

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2019 Examinations

Subject SP2 – Life Insurance Specialist Principles

Introduction

The Examiners' Report is written by the Chief 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.

Mike Hammer
Chair of the Board of Examiners
July 2019

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

1. The aim of the Life Insurance Specialist Principles subject is to instil in successful candidates the principles of actuarial planning and control, and mathematical and economic techniques, relevant to life insurance companies. The student should gain the ability to apply the knowledge and understanding, in simple situations, to the operation, on sound financial lines, of life insurance companies. The life insurance products covered by this subject exclude health and care insurance products covered by the Health and Care Specialist Principles subject.
2. The Examiners' Report covers more points than would be expected to get full marks. This is so that alternative approaches to questions by different candidates can be accommodated. The Examiners may also award marks for valid points that are not included in the marking schedule.
3. Candidates are expected to show knowledge of the relevant content of the Core Reading, and be able to apply this knowledge where appropriate.

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

Questions that focussed on knowledge of the Core Reading were generally well answered by well-prepared students with the exception of question 5 where only the stronger candidates were able to apply the theory and work through all benefit and investment elements.

In the higher mark application questions, stronger candidates generated the required breadth of points rather than focussing on a smaller number of themes, e.g. the latter parts of question 4 and 6, and these proved to be questions which differentiated candidates.

C. Pass Mark

The Pass Mark for this exam was 60.

Solutions

Q1

Moving from a passive to active valuation approach will mean:

Moving from a valuation approach which is relatively insensitive to changes in market conditions... [1/2]

... to one where the valuation changes as market conditions change. [1/2]

Valuation assumptions will need to be updated more frequently under an active valuation approach. [1]

This will increase the workload demands on the companies. [1/2]

More frequent reporting may also be required, further increasing workload. [1/2]

The concept of 'locked-in' assumptions (if used) would no longer be appropriate under an active valuation approach. [1/2]

Assets would be valued on a different basis... [1]

... moving from historic / book value to market value. [1/2]

The calculation of the solvency capital requirement may change... [1]

... a higher capital buffer may be required to protect against the increased risk of future adverse volatility. [1/2]

The calculation may move from a relatively simplistic approach to a risk-based capital approach. [1/2]

There may also be a material day 1 solvency capital impact of implementing the new approach. [1/2]

Active approach requires more subjectivity... [1]

... this may lead to companies' results becoming more volatile under an active approach. [1/2]

This then requires companies to spend more time explaining this volatility to financial markets... [1/2]

... and be exposed to the risk of a falling share price if listed. [1/2]

Under adverse market conditions e.g. a large fall in equity markets an active valuation approach can exacerbate the fall... [1/2]

... by indicating a sell off of equities to reduce capital requirements. [1/2]

The change may increase the need for sensitivity testing – possibly at the request of the regulator. [1/2]

As a result, companies would become more informed about the impact of market conditions on financial options and guarantees. [1/2]

There would be greater costs for the companies... [1/2]

... higher running costs, [1/2]

... costs from projects to ensure a smooth transition from a passive approach to an active approach, [1/2]

- ... costs incurred for changes required to systems... [½]
- ... the training of staff, [½]
- ... and potential recruitment of expertise [½]
- Companies would also need to consider the reputational and financial cost if the change cannot be implemented within the required timeframe set by the regulator. [½]
- [Total 15½, Maximum 8]

This question was not strongly answered overall. Most candidates commented on the change resulting in increased sensitivity and more frequent valuation assumption updates, but only stronger candidates covered points on capital and cost impacts.

