

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2013 examinations

Subject SA2 – Life Insurance Specialist Applications

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.

D C Bowie
Chairman of the Board of Examiners

January 2014

General comments on Subject SA2

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 within the marking scheme. Whilst candidates are expected to show knowledge of the relevant content of the Core Reading, it is much more important in this exam to tailor answers and apply that knowledge to the specifics of the question than it is in earlier exams.

Comments on the September 2013 paper

In general, candidates showed good knowledge of the core reading.

Q1 (ii), Q1 (iii), Q2 (i) and Q2 (iii) served as good differentiators, with the better candidates applying their knowledge to question.

Q1 (i) asked for "checks", candidates that discussed the full EV calculation methodology did not score well. Well prepared candidates were able to take the information presented, do relatively simple calculations and, thus, comment on the relative size and sign of various items in the analysis of change.

Those that scored particularly well were able to tailor their answers to the specific product/company described in the questions, rather than discussing generalities.

Candidates approaching the subject for the first time should use this Report, and previous Examiners' Reports, to practice the application of knowledge.

- 1** (i) Disclosure of such an analysis is required under minimum disclosure guidance
To provide a reconciliation of the opening and closing embedded value
To assist in revision of bases by comparing actual experience against expected
To provide the management with the value of new business written in the year
To identify the individual sources of profit and loss and so indicate areas where action may be needed to take further advantage of profitable business or limit future losses
To identify unprofitable contracts so that they can be redesigned or repriced
To provide information that can be used as a measure of performance of different areas of the business and so as a basis of remuneration
The output can be used to validate the EV calculation

This bookwork question was generally answered well, but some candidates provided too short answers which didn't explain why the firm would perform such a task.

- (ii) **Opening EV:**
This represents the closing embedded value from the previous year end. It may include adjustments made to the result since it was submitted e.g. for errors spotted. Check should be performed to reconcile to previously reported number.

Expected return on net assets:

Net assets are the assets allocated to the in-force business which are not required to support the in-force business at the valuation date, i.e. the excess of assets over liabilities.

This item is the return on the net assets at the rate expected at the start of the period. The net assets are backed by equities which were expected to earn 10%, therefore the expected return is $30 \times 10\% = 3$. The report states the expected return is 4.5, which is more than the sense check performed. This suggests that the company has incorrectly used the actual return (15%) rather than the expected return (10%).

Expected return on in-force business:

This represents the expected change in the present value of in-force business before the surplus distribution occurred calculated on the economic and demographic assumptions at the start of the year. It therefore represents the unwind of the risk discount rate on the opening PVIF.

The assumed risk discount rate as at the start of the year is 5%, therefore the expected return is £1m ($\text{£}20\text{m} \times 5\%$). This is less than the result in the report and so the company may also have included here the unwind of the risk discount rate on the new business. Assuming that the new business is written uniformly over the year, this would be on average for half a year. Therefore the new business contribution would be approximately $\text{£}3\text{m} \times 5\%/2 = \text{£}0.1\text{m}$. There is still a small inconsistency in the expected return which needs to be investigated.

Experience Variance:

This represents the difference between actual and expected experience

on the surplus emerging during the year and on the value of the PVIF at the end of the year. Experience will include mortality/longevity, lapses, pups and expenses but should not include experience variances due to investment returns (and currency movements) as these are analysed separately.

The negative figures suggest that actual experience has been worse than expected. At a high level, could note that it is reasonable that both the net assets and PVIF have moved in the same direction, since adverse experience may negatively affect both profit arising during the year and the emergence of future profits. The overall magnitude of the changes relative to the total net assets and PVIF does not seem unreasonable.

However it is not possible to perform robust sense checks without further information. We would need to get this item split by type of experience variance and by product, particularly persistency on unit-linked pensions and longevity on annuities. We would also need information from experience investigations performed by the company. We could then check the analysis of change figures against sensitivities of changes to lapse rates etc, which have been performed elsewhere in the EV result. If we are not able to get the result split by type of experience variance it will be hard to check as there may be offsetting movements in the result.

