

EXAMINATION

April 2007

Subject SA2 — Life Insurance Specialist Applications

EXAMINERS' REPORT

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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Chairman of the Board of Examiners

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Comments

These are given in the solutions that follow.

Generally candidates answered the bookwork type questions well but some struggled with expanding on the details of the other questions, and many stuck to listing points. Q1(vii) was particularly poorly answered.

1 (i) Manage the longevity risk

The company could simply accept the business risk and ensure they understand the risk by investigating their mortality experience carefully, and by keeping up to date with industry research.

When pricing annuities, the company should include an allowance for future mortality improvements in the pricing basis, it could also load in a significant prudential risk margin into the basis.

They can diversify their longevity risk (e.g. across different products, countries or socio-economic groups). In doing so they should ensure the overall risk exposure of the company is balanced to get the diversification benefits.

They could reduce the risk of random fluctuation in longevity experience by selling higher quantities of business or by entering the bulk annuity market.

Alternatively, they could reduce overall longevity risk by withdrawing from the annuity market or placing a maximum on the volume of business sold.

They could reinsure some or all of the longevity risk with a reinsurance company. They would need to weigh up the costs of this versus the reduced risk.

The company could sell with profits annuities that pass some of the longevity risk onto the policyholders.

If the annuities are currently sold within a shareholder fund, they could write them instead into the with profits fund and thus share the longevity risk with policyholders. Note that this does not actually help in the management of the risk, but it passes some of the risk onto policyholders and so other measures will still need to be taken to manage the risk.

They could use securitisation to pass the risk to another party, again the costs would need to be considered.

They could manage the longevity risk by using mortality-linked securities such as longevity bonds, annuity futures, options, OTC mortality swaps or futures.

The company could offer different annuity rates for different types of life (e.g. different states of health, different socio-economic groups, different regions).

They could then use underwriting to manage further the resultant risk.

This question was generally well answered with most candidates picking up the obvious points; better candidates obtained marks around talking about diversification. No marks were awarded for checking to see whether the lives were still alive since this is more an issue around the claims process rather than the longevity risk.

(ii) **Additional risks associated with impaired life annuities**

Underwriting is the greatest risk for enhanced annuities, i.e. correctly estimating the extra annuity payment afforded by a particular medical condition.

There may be a lack of available data on life expectancies relating to different forms of impairment/levels of smoking. This makes the pricing particularly difficult.

If there are only relatively few cases with similar conditions then the company will not get the benefit from averaging of experience for large homogenous groups.

Another risk is of substantial increases in life expectancy brought about by improvements in treatments for key conditions underwritten in the enhanced annuity market.

The policyholder could stop smoking or introduce other lifestyle changes, e.g. embark on a fitness regime which would increase his/her life expectancy. This could invalidate the pricing basis.

There is a risk of fraud and/or non-disclosure, e.g. lying about smoking habits or about the seriousness of a particular condition.

There is a risk of regulatory change, outlawing the use of differential annuity rates.

There could be bad publicity, if this move is interpreted as encouraging smoking.

The company has not sold this business before, and if not enough business is sold, and marketing levels are not attained, then the development costs may not be covered.

Anti selection could occur if the definitions of impairment are weak, leading to relatively healthy people fitting into the impaired category, or if people smoking only a few cigarettes take out the policy as a smoker. There is also a possible anti-selection risk if the company also continues to offer standard annuities as it will have to allow for the increased longevity risk of those taking up standard annuities, which on average may now consist of healthier lives.

However, this will depend on the extent to which the company is already exposed to some anti-selection in its normal annuities due to competitor companies already offering impaired life annuities. Also, if standard rates need to be repriced due to the increased longevity risk of those taking up standard annuities, volumes of those taking out those standard annuities may drop if they find cheaper rates with companies who do not offer impaired life annuities.

There is a risk that the company under-estimates the impact of this anti-selection on its normal annuities.

This question was answered well by the majority of candidates. The most common points missed were around the lack of data resulting in a lack of averaging of experience, and the level of detail around the anti-selection risk.

- (iii) Factors to consider when determining the design of the with profit annuity contract:

The contract will need to provide the required level of profit, and the sensitivity of profit needs to be considered. The profit will be sensitive to levels of new business since lower new business may mean that development costs are not recouped. Profits will also be sensitive to longevity.

The aim of immediate annuities is to remove the uncertainty of how quickly capital should be spent to provide income over the consumer's remaining lifetime. The with profits version allows the policyholder to take on some investment risk, but maintains a level of guarantee.

The target market and the suitability of this contract to meet the target market should be considered in light of this.

