

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2017

Subject CA1 – Actuarial Risk Management

Paper Two

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.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Luke Hatter
Chair of the Board of Examiners
December 2017

A. General comments on the *aims of this subject and how it is marked*

1. The aim of the Actuarial Risk Management subject is that upon successful completion, the candidate should understand strategic concepts in the management of the business activities of financial institutions and programmes, including the processes for management of the various types of risk faced, and be able to analyse the issues and formulate, justify and present plausible and appropriate solutions to business problems.
2. This subject examines applications in practical situation of the core actuarial techniques and concepts. To perform well in this subject requires good general business awareness and the ability to use common sense in the situations posed, as much as learning the content of the core reading. The candidates who perform best learn, understand and apply the principles rather than memorising the core reading.
3. The examiners set questions that look for candidates to apply the principles specific to the situation set out in the questions, having read the question carefully. Many candidates gain few marks by writing around the subject matter of the question in a more general fashion. Detailed specialist knowledge is not required and nor is very detailed development of particular points.
4. Good candidates demonstrate that they have used the planning time well to understand the breadth of the question and to structure their answer – this is a big advantage in making points clearly and without repetition. This also enables candidates to use the later parts of questions to generate ideas for answers to the earlier parts.
5. Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.
6. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to use these points to aid their revision.
7. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. General comments on student performance in this diet of the examination

- Better candidates planned out their answers, particularly for the longer questions and were rewarded because there was less duplication in their answers and ensured they thought widely enough to score well.
- Answers to the application questions were mixed in that those that were structured scored well, whereas those that weren't had problems getting sufficient depth into their answer.
- It was clear that the well thought out answers had better planning, this is a good use of reading time.
- Bookwork questions were from different parts of the course and these were also struggled on.
- In this diet the scoring for the exam was done out of 200 and therefore the mark scheme shows a total of 200 marks available for the paper.
- Candidates are assessed based only on their average score across both papers. In this diet candidates tended to score more highly on paper 1 than on paper 2. Performance on paper 2 was, on the whole, considerably weaker than in previous diets.

C. Pass Mark

The pass mark for CA1 in this diet was 58.

Solutions

Q1 The employer will obtain coverage for the following perils:

Indemnity against legal liability to compensate an employee (or their estate) for accidental bodily injury, disease (or illness), or death as a result of negligence of the employer (in the course of employment). [6]

(As well as accidents) perils covered include exposure to harmful substances or harmful working conditions. [2]

Any legal expenses relating to such liability are usually also covered. [1]

Indemnity may however be limited by statutes. [1]

May be a compulsory insurance. [1]
[Max 8]

Generally well answered, although a number of candidates struggled with the contract being requested.

Q2 General Process for a stage

The risk management control cycle has the following parts:

Specifying the problem/Develop Solution/Monitor Experience/Feedback/Professional implications/External environment [2]

Analyse the project to identify the risks. This is the hardest aspect of the risk management cycle. [3]

Risks should then be measured to determine financial consequences. This will include analysis of:

- frequency/severity of risks
 - risk correlations/accumulations/concentrations/diversifications
 - upsides/opportunities (ie not just downsides).
- [4]

The appropriate methods and cost of controlling, managing, mitigating or transferring risks will be assessed. [3]

Risk management procedures will be implemented. [1]

Risk financing will involve determination of the likely cost of risks and ensuring that adequate financial resources are available to cover the risks. [2]

A financial assessment of the overall construction project will be required, which will include selecting appropriate method/metric (eg NPV, IRR, payback or discounted payback period). [2]

Cyclical nature of a stage

The steps outlined above are cyclical/continuous. [1]

Risks and risk management procedures will develop and change over time and the steps of the cycle will be redone as the previously identified risks evolve, new risks emerge, or previously omitted risks are discovered. [2]

It is important to establish a clear management responsibility for each risk for cycle to be successful. Similarly, the whole process should be clearly embedded in the overall project plan. [2]

The control process should have a regular cycle, say monthly, to confirm that the controls are operating effectively and updating the status of the individual risks. [1]

Individual risks should be evaluated outside the regular control cycle when there is a significant change in status, or a control failure affecting the risk is identified. [1]

Contrasting project stages

The way in which the risk control cycle is applied is likely to vary across the different stages of the construction project. [1]

