible changes in taxation should also be considered.
- 1.2.66** G Take-up rates for guaranteed annuity options should be assessed on a prudent basis with assumptions that include margins for adverse deviation that take account of current experience and the potential for future change. The *firm* should reserve for option take-up at least at a prudent margin over current experience for options shortly to vest. For longer term options where the option becomes increasingly valuable in the future due to projected mortality improvements, increased take-up rates should be assumed. In view of the growing uncertainty over take-up rates for projections further in the

future, for guaranteed annuity option dates 20 years or more ahead at least a 95% take-up rate assumption should be made.

1.2.67 **G** Where there is considerable variation in the cost of the option depending on conditions at the time the option is exercised, and where that variation constitutes a material risk for the *firm*, it will generally be appropriate to use stochastic modelling. In this case prices from the asset model used in the stochastic approach should be benchmarked to relevant market asset prices before determining the value of the option. Where stochastic modelling is not undertaken, market option prices should be used to determine suitable assumptions for the valuation of the option. If no market exists for a particular option, a *firm* should take the value of the nearest equivalent benefit or right for which a market exists and document the way in which it has adjusted that valuation to reflect the original option.

1.2.68 **G** Where the option offers a choice between two non-discretionary financial benefits (such as between a guaranteed cash sum or a guaranteed annuity value, or between a unit value and a maturity guarantee) and where there is a wide range of possible outcomes, the *firm* should normally model such liabilities stochastically. In carrying out such modelling *firms* should take into account the likely choices to be made by *policyholders* in each scenario. *Firms* should make and retain a record of the development and application of the model.

1.2.69 **G** The value of a contract with an option is greater than the value of a similar contract without the option, that is, the option has value whether it is expected to be exercised or not. Although in theory a *firm* can rebalance its investments to match the expected cost of the option to the *firm* (including the time value of the option), this takes time to achieve and the market may move more quickly than the *firm* is able to respond. Also, there are likely to be transaction costs. *Firms* should take these aspects into consideration in setting up *mathematical reserves*.

1.2.70 **R**

- (1) Where a *policyholder* may opt to be paid a cash amount, or a series of cash payments, the *mathematical reserves* for the *contract of insurance* must be sufficient to ensure that the payment or payments could be made solely from:
 - (a) the assets covering those *mathematical reserves*; and
 - (b) the resources arising from those assets and from the contract itself.
- (2) In (1) references to a cash amount or a series of cash payments include the amount or amounts likely to be paid on a voluntary discontinuance.
- (3) For the purposes of (1), the *firm* must assume that:
 - (a) the assumptions adopted for the current valuation remain unaltered and are met; and
 - (b) discretionary benefits and charges will be set so as to fulfil the *firm's* regulatory duty to treat its *customers* fairly.

		<p>(4) (1) may be applied to a group of similar contracts instead of to the individual contracts within that group except where the cash amount or series of cash payments is the amount or amounts likely to be paid on a voluntary discontinuance.</p>
1.2.71	R	<p>For the purposes of ■ INSPRU 1.2.70 R, a <i>firm</i> must assume that the amount of a cash payment secured by the exercise of an option is:</p> <p>(1) in the case of an <i>accumulating with-profits policy</i>, the lower of:</p> <p>(a) the amount which the <i>policyholder</i> would reasonably expect to be paid if the option were exercised, having regard to the representations made by the <i>firm</i> and including any expectations of a <i>final bonus</i>; and</p> <p>(b) that amount, disregarding all discretionary adjustments;</p> <p>(2) in the case of any other <i>policy</i>, the amount which the <i>policyholder</i> would reasonably expect to be paid if the option were exercised, having regard to the representations made by the <i>firm</i>, without taking into account any expectations regarding future distributions of profits or the granting of discretionary additions in respect of an <i>established surplus</i>.</p>
1.2.72	G	<p>■ INSPRU 1.2.71R (1) applies only to <i>accumulating with-profits policies</i>; ■ INSPRU 1.2.71R (2) applies to any other type of <i>policy</i>, including <i>non-profit insurance contracts</i>. In ■ INSPRU 1.2.71R (1)(a) a <i>firm</i> must take into consideration, for example, a market value adjustment where such an adjustment has been described in representations made to <i>policyholders</i> by the <i>firm</i>. However, any discretionary adjustment, such as a market value adjustment, must not be included in the amount calculated in ■ INSPRU 1.2.71R (1)(b).</p>
		<p>Reinsurance</p>
1.2.86	R	<p>Future surplus may only be offset against future <i>reinsurance</i> cash outflow in respect of surplus on <i>non-profit insurance contracts</i> and the charges or shareholder transfers arising as surplus from <i>with-profits insurance contracts</i>. Such charges and transfers may only be allowed for to the extent consistent with the regulatory duty of the <i>firm</i> to treat its <i>customers</i> fairly.</p>
1.2.90	R	<p>[deleted]</p>
1.2.91	G	<p>[deleted]</p>
		<p>Application of INSPRU 1.2 to Lloyd's</p>
1.2.92	R	