The level of RB compared to TB may affect the marketability of this contract, for example customers may expect RB to be at least as high as their ABR. However, higher RB increases the guarantee risks, and so these two factors need to be considered together.

There are few providers of this type of contract in the UK and so the market is not as competitive as for without profits business.

These contracts can be differentiated by the following features:

- Need to consider the proposed level of ABR relative to those offered by competitors, and whether the ABR can be changed by the policyholder.
- Need to consider what investments to use to back the product and also should compare this with what competitors use. Consideration needs to be given to the amount of fixed interest versus real investment, and whether the long duration of the liabilities can be matched.

- Need to consider the level of guarantees offered by competitors — e.g. whether the income is guaranteed not to fall below a certain level, whether there are any guarantees on the levels of bonuses to be declared, whether mortality rates are guaranteed.

The level of capital requirements and how these are affected by the level of onerousness of the guarantees should be considered.

Consideration should be given to any expense cross subsidies e.g. between small and large policies, and new and existing policies.

The extent of any smoothing of investment returns also should be considered, since this can affect the level of capital requirements.

The annuity payments could increase or decrease, which is different to non-profit annuities which remain level or possibly increase with an index. The systems may need to be adapted.

The Company may wish to consider reinsuring the longevity risk and so the terms on which it could do so should be considered when pricing the contract.

Although the policyholders are willing to take some investment risks, the contract is sold to give income to retirees, and as such there should be a low probability of the annuity decreasing below the initial amount. The concept of treating customers fairly should be considered at all times. ABR ranges should be set with this in mind and the investment mix should be sensitivity tested.

The policy literature should set out clearly the risks involved so that the policyholders are fully informed and aware of the risks they are taking on.

Consistency with existing products is also important, the company should ensure that the annuity rates are consistent with those offered on without profit annuities, and that the practices around the management of the with profits element are consistent with current practices as set out in the PPFM.

This is a complex contract and so this should be considered when deciding which distribution channels to use..

Risks

A major risk with immediate annuities is longevity, particularly with regard to understating the rate of improvement of life expectancy.

It is also possible that some anti-selection risk exists to the extent that there is any free choice available to the policyholder regarding the purchase of the contract. In addition this could also affect the ABR chosen (e.g. those in ill health may choose a high ABR to achieve the highest possible starting annuity and vice versa).

As this is a with profits contract the company also faces investment risk due to any mismatch between the guarantees and the assets backing those guarantees.

The company could match the guarantees precisely using bonds but this would not lead to competitive returns, therefore it is very likely that the company would choose to mismatch. They may use corporate bonds in order to offer more competitive rates, but this would introduce credit risk.

The company should also consider any correlation of investment risk with longevity and with levels of guarantees.

There is a risk that expenses are higher than expected, in particular the ongoing administration costs will be higher than for a non-profit annuity e.g. due to the setting of bonus rates. There is also the risk that expense inflation is higher than expected, although it may be possible to match this with index-linked bonds.

Too much business may cause new business strain or admin capacity problems, and so the company needs to investigate the systems implications.

The current market for with profits annuities is small and the development costs (e.g. marketing and systems costs) may be high. If volumes are low it could take some time before these are paid back. This risk is exacerbated if other companies enter the market with more attractive products or bonus rates.

Smaller policies than expected could lead to different profits than expected if the profit varied by model point, similarly, if the mix by socio-economic group /location is different than expected, this could invalidate longevity assumptions.

There is a risk that the policyholder may complain if their annuity reduces from one year to the next; particularly if it wasn't made very clear to them that this may happen. There is also the risk that the policyholder does not understand the contract. This is why the risks need to be mitigated by ensuring clear and open communication.

Reputational risk might also arise from poor servicing, e.g. if admin systems do not cope well with the new product.

Risks which could be passed onto the policyholder

Since this is a with profits contract, it is possible to pass some of the longevity risk onto the policyholder by deducting the actual cost of the annuity payouts from the asset shares as opposed to deducting a charge from asset shares where the basis of the charge is guaranteed. This would then affect the level of the bonuses.

However, this would have to be very clearly stated in the policy literature and the company runs the risk of adverse publicity if bonuses fell due to longevity (particularly in times of good investment performance).

Charges to asset shares could be increased if it is clearly stated in the policy literature (or bonuses could be reduced), however customers need to be treated fairly and so the extent to which the expense risk can be passed on may be limited.

Deferral of bonus distributions passes some of the investment risk onto the policyholder, however, the extent to which bonuses can be deferred will depend on treating customers fairly particularly those who die early and who will not benefit from the deferral.