Operating assumption changes:

This includes changes to the reserving basis which impacts both the net assets and the PVIF, and the EV projection basis during the year which impacts just the PVIF. This may include changes to demographic assumptions and to expenses. The item is the difference between the end of year results on the two bases at that point in the analysis. The impact of changes to the economic assumptions in the EV basis should be excluded from this item of the analysis as it is covered elsewhere.

In order to sense check the impact, we need to see the breakdown of the result between each separate element of the basis, and whether the valuation basis and/or EV basis which has been changed. Could then sense check these against other sensitivities performed by the company, and also look at information produced by the company on reserving calculation sensitivities

The fact that the net assets have increased slightly suggests that the reserving assumptions have overall been weakened a little (lower reserves). This might simply reflect better than expected experience. However, this would seem to contradict the experience losses shown in the previous row of the table – so further investigation is needed. Lower reserves would in turn reduce the PVIF. But the PVIF has increased overall, suggesting that changes to the experience basis assumptions have been made to reflect expectations of better future experience. Whilst this may be consistent with the change in reserving basis it also contradicts the actual experience losses illustrated in the table. Generally the movement in the PVIF appears large relative to the base PVIF

The changes to experience assumptions appear to have been more significant than the changes to the reserving assumptions, since the PVIF has increased

by significantly more than the net assets. Overall that suggests that the reserving basis might actually have been strengthened overall i.e. a greater margin between reserving assumptions and expected experience. This would need to be checked with the reserving actuaries

New business contribution:

This represents the contribution from new business written during the year. The contribution to net assets broadly reflects the new business strain incurred by writing this business due to reserving strain and initial expenses. It therefore is reasonable that it is negative. The contribution to PVIF is the present value of all future cashflows relating to that new business on the year end embedded value basis. It would be expected to be positive in order to recover the initial loss. The overall contribution to EV is positive, which is consistent with writing profitable new business

The figure can be checked for consistency with other reported new business results in the company. The volumes can be checked against reported premium volumes. The implied profit margin can also be checked for reasonableness

Closing EV:

This represents the year end calculated EV and should equal the total of the previous rows of analysis (including those figures not shown in the given extract), subject to any “unexplained” balancing item which would be expected to be small.

This question was a good differentiator with most students providing sense checks where applicable and stating additional information required to perform more detailed checks. Better students linked the information in the table together by, for example, noting the inconsistencies between the operating assumption change and experience variance. A number of students failed to read the question correctly and, wrote about actual returns on the net assets in the section covering expected returns on the net assets, and wasted time by writing about rows which have no values attributed to them.

(iii) **Annuitants:**

EV projection basis mortality rates have been “weakened” to assume that policyholders live less long, but the mortality rates remain unchanged for the reserving basis. Therefore the prudence margin in the reserving basis, i.e. the difference between this and the more realistic EV projection basis has been strengthened

We would expect the net assets to remain unchanged as no change to either the assets or liabilities. We would expect the PVIF to increase because the prudence margin which is released in the PVIF is higher. Equivalently, the overall reserves being released are the same but claim payments are lower due to the expectation of annuitants living less long.

There may be a slight offset due to the impact of discounting. This is because the immediate annuity business is likely to be backed by fixed interest assets and the year end risk discount rate exceeds the assumed fixed interest investment return.

Unit-linked pensions:

Lapse rates have reduced for both the reserving basis and the EV projection basis whilst the prudence margin between the bases has remained broadly unchanged. The direction of the margin implies that a higher lapse assumption is prudent. This would be the case if the majority of the non-unit reserves were negative (which is allowed under certain conditions), or, in the case of positive non-unit reserves, if the projected expenses were adjusted to allow for the impact of the higher lapse assumption on per policy expenses (i.e. higher projected expenses and hence higher non-unit reserves).

It is reasonable to assume that there are few cases with positive non-unit reserves on specific policies where per policy expenses have not been reduced sufficiently to ensure that lower lapses result in a lower reserve.

Therefore it is assumed that overall, lower reserving lapse assumptions are likely to reduce non-unit reserves or equivalently, make them more negative if negative non-unit reserves are held. *[Marks were awarded for reasonable explanations of reserves moving either up or down]*

Unit reserves will be unchanged, so overall net assets will be increased or decrease. This is consistent with the figure in Table A.