The initiation of project stage will start the steps in the cycle, but will only be able to roughly assess risks from later project stages. [2]

Therefore the steps will re-cycle/be modified as the project progresses, and greater understanding develops of the depth and breadth of risks faced. [2]

For example, in the design phase the construction cost is a key risk, initially the cost will be measured and monitored. As the project develops through the phases the options available to deal with the risk will change. [1]

The range of risks from later project stages will also be expanded and analysed in greater depth as the certainty of the project progressing to the next stages increases. [1]
[Max 16]

This question was answered well by most candidates, with the stronger candidates going into depth/breadth – i.e. had well planned out answers.

Q3 Principles-based regulation requires users to decide how most appropriately implement them. This contrasts with rules-based regulation where a specific rule book has to be complied with little discretion. [2]

Judgement is required to decide the principles applying to specific work [1]

For each principle applied to specific work, judgement is required to apply it proportionately. [1]

All judgements must be reasoned and justifiable to a sufficiently high standard. [3]

It is necessary to allow for the interaction of TAS with any other regulations/laws. [1]

If unsure of whether to apply a principle, more prudent to follow than not. [2]

The expectations of potential users (e.g. client, regulator etc.) and the context in which the work is performed and reported should be taken into account in deciding the principles to apply [2]

Aim to apply the spirit of the regulations, rather than precise letter. [1]

Matters are material if they could, individually or collectively, influence the decisions to be taken by the users of the related actuarial information. [2]

Assessing materiality is a matter of reasonable judgement. [1]

Which requires consideration of the users and context in which the work is performed and reported. [2]

For example, A report to a company Board to make a significant decision will be more material than a report to sub-committee without delegated decision making authority. [2]

Not all reports and decisions by a company Board are significant and material. For example, a decision to spend £50,000 on further research on a potential £100m project would not be material. [2]

When assessing the application of a principle in a TAS, the principle can be put into one of the following groups:

- (i) The principle is not applicable
- (ii) The principle is applicable but its inclusion is not material to the decision to be taken by the user.
- (iii) The principle is applicable and its inclusion is material to the decision to be taken by the user. [3]

Principles falling into groups (i) are mainly matters of fact. [1]

Principles falling into groups (ii) and (iii) require the exercise of judgement. [1]

This may involve discussions with the user. [1]

If the principle falls into group (iii) then judgement will need to be exercised as to what is a proportionate application of that principle. [1]

Proportionality is referred to as follows:

The principles should not be interpreted as requiring work to be performed that is not proportionate to the nature, scale and complexity of the decision or assignment to which it relates and the benefit that users would be expected to obtain from the work. [3]

In considering how to apply proportionality the following should normally be considered:

- The significance of the piece of work including any financial, reputational or other consequences for the user
- The complexity of the piece of work

- The expectations of the user
- The knowledge and expertise of the user, and
- The extent to which judgement is required [5]

The proportionate application of principles should consider both current and expected future significance. Any limitations on the proportionate application of principles should be clearly set out, for example documentation of a risks should be extended if the exposure to a risk significantly increases. [3]

This indicates that a principle which is material can be disregarded (without further consideration or comment) in some situations. [1]

In other words, cost/benefit justifications apply to proportionality. [1]

There may be a number of principles underlying a TAS that are material to a decision that the user needs to make but the making of that decision itself is immaterial to the user. [1]

In this situation the actuary could decide not to apply certain principles when carrying out or reporting the actuarial work. [1]

However, in such a situation there is still a professional requirement to ensure that anyone affected by the decision to be taken by the user is not adversely affected by this course of action. [1]

Guidance notes may be available to help with either materiality or proportionality. Similarly would take advice from auditors or other relevant professionals. [2]
[Max 16]

This question was answered very poorly. This was a general piece of bookwork, but despite that there was little attempt made to consider the general experience of the candidates to assist. It is worth noting that any part of the course is examinable.