The company could introduce variable investment guarantee charges to pass some of the investment guarantee onto the policyholder.

This was reasonably well answered with most candidates listing the main factors and risks. The better candidates went into more detail giving examples and explaining the points further. Few candidates mentioned comparing competitor's products features such as levels of guarantees, mortality guarantees and flexibility of the ABR. One part which was not so well answered was around the passing of risks onto policyholders.

(iv) **Setting the initial annuity**

The initial premium less initial expenses should be equated to the discounted value of the projected guaranteed annuity payments plus renewal expenses. Best estimate assumptions (possibly with some allowance for prudence), for mortality, mortality improvements, expenses and expense inflation should be made.

Allowance would be made for the annuity reducing over time in line with the ABR.

These cash-flows should be discounted at the best estimate rate of return (or risk free rates may be used).

An allowance for future bonuses should be made reflecting what the company expects to pay. The assumptions for future bonuses should be consistent with the assumed future investment returns used in the discount rate.

If using a profit test approach some allowance for cost of capital may be required.

The company may wish to simplify this by discounting the annuity payments at a net rate equal or close to zero (effectively discounting the initial annuity at the EBR). This assumes that any investment return earned in excess of this is available to declare as bonus.

Competitor's rates should be considered when setting the initial value.

Sensitivity testing could be done to see the effect on the initial annuity of different mortality.

This relatively straight forward question part was answered reasonably well by many candidates, although many failed to mention that the premium needed to be equated to the benefits and expenses, and tended to treat this as a question around profit testing.

(v) **Setting Bonuses**

The company needs to consider the setting of both RB and TB.

Setting TB for this contract is more complex than for traditional business as bonuses need to be distributed fairly over time to ensure consistency between those who die early and those who survive longer as opposed to for conventional business where ensuring equity on the date of maturity is the main concern. Since there is little benefit on death, deferring the bonuses too much would not be fair to those who die early.

The long term aim will be for the total bonuses allocated to increase in line with the long term investment return (allowing for any expenses not allowed for in the premium). So for example if the long term investment return is 6%, and the ABR is 5% then the annuity will increase by a total of 1% over the previous year.

The company will need to put some bonus rules and long term targets in place otherwise there would be too many variables to consider. These rules could include:

- TB/RB relationship, for example the proportion of bonus allocated as TB may be targeted to be a set % of the total bonus, the % might vary by duration.
- The long term aim may be for RB to be a set % p.a.
- TB might be set as a fixed % which may vary by duration.

Asset shares will need to be calculated. Bonuses could then be set by comparing the asset share with the present value of the future annuities allowing for existing guarantees and the expected future bonuses consistent with investment return assumption and the bonus rules.

Smoothing

The company would also need to consider smoothing:

- The company may wish to set a period over which the above rules could be smoothed in. For example after a very poor return the company may decide that the long term rules above should be smoothed in over 5 years rather than reducing bonuses drastically in the following year. For example smoothing could be done by taking an average investment return over recent years.

- The company may not want the bonuses to vary too much from last year's bonuses and so there may be a limit as to how much the bonuses can be changed.

Other considerations

The company will also need to take the following into account:

- Policyholders' expectations, these will be based on what the company has done in the past as well as any literature the policyholder has seen and the PPFM/with-profits guide etc.
- Competitors' RB rates
- There may be a desire to ensure that total bonuses declared is at least equal to the maximum ABR (to ensure those on the maximum ABR do not see a reduction in their annuity). Shareholders may also have preferences as to how bonuses are distributed as this may accelerate their transfers.

RB increases guarantees and hence capital requirements increase. The asset shares could be compared to the present value of guaranteed benefits to determine the scope for further RB. Alternatively, stochastic projections could be performed, projecting forwards the asset shares to determine whether the cost of guarantees is considered too onerous. If so, consideration may be given to distribute more as TB and less as RB.

In these calculations, consideration would need to be made as to the future RB, management actions could be used in adverse scenarios to reduce RB.

If only very low levels of RB were affordable, then the company could consider changing the investment mix.

This question was looking for a good grasp of bonus setting, and was reasonably well answered by some candidates. However many failed to consider smoothing except for just mentioning it with no explanation. Some candidates treated this contract as if it were an endowment and failed to consider equity between those who die and those who survive. Many candidates also failed to mention that some rules around the level of TB/RB or the relationship between the two would need to be set.

(vi) **Calculation of the cost of the guarantee**

It is unlikely that a deterministic approach or even a closed form solution would adequately be able to allow for the future bonus declarations. Hence, stochastic modelling would be used to project forwards the asset shares.

