

# **INSTITUTE AND FACULTY OF ACTUARIES**

## **EXAMINERS' REPORT**

### **Subject CA3 – Communications**

#### **(Written Paper)**

#### **Scenario: XYZ Pension Scheme**

##### **Introduction**

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

The Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit.

D C Bowie  
Chairman of the Board of Examiners

April 2014

## SOLUTION

A possible answer is given below. This is not intended to be a model solution. In practice, a wide number of solutions were acceptable and candidates would have achieved good pass standards without having the same level of detail as the specimen solution.

Candidates were asked to draft a paper for a pension scheme trustees meeting explaining stochastic modelling.

The main points that the examiners were looking for and some common problems encountered were as follows:

1. Most candidates produced scripts that looked like a paper for a client meeting. Scripts gained marks for having a clear introduction to the paper providing brief details of the contents of the paper.
  2. There was no evidence of candidates running out of time and therefore not completing the answer.
  3. Poor scripts were unstructured with no clear headings, long sentences and poor explanations.
  4. A number of candidates used language that would not be appropriate for the trustees of a pension scheme.
  5. Most candidates included the points requested by their manager in their paper:
    - what a stochastic model is and how it differs from a deterministic model;For stochastic models:
    - the use of probability distributions to model assumptions and the correlation between different assumptions, together with a simple example to illustrate;
    - the outputs and benefits of the model, with a simple example to illustrate; and
    - the risks of such a model.
  6. Better scripts used simple examples that made reference to XYZ and the XYZ Pension Scheme.
  7. Better scripts concluded with a summary of the key points and offered further assistance to the trustees.
  8. Candidates lost marks because of the use of jargon such as deterministic, random variable, etc.
  9. A number of scripts suffered from poor spelling, grammar and punctuation.
  10. The guideline length was 500 to 550 words. Scripts which were below 475 words generally missed out some of the explanation. Scripts which were longer than 575 words often lost marks for including unnecessary repetition or irrelevant detail.
-

## **XYZ Pension Scheme Valuation – Stochastic Model**

This paper is addressed to the Trustees of the XYZ Pension Scheme and is to be discussed at the Trustee meeting dated <date>.

### **Introduction**

The purpose of this paper is to explain what is meant by stochastic modelling and compare the benefits and risks associated with using such a model when investigating the funding level of a pension scheme. It will cover:

- what stochastic modelling means
- the benefits of stochastic models and what they produce
- key risk areas to consider

### **What a stochastic model is**

Before explaining what is meant by stochastic modelling, it is useful to consider the traditional approach to valuing pension schemes. For the recent valuation of the XYZ scheme, we calculated the scheme's funding level. To do this, we made certain assumptions about key items of the scheme's experience, such as the investment return on the assets and the number of members expected to die or retire and then calculated the proportion of the benefits that could be paid if these assumptions were borne out. These assumptions were given single values and did not vary over a range. For example, we assumed a fixed investment return of 5% each year.

A stochastic model allows some of these assumptions to vary. For example, the investment return could vary from year to year between 3% and 7% each year. The model makes the same calculations as the traditional model, but thousands of times, each time picking different values for the investment return at random. It is thus an extension of the traditional approach which produces a single funding level.

The model can be refined further to allow for interaction between assumptions. For instance, more employees might leave XYZ in poor economic conditions when investment returns are low. The model can allow for this by linking the values picked for the withdrawal assumption and the investment return in each run.

### **What the model produces**

The traditional model for XYZ produced one estimated funding level of 100% in this case. However it does not give any indication of how likely it is that all 100% of benefits will be paid. The output from a stochastic model is usually in the form of a range of results reflecting the thousands of calculations made. These will include the average result, but it will also tell us the chances of the funding level falling below 90%, for example.

## **Risks of the model**

As with all models, the results produced depend on the inputs, the programming and the assumptions made. Where a model is extremely complicated, the costs tend to outweigh the benefits. The desirable level of complexity will depend on the purpose to which the model is put and there is always a danger of becoming too reliant on a complex model simply because it is complex.

## **Summary**

A stochastic model is an extension of the traditional valuation model which allows key assumptions to vary. The model produces a large number of possible outcomes for the scheme and this could be used to determine the extent of the risk of the scheme's funding level falling below 100%. Care would need to be taken in terms of keeping the model simple and fit for purpose.

If the trustees would like to discuss the possibility of using such a model in more detail, I would be glad to provide more information, either during the meeting or afterwards. I can be contacted on 01234 567890.

Jenny Actuary

Title

<Date>

## **END OF EXAMINERS' REPORT**