Q4 (i)

- A risk can be rejected or avoided for example contract terms set out the responsibilities and risks accepted by each party. [2]
- Risk can be accepted and retained for example where financial consequences are small, or insurance is too expensive. [3]
- Risk can be transferred (fully or partially) to manage the impact and frequency of a risk. May be done for example using reinsurance or ART. [4]
- A risk can be managed or reduced, e.g. operational risks, hedging. [2]

Diversification may also be used. [1]
[Max 8]

(ii) Reinsurance and various ART could be used. [2]

Reinsurance will be more economical for lower risk exposures ie earthquakes. [3]

ART likely economical only for large aggregate exposures ie larger company hurricane risks. [4]

Reinsurance

Both companies can choose from surplus, stop loss, excess of loss, quota share and catastrophe reinsurance. [2]

The specialist insurer will generally use reinsurance to limit its risk exposure unless very large. [1]

A large global general insurance company will have companies of different sizes across countries. [1]

Its use of reinsurance will depend on the size, development stage of the individual insurance subsidiary, volatility of insurance experience and risk concentrations. [3]

It may also first reinsure internally to retain risk within the group that is above the risk tolerance of the individual subsidiary. [2]

External reinsurance will be used above group risk tolerances. [1]

A specialist insurer that is part of a larger group may reinsure risks internally to contribute to group diversification and allow the group to retain risk beyond the tolerance of individual companies. [2]

Alternative risk transfer - integrated covers. [1]

They are often written as multi-year, multi-line covers and will give premium savings due to cost savings and to greater stability of results over longer time periods and across more (uncorrelated) lines. [2]

This may be organised at group level, as risks can first be reinsured in to a central company bringing multi-lines together to achieve greater premium savings. [1]

Smoothing the result of an individual subsidiary's insurance company remains important even in a global insurance company because the subsidiaries are subject to tax in their individual jurisdiction. The inability for losses to be relieved against profits in other jurisdictions results in inefficiency. [2]

Multi-year laying off of risk could result in excessive cover for specialist insurer. [1]

Alternative risk transfer – securitisations [1]

Securitisations, particularly for significant risk concentrations and catastrophes provide diversification away from reinsurers. [2]

Securitisations can also address capacity issues in reinsurance markets. [1]

For hurricanes, securitisations may also be used and can provide multiple-year reinsurance locking into attractive terms. [2]

Alternative risk transfer – insurance derivatives

Similar to securitisations, insurance derivatives provide diversification from reinsurers. The derivative contract here would need to be specifically based on hurricane or earthquake risks as appropriate (rather than the more generally available weather derivatives). [3]

A global insurer may support the development of both securitisation and insurance derivative to increase overall capacity to lay off risks. Long term this should reduce the cost of laying off risks and improve profitability. [2]

Alternative risk transfer – swaps [1]

A global insurer is unlikely to have global diversification. One insurer could swap exposure to hurricanes in Florida with a Japanese insurer with exposure to cyclones or earthquakes. [2]

For hurricanes there will be large aggregate exposure and therefore the ability to access alternative risk transfers such as swaps with a Japanese insurer writing cyclone or earthquake reinsurance. [2]

FinRe solutions could also be used provided they involve some genuine transfer of risk or have clear arbitrage benefits. [2]

[Max 20]

[Total Max 28]

- | | |
|------|---|
| (i) | This was generally answered OK. |
| (ii) | Few candidates tailored their answer to the question being asked. |

- Q5** (i) Some expenses can be identified directly as belonging to a particular class of business (ie direct costs). [1]

Others do not have a direct relationship to any one class of business. These need to be apportioned between the appropriate classes (ie indirect costs). [1]

Expenses form an important component of the total outgo analysed in internal management accounts and financial plans. Hence, expenses need to be allocated to different types of business in as realistic a manner as possible. [2]

Direct expenses may arise from a department dealing purely with one class of business, in which case the expenses relating to that department can immediately be allocated to the relevant class. If direct expenses arise from areas dealing with more than one class of business then time sheets can be kept (either for a period or permanently) to help split costs between classes. [4]

The indirect expenses are harder to allocate. By definition, the departments concerned are not related directly to any particular class of business, but form a support function for the provider. In this case, it is necessary to find a sensible apportionment of the expenses across direct business activities. [3]

For some costs a “charging out” basis could be used:

- Computer time and related staff resources could be charged to the direct function.
- Departments based on actual use.
- Premises costs can be allocated by floor space taken up by a department.
- For other costs such a more arbitrary basis may be required, e.g. for statutory fees or senior management costs.
- These costs could simply be added at the end of the analysis as a percentage loading to all the other attributed costs. [7]

One-off/non-recurring costs may need spreading. For example, the cost of a new admin system could be spread over the expected useful life of the system and loaded into the policy types that would be administered on the system. [2]

(As well as apportioning expenses to a line of business) costs also need to be apportioned by function, so that they can be allowed for in determining product pricing or the provisions for future liabilities.