Q2

- How would offering this affect profitability? [1]
- What are the additional investment costs and are they significant? [1]
- A new fund may give the company a competitive advantage [1]
- ... and hence may generate new business by attracting new customers [½]
- ... or by increments to existing business generating new funds [½]
- Or it could result in customers merely selecting this unit-linked fund rather than an existing unit-linked fund. [½]
- If the latter then the extra income may not justify the extra costs involved. [½]
- Is there experience of this asset class being sold to retail customers in other jurisdictions – if so what was that experience? [½]
- Would the asset class be appropriate for the target market? [1]
- Is there any market research supporting demand for the proposed fund? [1]
- Would the asset class be understandable to the target market? [1]
- Are the expected returns sufficient... [½]
- ... with a level of market risk appropriate to the target market? [½]
- Is the charge for the fund likely to be consistent with other funds? [½]
- Would the asset class be appropriate for the distribution channel(s) used by the company? [1]
- An unusual asset class might be appropriate for face to face channels... [½]
- ... especially insurance intermediaries. [½]
- But it is unlikely to be appropriate for direct marketing. [½]
- Are there any ethical reasons that might make the asset class unattractive to customers... [1]
- ... and be inconsistent with the company brand / cause brand damage. [½]
- Is the asset class sufficiently liquid for a retail fund? [1]
- Is the asset class sufficiently divisible for unit linked pricing? [½]

Does the insurance company have sufficient internal expertise to invest in the new asset class with confidence? [1]

Who is the investment bank? What is their reputation? Do you have sufficient confidence in the quality of their advice? [1]

Are there any limitations or restrictions imposed on the fund by the investment bank (e.g. max size / availability) [½]

Are there any legal restrictions that would prevent the company from using the asset class? [½]

Are there any regulatory restrictions that would prevent the company from using the asset class? [½]

In is not unusual for regulators to restrict the asset types in which an insurance company might invest. [½]

How would the asset class affect the company's reserving or statutory capital requirements? [1]

Does the company have sufficient capital resources to cover any additional capital or reserving requirements... [½]

... including any costs or strain associated with increased new business volumes, [½]

... and any counterparty risk introduced through use of the investment bank? [½]

How would the asset type be taxed? [½]

Amending marketing/fund literature to include new fund. [½]

Amending administration systems to allow for the new fund. [½]

Amending unit-pricing systems to cope with the new fund. [½]

Any requirements for extra training of staff on the new fund [½]

[Total 24½, Maximum 13]

This question was answered reasonably well with most candidates covering profitability and marketability points. Candidates who applied their knowledge of issues relating to a new unit linked fund, rather than just repeating general issues that relate to a new product, scored well. Stronger candidates also considered broader consequential points such as reserving, potential for default or illiquidity, and any regulatory restrictions that may prevent the addition of the fund.

Q3

- (i) Reinsurance may be used to:
- Limit the amount paid on any particular claim
 - Limit total claims payout from a single event (e.g. catastrophe) ...
 - ... or on an ongoing basis
 - Reduce insurance parameter risk
 - Reduce claim payout fluctuations/volatility
 - Receive technical assistance

Reduce new business strain
 Increase profits
 by reducing risk cost
 .. or increasing volumes
 Reduce overall capital requirements
 Allow aggregation of risks that the insurer cannot manage on its own
 Allow disaggregation of risks, separating risks out from a product to allow the insurer to optimise its risk margin and capital requirements.
 Raise capital (e.g. through financial reinsurance)
 Allow regulatory or tax arbitrage

[½ for every two points made]
 [Maximum 3]

(ii) Original Terms

Under Original Terms, the reinsurance premiums are set by the insurer... [1]
 ... meaning a change in the insurers premium rates will automatically result in a change in reinsurance premiums. [1]

All aspects of the original contract are usually shared between the reinsurer and the insurer [O1]

There will be explicit reinsurance commission paid by the reinsurer. [1]
 Calculated by the reinsurer based on the likely future experience... [½]
 ... and knowledge of cedant's underwriting process/quality [½]
 The reinsurance commission is likely to cover the commission paid by the cedant on the reinsured portion... [1]
 ... and part or all of the cedant's initial expenses [½]

Risk Premium

Under Risk Premium the reinsurer sets their own rates... [1]
 ... meaning the reinsurance rates would not necessarily change if the insurer rates change [½]