The PVIF for the unit-linked pensions will reduce due to lower release of non-unit reserves. However, the PVIF will also increase due to the higher value of future profits (from charges less expenses) on those policies which were previously assumed to have lapsed before the EV projection lapse rates were reduced. Additionally, there may be a second order impact on EV expense assumptions due to changes in volumes of policies

If the company only holds positive non-unit reserves (and zeroises negative non-unit reserves) then the non-unit reserves may not have reduced by as much as would otherwise be the case, and the latter (increase in future profits from charges) would be expected to exceed the former (reduction in reserve release) materially. This is since positive non-unit reserves would normally only be held for a minority of policies, often the smaller ones. Overall the impact would therefore likely be a material increase in PVIF

However, if the company also held negative non-unit reserves, then the two PVIF impacts would broadly offset each other given the similar changes in bases and ignoring any potential second order effects of differences in the valuation rate of interest, assumed earned rate and the EV risk discount rate.

The movements in Table A (high PVIF change) therefore suggest that negative non-unit reserves are not held. However, the PVIF change in Table A is a total and might be largely attributable to annuities and so this cannot be concluded with certainty.

Most students picked up the key points but failed to expand their answers. Only well-prepared students considered the potential impact on non-unit reserves in adequate detail. Many students did not consider how the prudence margin had changed and the implications of this.

- (iv) The company can no longer offer commission, so products will have to be sold on the basis of adviser charging, or consultancy charging if some of the business is group pensions. These are effectively fee bases where the fee amount is agreed between the client and adviser.

The company may set up an arrangement with the adviser whereby the fee is carved out of the premium so that it appears very similar to commission. However, it would not be possible to do this on an up-front basis because the RDR requires the timing of payments to advisers to coincide with payments from policyholders. 'Factoring' of commission, where a lump sum is paid in lieu of future payments from policyholders is not allowed. Therefore the arrangement is likely to be moved to a renewal fee basis paid in line with premiums on either a percentage of premium or percentage of fund basis.

The company may need to reprice the products following the removal of commission. For example it may no longer be necessary to include high initial charges

It may need to consider if there are any impacts of the changes to the expected decrements. Changes to the adviser remuneration structure may impact short-term surrender rates. It will also need to consider if there will be any impact on expected new business volumes and how customers react to an explicit fee. This will depend on support from financial advisers for the new product types in the new environment. The re-priced products may appear more attractive to potential policyholders. However the premiums invested may be lower, if the policyholders consider fee + premium as now equivalent to original premium. If policy volumes and/or size are expected to change then the firm may need to consider the impact on per policy expenses due to spreading fixed costs. If the target market is changed then may need to consider the impact on future demographic assumptions (e.g. more affluent target market). The firm may also need to consider the impact on future increments.

In addition, system changes and changes to policy literature may be required.

This question was answered reasonably well with most candidates picking up the core marks. Candidates who did better considered the implications of RDR on the potential fee arrangement, decrements, new business and systems.

2 (i) Market risk

Market risk is the risk that as a result of market movements, a firm may be exposed to fluctuations in the income from, or value of, its assets, or the amount of its liabilities.

Sources of market risk include:

- movements in interest rates
- market value of equities
- movements in exchange rates

None of these sources of risk is independent of the others.

The company is exposed to these risks mainly through the guarantees offered on this product. Market movements could result in the policyholders' fund values falling. In this case, fund management charge income will be lower than expected and the guarantee income charge may be lower than expected if the charge is a percentage of the fund. If policyholder fund values fall there is also a risk that the fund cannot support the guaranteed withdrawal benefit amount. It may that it drops to below the amount of the next guaranteed annual payment, which could be the case for an older policyholder with an established policy. Or that the fund value is lower than the value of expected future withdrawal payments. These effects could be larger in the higher equity ratio funds, which is exacerbated as the policyholder can choose the fund themselves.

There is also a risk that the fund value increases significantly, but temporarily, just before the policy anniversary, i.e. at the point at which the guarantee base fund is reviewed.

The market risk will increase with higher withdrawal percentages.