For most types of business the high level division is into the costs of:

- securing new business.
- maintaining existing business (renewal and investment).
- terminating business (including claims).

Depending on the purpose of the expense analysis, these items may be subdivided. [6]

For example new business costs might be split into marketing; sales and commissions; processing and policy issue; and underwriting. [2]
[Max 14]

(ii) In all cases, loadings should be applied on the outgo side of the equation. [1]

(a) Treat as an extra annuity per annum per policy, but use reduced interest rate to allow for future expenses inflation. [3]

(b) Reduce interest rate. In this case, on both sides of the equation. [3]

May adjust further to allow for other features eg arrangement or performance related fees. [1]

(c) Add to fixed initial costs per policy. [2]

Alternatively initial costs could be increased as % of sum assured to reflect that underwriting costs might vary with policy size. For the same reason, loading might vary within benefit bands. [3]

Add inflation based on half the period the premiums are expected to apply (i.e. before repriced/withdrawn). [2]

(d) Add initial underwriting to fixed initial costs per policy or as % of benefit. [2]

LTC products vary considerably in the types of benefits they provide, and therefore the level/cost of underwriting that needs to be allowed for. So again premiums might be banded with different loadings for each band, or potentially an individual policy loading may be applied. [4]

Add inflation based on half the period the premiums are expected to apply (i.e. before repriced/withdrawn). [2]

Add claim-inception underwriting to the amount of the first claim payment, allowing for inflation. [2]

Add during-claim underwriting to subsequent claim payments, allowing for expected frequency of claims management, and inflation. [3]

In this case, how to allow for inflation will depend on the extent to which the expense loadings are treated as additional claims which will have their own (possibly different) expected rate of claims inflation. [2]

[Max 16]

- (iii) Including a full theoretical allowance for expenses can produce unmarketable premiums, across all or part of the product spectrum. [3]

Usually the full amount of direct costs will be allocated, in aggregate, at product level. But premiums overall may only be required to produce a limited contribution to indirect costs/overheads, subject to ensuring the whole product range can cover aggregate costs of insurer in the long term. [3]

Allocating direct costs, on a fixed per policy basis, may make smaller policies too expensive. So instead these may be translated into % of premium (or similar) instead. [3]

Loadings may also need to conform with competitor approaches so as to avoid anti-selection. [2]

May wish to keep the approach simple, or to allow for ease of administration. [2]
[Max 4]

- | | |
|-------|---|
| (i) | Generally well answered with most candidates setting out well-structured solutions |
| (ii) | This part of the question was poorly answered with few candidates getting to grips with what was being asked. Those candidates with the better answers went back to first principles and then built their answers up. |
| (iii) | Better answered. |

- Q6** (i) The assets (potential investments) comprise loans and free reserves. [4]

Regulations can impact the two classes differently due to risk-based capital requirements. The overall approach to investment will be limited by the fact that the Regulator may impose capital charges on each entity. [3]

The following controls may be implemented:

Restrictions on the types of assets that can be invested in. [1]

In this case, banks would be restricted (authorised) to issuing loans – any other (in particular higher risk investments) wouldn't be allowed, i.e. they are lending institutions not speculators. [2]

Restrictions on the amount of any particular type of asset that can be taken into account for the purpose of demonstrating solvency. [1]

Again this would relate to only issuing loans but may also limit loans as a proportion of total assets, i.e. requiring free assets in terms of cash or government bonds. [2]

A requirement to match assets and liabilities by currency. [1]

In this case, any funding to provide loans would need to be in the same currency as the loans. [1]

Restrictions on the maximum exposure to a single counterparty. [1]

In this case, this would relate to restricting the proportion of total loans going to a single entity or related entities. [2]

Custodianship of assets. [1]

Whilst possibly not directly relevant, this would cover proper record keeping, independent verification of loans (solicitors) and safe storage of loan agreements. [1]

A requirement to hold a certain proportion of total assets in a particular class. [1]