The projected asset shares would be the premium accumulated at the investment returns less expense charges less charges for guarantees and capital support less projected annuity payouts.

The setting of the charge will be iterative as the charge will affect the cost of the guarantees through the reduction of the asset shares so an initial assumption for the charge needs to be made in order to value the cost.

The projection period should be long enough to allow for the long nature of the contracts, and an approximation at the end of the projection period would need to be made to allow for any outstanding liabilities which should be a deduction from the asset share at the end of the projection period.

A cost occurs if at the end of the projection period, or when the policyholder dies if earlier, the asset shares are negative.

This cost would need to be split between the cost of the guarantee and any cost of smoothing. The smoothing algorithm should be chosen such that the cost of smoothing is neutral. These guarantee costs would be discounted back to the valuation date at either the risk free rate or the earned rate depending on what the company decides the guarantee reserve is to be invested in, and also on whether the company wants to use a market consistent approach or not.

Note no additional allowance is made for risk in the discount rate as this would decrease the cost of guarantees.

1000s of simulation would be used, and the costs of the guarantees over all the simulations would be averaged to give the expected cost. However the company may choose to base the charge on a percentage other than the average, in which case it would have to use a real world approach for scenario generation.

The projection basis used should in the main be best estimate although some prudence may be required due to the long term nature of the contract and the uncertainty around longevity.

Assumptions would need to be made as to the bonuses to be allocated in the projections, and these should take account of TCF and smoothing. Assumptions also needs to be made as to the expected asset mix.

The RB should be dynamically linked to the level of the asset shares, and management actions around linking investment mix to levels of guarantees may also be assumed. TB declarations should be modelled to follow how they are expected to be applied in practice.

The investment returns could be market-consistent or real world, but should be consistent with the discount rate used.

Sufficient model points should be chosen to give a good spread of sizes of contracts, ages and levels of ABR. Discussions around the model points should be had with the marketing department.

Calculation should be based on expected mortality allowing for future improvements. If mortality risk kept by company then may want to use prudent assumptions.

The company could consider a stochastic mortality model, taking into account correlation with market risk, although there is limited consensus at present on appropriate stochastic mortality model to use.

The model should allow for expenses and inflation. Inflation could be modelled stochastically consistent with the investment scenarios.

This question part was answered well by some candidates but many did not write enough for 12 marks. The areas where relative few marks were picked up were around the importance of setting the mortality rates and around how to measure the guarantee. Some discussed how the guarantee cost occurred when the reserves were higher than the asset share rather than when the funds actually ran out. Few failed to mention the length of the projection term and what approximations needed to be made at the end of the period. The better candidates discussed both the assumptions and the dynamics of the assumptions.

(vii) **Charges for capital support**

“asset share charging approach”

this method can apply a charge to the asset share either as a deduction to the investment return on asset shares, or apply a charge to the asset share on claim.

Advantages:

- it is simple to apply and understand
- it is the method used by many companies

Disadvantages:

- it does not reflect the extent to which the capital support is required at any given time
- any increase in the required capital is not automatically reflected in the charge made
- it will unfairly charge contracts with high asset shares and low capital requirements

“capital support charging approach”

Advantages:

- it automatically increases as capital requirements increase
- it copes automatically with any changes in the asset mix as this will change the ICA levels, and so charges fairly for the increased risk

- it charges each policy fairly and equitably for the level of capital support it actually needs

Disadvantages:

- it is complex to apply and more difficult for the policyholder to understand (particularly as how the company's ICA is not described in the PPFM or other literature)
- it would involve calculating the individual ICA for each contract which may not be possible
- the company would need to consider how to deal with any diversification benefits between different policies

This question part was looking for candidates to apply their knowledge to the specific issue of allocating a charge for capital support. The question part was generally poorly answered with most candidates picking up just 1 or 2 marks. The points candidates tended to get were that charging via asset shares was easy to do and simple to understand but that the alternative method was fairer. Few explained why the alternative was fairer. Some discussed the difficulties of the first approach when asset shares were negative without considering that it would be impossible to make a charge under any method if asset shares were negative. Few candidates made points such as the capital support charge changing with the capital requirements, or with equity backing ratio.