The cedant shares part of the sum assured or sum at risk... [½]
 ... for term assurance this would be the mortality risk associated with the sum assured. [½]

The reinsurance premium charged may be level over the term of the policy... [1]
 ... or may vary annually with the probability of claim... [½]
 ... this arrangement is known as "net level premium arrangement" [½]

Quota Share vs Individual Surplus

Under QS a specified percentage of each policy is reinsured... [1]
 ... whereas under individual surplus the reinsured amount is the excess of the original benefit over the cedant's retention limit on any individual life, [½]
 and the reinsured amount/percentage will vary." [½]

[Total 12, Maximum 6]

(iii) The insurer may want to retain more of the profit on the business... [1]

... and hence only reinsure risks over a certain retention level [½]

The insurer may now have a large enough book of term policies to enable it to retain more of the risks... [1]

... and reduce the need for technical assistance or expertise... [½]

... or protection from claims volatility/random fluctuations [½]

The insurer may now have a large book of other business that may act as a hedge against the risks under term assurance [1]

e.g. annuity business. [½]

The relationship between the insurer and current reinsurer may have deteriorated [1]

... e.g. due to administration issues... [½]

... or the current reinsurer may be seeking to change or cancel the current arrangement. [½]

The existing reinsurance contract may be coming to an end, prompting a review [½]

The rates offered by the new reinsurer may be preferable to the current reinsurer... [1]

... e.g. lower rates [½]

... or guaranteed rates [½]

Financial reinsurance may also be possible under the new arrangement. [½]

The insurer may want to change its premium rates and the current arrangement would mean these changes would result in changes to reinsurance premiums [½]

.. or the insurer may be introducing other products and feels a new arrangement may be appropriate [½]

The new arrangement would allow it to respond to competitor pressures without recourse to the reinsurer [½]

There may be concerns over the solvency of the current reinsurer [1]

The insurer may have changed its risk appetite, and hence decided on a new arrangement, [½]

or may be above internal counterparty limits with the reinsurer, and seeking to reduce overall exposure. [½]

There may be changes in regulatory, fiscal or solvency requirements that make a new arrangement more appropriate [½]

[Total 14, Maximum 6]

[Total 15]

Overall this was the most well answered question with 3(ii) in particular scoring well for most candidates. Stronger candidates covered the full range of uses of reinsurance in part (i) and a broad range of drivers to change reinsurance arrangements in part (iii).

Q4

- (i) A life insurer sets assumptions to assess the value of its assets and liabilities, [½]
e.g. for use in pricing, or valuation (any suitable example) [½]
[Total 1]

- (ii) (a) The cost of the property is converted into a notional rent... [1]
...which is charged to the relevant departments. [½]

This rent (plus running costs) can be split by floor space occupied, between departments and then allocated in accordance to salaries. [1]

Depending on the work performed by each department the cost is included in either the initial, renewal or claims expenses. [1]

The split may be carried out at a more granular product level based on the work performed on each product. [½]

If part of the office is rented to a third-party allowance should be included in the costs. [½]

Allowance for relocation costs should be included... [1]
... and depending upon the proximity of the old and new offices they would need to include staff relocation costs. [½]

The expense assumptions should allow for the costs of the old offices up to the relocation date and thereafter the cost of the new offices. [1]
[Total 7, Maximum 4]

- (b) The cost of purchasing the new computer system could be amortised over its useful lifetime... [1]
... and then included with its existing computer costs. [½]

The amortised cost would be separated into new business functionality, on-going administration costs and claim costs. [1]

The cost would then be included in either the initial, the renewal or the claims expenses, respectively. [1]

The split may be carried out at a more granular product level based on the work performed on each product. [½]

Allowance in the amortised cost would need to be made for the migration costs incurred for the new systems... [1]
...for example, staff costs. [½]
These would be in addition to the pure cost of purchasing the system. [½]

The renewal expenses would need to allow for the existing computer costs up to the migration date and then for the new system costs post migration. [1/2]
[Total 6½, Maximum 4]

(iii) Risks to the company from outsourcing the administration to a third party.