As with the solvency requirement, this could relate to the “class” of loan, e.g. simple products – fixed or variable interest rates, nature of security or repayments, i.e. nothing too opaque or complex (e.g. dressing up more risky vehicles as loans). [4]

Alternatively, it may go into more details on the specific nature of bonds or cash to be held as free reserves (quality, liquidity, risk). [2]

A requirement to hold a mismatching reserve. [1]

In this case, banks would need more free reserves if their loans and borrowing were mismatched for example if the quality of their loans was poor, i.e. to high risk borrowers, more free assets would be needed. [2]

A limit on the extent to which mismatching is allowed at all. [1]

In this case, the degree of mismatching would be constrained, e.g. by term or currency or quality. This could be on an individual loan or overall portfolio basis. [3]

Regulations on the public disclosures required may restrict asset choices. For example, the bank may not want to disclose risky assets, and therefore avoids holding them. [2]

[Max 12]

(ii)

Essentially the government wouldn't consider that commercial lending was an appropriate role for it to undertake. [1]

It would not have the financial resources (unless tax take or its borrowing were huge) to do this. Resulting interest rates may be uncompetitive. [3]

Nor is it likely to have the infrastructure (admin) set up to issue loans, nor the expertise to decide which loans are worth granting (e.g. credit worthy or not). [4]

Politically, such lending would be seen as undue interference in the running of a free market. For example:

- conflicts of interest
 - eg wants to increase base rate but this would also increase interest obtained on loans
 - relationship with end customer
 - eg cronyism related to who it grants loans to
- [5]

Routing loans via a bank has gearing/credit creation advantages ie boosts economic growth quicker. [1]

Government's role would be to facilitate and regulate beneficial borrowing and lending in the economy at large. [2]

It does this by providing liquidity (rather than direct funding) and controlling those allowed to provide loans. [2]

In this way, it reduces the risk to the government of large losses caused by loans defaulting. [2]

Whilst at the same time, managing the risks from free market lending in a cost effective way, i.e. fewer parties to keep an eye on. [2]

The government is likely to be happy that banks are lending enough (and often enough) for businesses/economic aims to be met (i.e. content that banks are not holding back unduly from making loans). [2]

The government provides funds on relatively generous terms to financial institutions as a quid pro quo for them being regulated and constrained in what they can do (so that they can make a profit). [2]

[Max 8]

(iii) The first point is to set out what is meant by appropriate.

Clearly this relates to matching assets and liabilities, i.e. loans and the borrowing the bank takes out to finance them. [2]

In this case, this will mean matching cash flows both income and capital. [2]

Shortloan

These loans are short term and possibly without the payment of explicit coupons, i.e. a lump sum is borrowed and a larger one repaid. [2]

Given the relatively low risk involved, the bank probably won't be able to charge high amounts of interest – hence it will need relatively cheap borrowing. [2]

These are precisely the features of money market instruments and so they will be most appropriate in this case. [2]

Longloan

These loans are longer term (again, the clue is in the question). [1]

Given the nature of the projects, the borrower may want low or deferred initial interest payments so as to help with its cash flow management. [1]

Lenders may not be keen as this increase their risks. [1]

These loans are relatively more risky (long term projects) than those made by Shortloan though reduced a bit since large organisations are involved (but they do default or reschedule). [2]

Hence Longloan will want to charge a higher rate of interest than Shortloan does. [1]

Whilst index linked repayments may not match the coupons or capital Longloan receives (unless they give some form of increasing repayments loans), the term of an index linked bond will be relatively long. [2]

So even though borrowing via index linked bonds may be relatively expensive (compared to money market instruments), it will be more appropriate for Longloan. [2]

[Max 10]

- (iv) Implementing the fundamental principles of good lending is seen as a way of reducing credit risk – in this case defaulting on short term loans. [2]

In this case, Shortloan's customers will need to purchase stock, pay staff and suppliers plus other running costs before they receive payment for the sales they make (some large food retailers who have high cash turnover and can

squeeze suppliers are probably exceptions – but in general retailers need a lot of working capital). [2]

Their problems will be increased if they sell on credit (hire purchase – especially interest free), i.e. more of a delay until payment is received. [2]

In order to assess the credit risk, a number of key questions have to be asked about the borrowers:

Character and ability. [1]

Are the borrowers known, competent and trustworthy? [1]

Does the management have the required skills and expertise? [1]

In this case, borrowing may be quite frequent and so good relationships and understanding of management should exist. [1]

Issues may arise on changes in management as some retailing is very specialist. [2]

Or if this is a new borrower – why have they switched to Shortloan? Defaults with other lenders (poor track record)? What is the credit rating of customer (credit scorecard) [3]

Purpose of the loan. [2]

In theory, this is to meet working capital requirements, i.e. due to be repaid out of future sales. Shortloan will need to have controls in place to ensure that this is the case. [1]

For example if funds are used to pay off existing debt or stock write downs, questions about repayment will arise, i.e. not funding sales. [1]

The nature of retailers and traders can vary a lot. So shortloan should try to ensure that is not overexposed to certain sectors, e.g. vary by cyclical and non-cyclical. [2]

The nature of the customers' business should be investigated to identify particular risks. For example by location, fashion, reliance on certain suppliers or customers, currency etc. [2]

There may be moral or ethical issues, e.g. gambling businesses, links to certain regimes etc. [1]

Is the amount reasonable taking into account the purpose? [2]

Comparison should be made with previous borrowing. If the amount is increasing, questions will be asked. [2]

Should probably check against the value of stock to be purchased, i.e. look at specific reasons for this loan. [1]

Repayment. The key issue is can the borrower service and repay the debt when due? [2]

Sales forecasts and cash flow projections will need to be looked at very carefully. [2]

So consider pricing, strength of the economy or policy on returns to suppliers etc.

Are the assumptions used credible? What margins have been built in? [2]

Many retailers are highly seasonal eg Christmas. [1]

Does the timing of repayments and income fit in with this seasonality, e.g. highly unlikely to be able to repay loans in November? [2]

Will need to look at debtors and creditors. [1]

If debts are increasing, how secure are the loans – prior calls on funds? [1]

If creditors are increasing how likely is it that payments will actually be received? [1]

Availability of security or a guarantor. [2]
[Max18]

- | | |
|-------|---|
| (i) | Most candidates scored well – those that thought widely scored best. |
| (ii) | Well answered, but again those who scored best managed to think widely on why a government might think it was a good idea to sell direct. |
| (iii) | Less well answered, with candidates repeating their answer for both companies |
| (iv) | Well answered with most candidates picking up the obvious points. |

Q7 (i) The company believes the guarantee will enable it to increase its new business, and make higher profits, in the new territory. [3]

May decide to use the guarantee as a loss leader initially. [1]

Competitors may already offer similar guarantees, or the guarantee may be innovative versus the competition. [2]

The economic conditions may be quite volatile in the new territory, meaning that no-one would purchase without a monetary guarantee. [3]

The target market may be relatively unsophisticated, not used to investment contracts. The guarantee is likely to be a familiar concept to them, and can be easily explained because it looks like a bank/building society account. [7]

Local regulations may require guarantees. [1]

There may be specific tax advantages of offering the guarantee. [1]

There may be diversification benefits [1]

Other products the insurer sells in the new country may provide a hedge for the guarantee. Or the investment market in the new country may offer investments that provide a hedge for the guarantee. [2]
[Max 10]

(ii)

Immediately

Likely that premium paid will be greater than value of units. [1]

Because:

Bid offer spread. [1]

Likelihood that the initial allocation rate to units is significantly less than 100%, because this will be the only practical way to recoup initial costs given that 100% of unit value is offered at all durations [4]

Customer has locked into the guarantee for the future (eg even if insurer later withdraws guarantee/product). [2]

In the future

Payout at any of the “various points in time” may see the money guarantee exceeding the unit value at that time. [2]

This may be because the investment returns – net of product charges - are poor, or volatile, or the guaranteed roll up rate has been set too high. [6]
[Max 8]

(iii) **Guaranteed roll up rate**

Set guaranteed roll up rate as low as possible, but still marketable/competitive enough. [3]

If the guaranteed rate is linked to an index then use an index which will more closely track unit linked fund (eq equity tracker) and consider combining with a fixed cap. [2]

Keep rate reviewable for future new contracts. [1]

Set rate as simple not compound. [1]

Allow interest only for complete years (*or alternative reasonable example*). [1]