There is an increased market risk from the 3% deferral fund increase guarantee. There is a risk that policyholders anti-select against the company and chose not to take a withdrawal at times when the fund value is low. The withdrawal benefit may not be sustainable if actual fund value increases do not keep pace with this guaranteed 3% increase, particularly if more policyholder funds are subject to this increase than were expected during pricing (i.e. fewer early withdrawals). Therefore the company will either make a smaller profit than expected or the fund may run out before all future withdrawal benefits are paid

Credit risk

Credit risk is incurred whenever a firm is exposed to loss if a counterparty fails to perform its contractual obligations including failure to perform them in a timely manner.

The company may choose to reinsure all or some of the guarantees this exposure to a reinsurer which comes with the credit risk that the reinsurer may default on its obligation. Alternatively the company may choose to manage the guarantee costs themselves. This could be done using derivatives which would in turn come with credit risk against the derivative provider.

Assets other than derivatives may be held to back the cost of guarantees or to back additional capital requirements for this product. Such as corporate bonds, which have credit risk; the counterparty could default on coupons or the principal amount. Or a bank could default against any cash held there.

The company also has exposure if assets held in policyholder funds default in the same way as above, although the policyholder usually retains this risk.

However, as the company has promised an annual withdrawal benefit it is likely still to be obligated to pay this irrespective of default in the underlying fund. Similarly falls in unit fund values due to defaulted assets will reduce charges received

The company may have exposure to losses from the failure or poor performance of third party companies used for admin outsourcing or used for investment management. If the products are distributed using financial advisers, the company may have exposure to them failing to fulfil their obligations.

Operational risk

Operational risk is the risk of loss, resulting from inadequate or failed internal processes, people and systems, or from external events.

This is a complex product to administer and therefore comes with a high potential system failure risk and a risk of inadequate staff training. As this is a new product the risks are increased. Admin systems could fail to calculate policyholder benefits correctly, with the requirement to track both the actual fund value and the guarantee base fund. They could fail to apply an increase to the withdrawal benefit when the annual fund review should result in one. They could fail to apply the annual deferral guarantee increase correctly. *[Marks were awarded for any sensible examples]*

There is increased operational risk from potentially applying a different guarantee charge to each fund.

There are operational risks around the payment of the regular withdrawal benefit to customers. There is an operational risk around what happens if a policyholder's fund reduces to zero while still alive as there is no fund to pay the benefit from but the policyholder must still receive it.

There is a high potential risk of mis-selling given the complex nature of the product and the guarantees attached. The degree of this risk will depend on the distribution method chosen.

There is a risk of internal fraud by an employee and policyholder fraud, e.g. money laundering. There is a legal risk if policy conditions are not appropriately worded. There will be an operational risk of unit pricing errors. There is a risk of failure of appropriate management governance and controls.

Reputational risk could arise if errors are made. The potential for administrative errors could increase if significantly greater volumes of the product are sold than anticipated. There may be a risk of regulatory or tax changes that would reduce the relative attractiveness of this product. There is a risk of miscalculating the correct price to charge for guarantees due to operational error. There may be a risk of incurring a regulatory fine

This question was a good differentiator with most candidates achieving the bookwork marks but only well-prepared candidates provided enough risks and sufficient detail for the number of points available. A number of candidates considered risks outside the categories required for the question and hence wasted time. Poorly prepared candidates did not consider risks specific to the product and instead provided generic risks.

(ii) **General**

The company should produce regular management information to monitor risk exposures and management should review this on a regular basis, and act accordingly. It should have defined governance arrangements and controls Pricing should have appropriate margins which should be reviewed and actions taken as appropriate. Adequate reserving margins and solvency capital requirements should be held.

Market risk

There should be clear rules and limits for any decisions made around market risk or investments. The company should do careful work around the interactions of different market risks to fully understand the exposures it has. It should also do sensitivities of the guarantees to the market conditions to ensure it understands the risks to which it is exposed, or through stochastic modelling.

The company could take out reinsurance for the risks it faces on this product, which could be on a fully or partly reinsured basis. It may want to reduce the reinsured proportion over time once it develops its own expertise. Alternatively it could use derivatives, such as tranches of equity put options, but this would require a high level of expertise, as the hedging techniques for this type of product are very complex.