Reputational risk

The company might lose direct control over the administration process and with the loss of visibility and any issues with communication, this may lead to reduced quality of customer service. [1]

.. which may in turn lead to increased costs to resolve complaints and impact on reputation [1/2]

The third party's response time may not be consistent with the company's required response time. [1]

For example, another company's business may be given a higher priority over this company's business if the same staff work on multiple companies' business. [1/2]

Risk of ill will as staff will either be made redundant or transferred to the third party. [1/2]

Company's own philosophy / beliefs may not be in line with the third party's. [1/2]

For example, how customers are treated . [1/2]

The outsourcer may not have the same levels of security over protecting personal information. [1/2]

There may be data loss arising from the transfer of information. [1/2]

Achieving outcomes not set out in the original servicing agreement will be difficult. [1/2]

Default risk

Risk to the company that the third party defaults on the servicing agreement... [1]

... leaving the company with no administration support and no means of immediately covering this... [1]

... and a need to set up alternative arrangements in short order [1/2]

If the policies are migrated to the third party's administration system as part of the outsourcing agreement, the company loses the ability to administer the policies. [1]

There will be a loss of expertise within the company if the staff are made redundant / transferred to the third party. [1]

Expense risk

The expense escalation is likely to be set in the agreement, [1/2]

the fee for outsourcing may increase by more than would have been the case if the business had been administered in-house. [1]

The fees are normally set for a fixed period after which a renegotiation is required – the fees after this renegotiation period will be unknown. [1/2]

The cost of the initial outsourcing (e.g. data migration, contract setup) may be higher than expected. [1/2]

Managing the outsourcing arrangement may involve more ongoing cost and resource than originally anticipated. [1/2]

Operational risk

There may be increased operational risk under the arrangement (e.g. fraud, contract disputes) [½]

[Total 14, Maximum 5]

- (iv) Outsourcing will change the allowance for expenses made by the company in its valuation and pricing. [½]

The initial setup cost of the outsourcing arrangement will need to be amortised over the expected life of the arrangement and allocated to policies. [½]

The renewal expense previously assumed by the company will reduce to:

An assumption for the remaining ongoing activities not being performed by the third party, [1]

for example, the cost of executive managers or human resources. [½]

In addition, there will be the explicit per policy outsourcing cost... [1]

...plus any frictional cost from the arrangement (e.g. tax) [½]

...plus any margin to allow for risks associated with the arrangement [½]

If the contractual inflation applied to the outsourcing cost is different to that assumed by the company for the renewal cost... [1]

... then an explicit outsourcing expense inflation assumption will be required. [½]

Any new business administration taken on by the outsourcer will also need to be reflected in the expense assumptions... [1]

... with a lower in-house expense assumption...

... and an explicit outsourcer new business expense assumption. [½]

Similarly for claim expenses. [½]

The company will need an explicit assumption about what expenses are expected to apply after the initial fixed term of the outsourcing arrangement expires and expenses are renegotiated. [½]

[Total 8½, Maximum 4]

[Total 18]

The points strongly related to bookwork in parts (ii) and (iii) were well covered by most candidates, however only the stronger candidates expanded beyond these to apply the theory to the specifics of the topic, e.g. consideration of relocation and migration costs. Part (iv) was generally not well answered, with few candidates considering which costs would be retained by the company and how inflation would affect assumptions.

