



## CHANGES TO THE SYLLABUS AND CORE READING FOR SUBJECT ST2 FOR THE 2018 EXAMINATIONS

### Changes to the Syllabus and their impact on Core Reading

#### Syllabus objective (k)

*This objective has been amended to the following:*

Demonstrate methods of determining the cost of guarantees and options.

- Describe the use of stochastic simulation and the use of option prices to determine the cost of an investment guarantee.
- Describe the assessment of the cost of simple mortality options

### Changes to Core Reading

#### UNIT 11

*There have been a large number of changes to this unit as follows:*

##### Section 1.1

#### 1.1 Examples

Traditional life insurance contracts transfer the mortality, expense and investment risk from the policyholder to the life insurance company. Investment-linked (including unit-linked) contracts leave the investment risk with the policyholder. The attractions of these policies can be enhanced if part of the investment risk is transferred to the insurance company by the contract including, for example:

- a guaranteed minimum maturity value
- a guaranteed minimum surrender value
- a guaranteed annuity option

With profits contracts transfer investment risk to the policyholder, but generally to a lesser extent than for unit-linked contracts (due to smoothing). They typically have some level of guaranteed benefit, which is equivalent to an investment guarantee, e.g. the basic sum assured plus attaching bonus for conventional with profits business under the additions to benefits approach. Each of the above investment guarantees may be available on with profits as well as on investment-linked contracts.

The attractions of traditional policies can also be enhanced if the company provides guarantees of investment performance. For example, an option could be provided to convert the maturity value of a without profits endowment assurance into an immediate annuity on guaranteed terms.

### **Section 1.3**

*The first paragraph of this section has been amended to:*

The liability created by an investment guarantee is the excess of the guaranteed amount (e.g. guaranteed maturity value of an endowment, or the fund needed to purchase the “guaranteed annuity” at current market rates), over the cost that would have been incurred at the time in the absence of the guarantee. The policyholder should only choose to exercise the option to take up this guarantee if it is in-the-money (which can alternatively be expressed as “if it bites”) i.e. is financially advantageous.

#### **Section 1.3.1**

*The first paragraph of this section has been amended to:*

The options incorporated into life insurance contracts are analogous to options traded in the market place. A guaranteed minimum maturity value corresponds to a (European style) put option on the investment funds at an exercise price corresponding to the maturity guarantee. A guaranteed minimum surrender value corresponds to a similar American style option or a series of options with different exercise prices which match the guaranteed surrender values.

*The fourth paragraph of this section has been amended to:*

At the date of policy issue all guarantees will normally be expected to be out-of-the-money, i.e. they will have no intrinsic value because current market rates are more than sufficient to meet the guarantees. However, they will have a time value which is the result of the views of many investors (“the market”) of the present value of the likely future costs of the option. Thus the market price of a suitable option produces a way of costing a financial option or guarantee incorporated in a life insurance policy.

### **Section 2.3**

*This section has been amended to:*

#### **2.3 Valuing a mortality option**

Mortality options are normally valued using cashflow projections.

These cashflows would include the additional benefits expected to be payable under the option and the additional premiums expected to be received in relation to these benefits, to the extent to which the option is assumed to be taken up. The additional premiums would be based on the expected premium rates that would be charged to standard lives for the additional benefit, as at the option exercise date.

The projections should also allow for any additional expenses incurred in the administration of the option.

If the purpose of the valuation is pricing the option (rather than setting the liability) then allowance should also be made for the additional reserves that should be held, both before and after exercise.

Valuing a mortality option therefore requires extra assumptions as part of the basis:

- the probability that the option will be exercised, at each possible exercise date
- the additional benefit level that will be chosen, if this is at the discretion of the policyholder
- the expected mortality of the lives who choose to exercise the option
- the expected mortality of the lives who choose not to exercise the option
- additional expenses relating to the option

### **2.3.1 Option take-up rates**

The model may assume that all eligible policyholders will take up the option, and that the maximum additional benefit will always be taken.

If there are many possible dates on which an option may be exercised, or there is a choice from several alternative options, the model may assume that the worst option from the financial point of view of the company is chosen with probability one.

Alternatively, the model may use more sophisticated take-up rate assumptions which vary by exercise date or by alternative option. These would ideally be based on past experience.

### **2.3.2 Mortality rates**

Typically, due to anti-selection, the expected mortality of lives who take up the option will be heavier than that of those who do not.

For example, the mortality of those who exercise the option may be assumed to be a higher percentage of the base mortality table.

Alternatively, an age loading may be applied (e.g. a policyholder of age  $x$  may be assumed to experience mortality of age  $x + 5$  years).

It may instead be assumed that the mortality experience of those who take up the option will be the Ultimate experience which corresponds to the Select experience that would have been used as a basis if underwriting had been completed as normal when the option was exercised. This would be consistent with an assumption that all eligible policyholders take up the option.

As noted earlier, there should be a link between the assumed option take-up rates and the assumed mortality rates.

It may be assumed that the lives who do not take up the option will continue to experience the same level of mortality as would have been assumed without the existence of the option. However, this would mean that the average mortality for all lives has been assumed to be in excess of the base mortality assumption, since those taking up the option are assumed to experience higher mortality than this level.

An alternative assumption would therefore be that the mortality of those who do not take up the option is such that average mortality for all lives remains at the base expected level. The assumed mortality of those who do not take up the option would then be lower than this base level.

**END**