The company should restrict or prevent the option of switching between funds

Credit risk

To mitigate the risk of reinsurer default the company could request collateral to be held in respect of this arrangement. To reduce exposure to one reinsurer in particular, the company could use a panel of reinsurers and spread the risk, and focus on reinsurers with high credit ratings.

To reduce both the market risk and credit risk associated with potential default on assets held, the company can restrict the exposure to any one party. Or only invest in assets from a company with a high credit rating.

It could take out credit derivatives against any corporate bonds held, though this in turn will introduce another counterparty for credit risk exposure. Collateral could also be requested against any derivatives held.

Robust service level agreements should be put in place with third party providers and due diligence done before any such arrangements are put in place. The company should aim to deal only with reputable financial advisers

Operational risk

The product design could be simplified to reduce the risk of operational error. The company should have a high level of automatic checking and controls around the admin and unit pricing systems used, and any developments made to them for this product should have been thoroughly tested to ensure the system can withstand the complexities of this product.

Administrative staff should be well trained and staffing levels should be adequate. Processes and systems should be well documented. The sales force should be trained up to thoroughly understand the features of the product and policyholder suitability. Sales literature should be comprehensive and outline all the risks. The company could perform a customer satisfaction survey to monitor for reputational/mis-selling issues. To reduce the risk of fraud staff should be vetted and trained in anti-money laundering. The company may be able to lobby against potential adverse tax/regulatory changes. New business volumes should be capped to reduce the risk that the administration teams can't cope.

Well-prepared candidates scored well by considering all the risks raised in part (i). As in (i) poorly prepared candidates provided responses related to general risks rather than those specific to the product.

- (iii) There are a number of different guarantees on this product; the withdrawal benefit itself, the deferral fund increase of 3% p.a. and the increase in guarantee base fund to the current fund value if higher. The company needs to consider the potential cost of all these when calculating the charge.

As the percentage of the fund that can be withdrawn varies by the age at which the first withdrawal is taken, this needs to be factored in when calculating the guarantee charge. The company will also need to consider whether these percentages are also a variable in the pricing exercise or whether they are in effect fixed due to other factors, e.g. to be competitive. If they are also a variable, there will be an interaction between them and the level of charge where the best balance should be struck. This may depend on competitors' products.

As there are six different funds a policyholder could invest in, the charge is likely to vary by equity content and the company needs to consider how the cost of the guarantee varies by fund equity content.

The company will also need to make assumptions about the demographics of its customers where this would impact the guarantee cost. For example, age at first withdrawal (as this affects the withdrawal percentage), average deferral period (as this affects the number of 3% p.a. increases to the guarantee base fund) and mortality/longevity assumptions (as this will affect how long the

withdrawal benefits are paid for). Full withdrawal (or transfer) rates for the product will also impact the potential guarantee cost. These could be anti-selective / dynamically linked to the value of the guarantee, e.g. higher full withdrawals when the guarantee is less advantageous to the policyholder.

The demographics will be impacted by socioeconomic group as the target market is more likely to be affluent, which is likely to be reflected in the sales channel used. The average fund size and/or average premium may be considered and whether the charge will vary with this.

The company will also look at stochastic market assumptions to understand how the cost of the guarantee could vary with market conditions.

This question was a good differentiator with well-prepared candidates scoring highly by considering the features of the product and the impact of the target market on the demographic assumptions, and stating reasons why these would influence the cost of guarantee.

- (iv) The company could reduce the equity proportions in each of the funds it offers as a lower equity proportion should result in less volatile fund values. This could also be done by only offering funds with lower equity proportions.

It could reduce the deferral increase guarantee, e.g. to 2% per annum, or 1% per annum, or remove it altogether.

It could put a maximum on the annual increase in guarantee base fund when it is compared to the fund value or remove that element of the guarantee altogether or make the guarantee charges reviewable.

The withdrawal percentages by age could be reduced or fixed for a certain period rather than life or wider age bands used before the next step up. Alternatively the company could keep the withdrawal percentages but have a mandatory deferral period initially for the same withdrawal levels.

Candidates generally scored well on this question but those who did better gave sufficient examples to support the points made.

END OF EXAMINERS' REPORT