Q5

General points awarded once if mentioned in any of the three products

The assets should reflect the nature, term and currency of the underlying liabilities. [1]

Also need to consider any regulatory restrictions on assets allowed to be held... [1]

...And assets allowed to contribute to solvency calculations... [½]

The strategy will depend on the level of free assets. If the company has sufficient free assets it may depart from matching strategies to maximise overall return. [1]

The extent to which it does so will depend on its risk appetite [1/2]

- (i) The benefit is likely guaranteed in money terms, [1]
 although could be guaranteed in terms of an index if the benefit is inflation-linked. [1/2]
 The term is until death of the second life between the policyholder and spouse. [1/2]
 Though the level of payment is reduced after the policyholder dies if the spouse survives. [1/2]

There will also be an expense reserve.... [1]

....the expenses are likely to increase with inflation each year. [1/2]

Look to invest in a fixed income bonds... [1]

... or suitable index-linked bonds if the benefit is inflation linked. [1/2]

Look to match the bond term to expected liability term. [1]

This term would be based on expected longevity of main lives... [1/2]

...and spouses [1/2]

Could buy government bonds. [1/2]

Or corporate bonds. [1/2]

With a higher return expected on corporate bonds... [1/2]

...but also higher credit risk [1/2]

There may not be assets available of long enough duration to match the liabilities... [1]

...depending on current age and expected term [1/2]

Some cash would also likely be held... [1/2]

...for liquidity purposes. [1/2]

The expense reserve in respect of this product could be matched with index-linked bonds... [1]

...where the index they track is closest to what the expected expense increase driver is. [1/2]

[Total 17½, Maximum 9]

- (ii) The benefit is investment linked. [1]

The assets held to back the unit fund are likely to be the assets in the fund selected by the customer... [1/2]

...as most regulations restrict mis-matching on unit funds. [1/2]

The assets backing the non-unit reserve will need to be liquid assets... [1]

...as the non-unit reserve covers any short fall between charges and expenses. [1/2]

Hence cash or near cash instruments are likely to be held. [1/2]

... and potentially suitably liquid bonds of ten year term. [1/2]

[Total 4 ½, Maximum 3]

- (iii) The benefit is partially guaranteed in money terms, for the sum assured. [1]

And any regular bonuses declared to date. [1]

And partially discretionary, for any future regular terminal bonuses. [1/2]

The term is until policyholder death. [1/2]

For the benefits guaranteed in money terms (sum assured and bonuses declared to date) fixed rate bonds would be suitable. [1/2]

The term should match the expected term of the life assurance... [1]

...which is based on expected longevity [1/2]

Could buy government bonds. [1]

Or corporate bonds. [1/2]

With a higher return expected on corporate bonds... [1/2]

...but also higher credit risk [1/2]

Some liquidity will be needed to meet guaranteed costs as they fall due [1/2]

So the assets held should include an element of liquid assets such as cash or near cash instruments. [1/2]

For the discretionary benefits (future bonuses) the main aim is to maximise investment return... [1]

...subject to the risk appetite. [1/2]

This will depend on the amount of free assets available... [1]

...with higher free assets allowing greater investment freedom. [1/2]

Policyholders reasonable expectations (PRE) should be considered for what investments the customers expect. [1]

This will be based on what the company has said in sales and other product literature. [1]

Equities and property are likely to be chosen to back this part of the benefit. [1/2]

Though the mix will change as the policy moves through its term and a greater proportion of the benefits are guaranteed. [1]

There will also be an expense reserve.... [1]

...the expenses are likely to increase with inflation each year. [1/2]

The expense reserve in respect of this product could be matched with index-linked bonds... [1]

...where the index they track is closest to what the expected expense increase driver is. [1/2]

[Total 18 1/2, Maximum 8]

[Total 10]

This question overall was not well answered by candidates despite it being grounded in standard asset-liability matching considerations. Most candidates covered the basic considerations for the product in parts (i) and (iii), but only stronger candidates considered the different types of fixed interest bonds that are available and their impacts. In part (ii) many candidates suggested selecting different investments for the unit linked fund rather than considering points around assets for the non-unit reserve.

