

# Subject CA1

## Corrections to 2014 study material

### **Comment**

This document contains details of any errors and ambiguities in the Subject CA1 study materials for the 2014 exams that have been brought to our attention. We will incorporate these changes in the study material each year. We are always happy to receive feedback from students, particularly details concerning any errors, contradictions or unclear statements in the courses. If you have any such comments on this course please email them to [CA1@bpp.com](mailto:CA1@bpp.com).

You may also find it useful to refer to the Subject CA1 threads on the Actuarial Discussion Forum. (You can reach the Forums by clicking on the “Online Learning” button on the ActEd homepage and then clicking on “Discussion Forums”, or by going to [www.acted.co.uk/forums/](http://www.acted.co.uk/forums/).)

### **Important note**

This document was last revised significantly on 18 December 2013. The date on which any subsequent corrections have been added is noted below.

### **Chapter 33 Page 2**

*(added 21 October 2013)*

There is an error in the answer to Self-Assessment Question 33.1 of Chapter 33.

As the sum assured is payable on death it should read:

$$EPV = £100,000 \bar{A}_{43:\overline{20}|}^1$$

**Chapter 13 Page 5***(added 14 November 2013)*

The last paragraph of Section 2.2 should be replaced with:

A repo is a sale and purchase agreement. It involves the sale of securities (usually government debt) by money market dealers to the central bank, tied to an agreement that the dealers will buy back the securities at a later date. The action of the sale of the securities to the central bank leads to more cash being available in the markets and therefore drives down interest rates temporarily. If the repo is the other way round (a reverse repo), such that the central bank agrees to sell and subsequently repurchase bills from the market then this leads to less cash being available in the markets and therefore interest rates will tend to increase temporarily.

**Chapter 47 Page 23***(added 18 December 2013)*

Page 23 of Chapter 47 is missing and page 22 is duplicated. Please remove the second page 22 and use the replacement page provided below.

**Q&A Bank Part 5 Solutions Page 10***(added 24 March 2014)*

Whilst Solution 5.10 is correct, it isn't quite as clear as it could be. The fourth paragraph should be replaced with:

If rental growth is assumed to be 3%, then the rack rental income is effectively a perpetuity starting in three years' time, discounted at

$$j = \frac{1+i}{1 + \text{growth in rack rent}} - 1 = \frac{1.08}{1.03} - 1 = 4.854\% . \quad [1]$$

**Q&A Bank Part 7 Questions Page 5***(added 24 March 2014)*

The uniform split of marks between the four parts of Question 7.23 is not reflected in the solutions. Therefore the question should be replaced with:

Describe briefly how the following expenses would be allocated in an insurance company's expense analysis:

- (i) salaries of actuarial department staff
- (ii) costs of running the investment department
- (iii) costs associated with a computer model from a third party
- (iv) costs of property owned by the policyholders' fund. [8]

**Chapter 47 Page 16** (added 8 April 2014)

The formula near the top of the page should read:

$$\text{Risk margin} = \sum_t \frac{k_t \times C_t}{(1+r_t)^t}$$

**CA1 Mock A solutions Paper 1** (added 8 April 2014)

In the solution to Qn 7(ii) on page 15, remove the point about a salary growth assumption. This point is not relevant as the only benefit is repayment of the loan.

**Chapter 28 Page 32** (added 25 June 2014)

The convexity formula in the solution to Qn 28.12(ii) should be:

$$C = \frac{\sum_k C_k v^{t_k+2} t_k (t_k + 1)}{\sum_k C_k v^{t_k}}$$

**Economic capital**

Economic capital is the amount of capital that a provider determines is appropriate to hold given its assets, its liabilities, and its business objectives.

It is an internal, rather than a regulatory, capital assessment.

Typically it will be determined based upon:

- the risk profile of the individual assets and liabilities in its portfolio
- the correlation of the risks
- the desired level of overall credit deterioration that the provider wishes to be able to withstand.

In an economic balance sheet:

- assets and liabilities should be valued at market rates, and the excess of the assets over liabilities (*ie* the available capital) should be compared to the economic capital requirement
- one way to calculate the market value of liabilities is to use the present value best estimate basis and add on a risk margin.

The cost of capital approach may be used to determine this risk margin:

- firstly project the required capital at each future time period (*ie* the amount required in excess of the projected liabilities)
- multiply the projected capital amounts by the cost of capital
- discount using market consistent discount rates to give the overall risk margin.

**Internal models**

Internal models are used to calculate economic capital requirements and may be used to determine the Solvency II SCR (provided the internal model gains regulatory approval).

Internal models aim to create a stochastic model that reflects a company's own business structure.

Companies can use internal models:

- to calculate economic capital using different risk measures, *eg* VaR and TailVaR
- to calculate levels of confidence in the level of economic capital calculated
- to apply different time horizons to the assessment of solvency and risk
- to include other risk classes not covered in the standard model.