Strike date of guarantee/min investment period

Limit strike date, e.g. to policy anniversaries.
(*or alternative reasonable example*) [3]

Set minimum period of years before guarantee applies, high enough that a reasonable chance exists of smoothing out market volatilities,
e.g. at least $X = 5$ years. [4]

Variable contributions

Basic guarantee allowed on regular level contributions throughout. [2]

Lower, or no, guarantee applies to:

- premium reductions [4]
 - may lose guarantee altogether
- premium increases [4]
 - may tranche premium levels
 - roll up rate depends on tranche start date
 - tranche to have been invested for X years continuously before guarantee applies
- single premium drop ins [3]
 - roll up rate depends on investment date
 - minimum investment of X years

Choice of unit linked fund

Allow the guarantee only on certain funds, particularly those with less investment volatility, e.g. a fixed interest or balanced fund rather than an emerging economy/industry type fund. However policyholders will want the guarantee to apply more to the higher volatility funds. [6]

No (or limited) switches allowed in order to retain the guarantee. [3]

Other

Limit partial surrenders before guarantee removed. Limit future premium redirections before guarantee removed. [2]

Segmentation/clustering of overall policy will impact proposals. For example, could reduce premium by surrendering segment; but remaining segments would retain guarantee. Similarly could surrender/switch/redirect on only some segments, losing g'tee only on those segments. [3]

An explicit additional charge could be made for the guarantee, and this could also be kept reviewable. [3]
[Max 18]

- (iv) Unit linked contracts, in the absence of a guarantee, require the life office to payout the underlying value of assets held, according to the investment objectives of each fund. Therefore adopting any mismatching is very difficult in practise, because potentially enormous amounts of capital would need to be allocated against the potential losses from mismatching. [5]

Anyway, unit linked mismatching likely not to be permitted by regulation. [1]

In this case the guarantee, in isolation, is most suited to being matched with fixed interest investments. [1]

Most unit linked funds would have wider/more specific investment objectives, e.g. equities/property, but also allow some (limited) use of derivatives. [3]

So in practise the office needs to predominantly match the unit linked liability but also try to hedge against the guaranteed cost. [2]

To some extent, the company may obtain natural hedging from other products it sells. But these may prove insufficient in themselves to provide enough of a hedge against the new guarantee (eg if business volumes really take off). Purchasing of derivative investments would then become necessary. [2]

Therefore a derivative investment is likely to be most successful in achieving the overall investment aims here. [1]

The idea is that their cost is reasonably low compared with the greater loss exposure that they cover. [1]

(European style) put options would be appropriate to hold here, to provide a minimum floor value for the unit linked funds. [3]

[Max 8]

- (v) The required (strike price and date of the) options will depend on the T&Cs finally agreed on by the office. [1]

If the T&Cs are not tight enough, it will be very difficult to obtain any derivatives to give even approximate coverage. For example, if strike dates aren't restricted to policy anniversaries then likely impossible to find an open ended derivative to cover. [3]

Any more than one strike date introduces a persistency risk as the insurer will need to estimate what proportion of policies will exercise the guarantee on each of the strike dates. Very unlikely to be able to obtain a derivative contract that covers the required optionality of strike dates; it would anyway be more expensive than standardised derivative contracts. [4]

Even where T&Cs are tightly set, even standardised derivatives may be too expensive, or carry high default/counterparty risk, or be unavailable, e.g. longer terms unavailable. Terms may be unavailable initially or later when derivatives need to be rolled over. [5]

Even where available, there will always be possible basis/mismatching errors that mean the hedge will be only partially successful in practise. For example time lags, index differences, may not reflect the amount of funds under guarantee as this changes (eg due to new customers/if existing customers increase premiums/customers withdraw/investment return), currency or other plausible basis error. [3]

[Max 6]

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|-------|---|
| (i) | Most candidates managed the obvious points, but only the well-structured answers managed to cover other points. |
| (ii) | Poorly answered with few candidates understanding the guarantee being offered. |
| (iii) | Most candidates didn't think of more than one approach and therefore generally scored poorly. |
| (iv) | Poorly answered with many candidates missing the part completely. |
| (v) | Better answered with most candidates attempting and picking up points around clarity on the T&C's |

END OF EXAMINERS' REPORT