Q6

- (i) The key uses of models are to
- ... assist in product design and charging structures [½]
 - ... assist in calculating cost of options and guarantees [½]
 - ... calculate profitability / return on capital [½]
 - ... assess investment strategies [½]
 - ... assess current solvency position [½]
 - ... project future solvency position [½]
 - ... calculate embedded value [½]
- [Total 3 ½, Maximum 2]
- (ii) Needs to allow for
- All cashflows that may arise.... [1]
 - ...which will depend on the nature of the contracts [½]
 - ...in terms of premium and benefit structure [½]
 - ...and any discretionary benefits (e.g. non-greed surrender values) [½]
- Allow for cashflows from supervisory requirement to hold reserves... [1]
- ... and solvency capital [½]
- Cashflows needs to allow for interactions, [1]
- particularly where assets and liabilities are modelled together [½]
- Ability to use stochastic models and simulations need to be allowed for where appropriate... [1]
- ... to assess impact of financial options and guarantees. [½]
- The model being used should be adequately documented. [½]
- The model should be easy to use, including communication of results. [½]
- The outputs from the model should be capable of independent verification and sign-off [½]
- [Total 8 ½, Maximum 5]
- (iii) Pricing
- A number of sample model points will be chosen [1]
 - ...to represent the expected new business under the product. [1]
 - The profile of any similar existing product ... [½]
 - combined with advice from the company's marketing department would be used. [½]
- Reserving
- Real data on policies held will be used [1]
 - This will either be ungrouped (i.e. policy by policy) [½]
 - Or by using model points that are representative of the full data. [½]
- [Total 5, Maximum 3]
- (iv) To prove that model accurately reflects the future cashflows [1]
- and is not mis-stating the reserves [1]
 - or value of the business [½]

or setting inappropriate new business terms [½]
as the model will be used in the day to day management of the business. [½]

The auditors may have previously noted issues with the model and want to ensure that these issues have now been resolved [½]

If a model has been in place for a number of years it may have been appropriate in the past but over time the accuracy of the model may no longer be sufficient. [1]

e.g. due to changes to product features, [½]

e.g. approximations made in the past may not be acceptable now [½]

There may have been a fundamental model change since the previous audit [½]

Alternatively, this may be standard audit practice in this jurisdiction. [½]

[Total 7, Maximum 4]

(v) Product specifications [1]

Details of the products to include [1]

i.e. details of benefits [½]

for example, indexation of benefits [½]

Any options or guarantees [½]

Premiums payable [1]

Or key features or similar information which was sent to policyholders [½]

As the Company needs to be satisfied that the model reflects the product features the policyholders are expecting [½]

Reinsurance agreements... [1]

...both internal and external [½]

Expense agreements [1]

Signed off reserving methodology documents [1]

Policyholder data consistent with those used in the main model [½]

Details of any capital requirements [½]

Pricing and reserving assumptions [½]

... any two suitable examples of an assumption (½ mark each, max 1) [1]

[Total 11½, Maximum 6]

(vi) The level of materiality... [1]

... and what this is based on (i.e. reserves, cashflows etc). [½]

Does the materiality vary by product? [1]

What reporting period to use for testing... [1]

... and whether to use more than one. [½]

Which products to baseline? [1]

All or just the most material? [½]

What can be assumed to be correct and doesn't need to be baselined? [½]

e.g. data? [½]

Who will build the independent model? [1]

It cannot be the same team who built main model [½]

Who is signing off the results... [½]

... and what they require to see. [½]

Are they testing individual policies... [½]

... or overall reserves for all policies...	[½]
... or both?	[½]
Consider the time and resource available to build the model	[1]
... and associated costs	[½]
Is there any existing spreadsheet model framework that could be built upon?	[½]
	[Total 13½, Maximum 6]
	[Total 26]

This question was not well answered with the exception of part (i), where most candidates covered the uses of a model well. Only stronger candidates focussed on the cashflow aspects of the model to score well in part (ii), and in part (iii) many candidates did not identify the distinction between reserves utilising real data and pricing using model points. Candidates who scored well in the later parts of the question considered a breadth of reasons in each part and only the strongest candidates identified a sufficient range of factors to answer the question well.

END OF EXAMINERS' REPORT