- 2** (i) The main duties of the actuarial function holder with regards to their ability to meet liabilities to policyholders, as described in GN40, are as follows:
- Use judgment to decide which risks need monitoring, and at what frequency, and advise the company accordingly.
 - Advise the company in writing of the actions that could be taken if the solvency of the company were to deteriorate, or capital requirements were to increase, as a result of actions outside the company's control.
 - Liaise with the With-Profits Actuary to ensure he or she is aware of advice by With-Profits Actuary and relevant decisions taken by firm in so far as they affect liabilities to policyholders.
 - Ensure that the company's management are aware at all times of the Actuarial Function Holder's interpretation of PRE and any other obligation to treat customers fairly, except where this is covered by With-Profits Actuary.
 - When a material change takes place to the company's business plans, take all reasonable steps to ensure that the company appreciates the implications for fairness and reasonable expectations of policyholders.

- When the company also carries out general insurance business, consider that business to the extent that it might impact on the long-term insurance business.

This relatively straightforward bookwork question part was generally poorly answered with candidates failing to recognise that this question arises from a specific section of GN40.

- (ii) Under Pillar 1 Peak 1, a statutory valuation, that meets the minimum EU standards, will be carried out and under Pillar 1 Peak 2, a realistic valuation.

The life insurance company's reported solvency result, will reflect the more stringent of these two valuations.

Under the peak 1 valuation, the mathematical reserves would be calculated using a prospective valuation method, whereas under Peak 2, the starting point is the with profits benefit reserve. For this reserve, the company has the option to use either a prospective method or a retrospective method. If using a retrospective method, this would be the asset share, these are then adjusted:

- An additional amount is added to the with profit benefit reserve to allow for the market consistent cost of guarantees, smoothing, and planned benefit enhancements.
- Credit is taken for any future deductions that will be made to asset shares to allow for the cost of guarantees.

For the cost of guarantees, smoothing and options, a market consistent valuation must be used and therefore stochastic modelling techniques are likely to be used.

Under Peak 1, a realistic basis life firm is required to value options (e.g. guaranteed annuity options on with profits business) using stochastic techniques.

Under peak 1, approximate methods can be used if it can be demonstrated that they are prudent and don't materially affect the overall result, this is partially true for peak 2.

Under peak 1, prudent assumptions, with appropriate margins for adverse deviation should be used.

A realistic basis life firm may make a prudent allowance for lapses in the valuation of the with profits business under the peak 1 valuation.

The valuation rate of interest to be used for calculating the mathematical reserves cannot be greater than 97.5% of the risk-adjusted yields on the assets backing the with profits liabilities, where risk-adjusted refers to an adjustment to yields to allow for the risk of default. For equities, this yield is based on the current dividends & earnings.

Under peak 2, the main requirement is that the parameters used to value the liabilities are realistic best estimate assumptions, as opposed to being prudent assumptions containing margins for adverse deviations, as under peak 1.

Under Peak 1 (for realistic basis life firms), no allowance is needed for future annual bonus.

Peak 2 requires more complex stochastic modelling than under Peak 1 and is likely to include more complex future management actions, such as:

- varying bonus rates according to the economic conditions
- varying the equity backing ratio according to economic conditions
- varying the costs of guarantees to be deducted from asset shares according to economic conditions

This question part was fairly standard bookwork and most candidates answered this well.

(iii) **Capital requirements under each approach....**

Methodology

Under peak 1, in addition to the mathematical reserves, the company must have capital to cover the following:

- The long term insurance capital requirement (“LTICR”), which is equivalent to the EU required minimum margin, that existed under FSA rules prior to 31 December 2004; and
- The resilience capital requirement (“RCR”). This is a resilience reserve which the firm must hold.

Under peak 2, rather than defining an LTICR and RCR to be held in addition to the basic reserves, the regulations require the company to recalculate their peak 2 solvency results on a number of stress tests, and the additional capital required to cover the impact of these stress tests is called the risk capital margin (“RCM”).

Under peak 1, the sum of the LTICR and the RCR are referred to as the minimum capital requirement (“MCR”), and is subject to a minimum monetary amount as specified by various EU directives. No such minimum exists under peak 2.

Stress Tests

The RCR must be sufficient to cover the following 3 shocks:

- A fall in equity values of between 10% and 25%, depending on the relationship between the earnings yield on the FTSE All Share Index and long term gilt yields plus the average level of the FTSE All Share Index relative to its level over the previous 90 days.

- A fall in property values of between 10% and 20% depending on the relationship between current property values and their average value over the past 3 years.
- The more onerous of a fall or rise in fixed interest yields of 20% of the long term gilt yield.

The RCM stress tests include:

- A fall or rise in equity values of between 10% and 20% depending on the average value of the FTSE all share index over the previous 90 days compared to its current level.
- A fall or rise in property values of 12.5%.
- A fall or rise in fixed interest yields of 17.5%.
- An increase or decrease in assumed lapse rates of 32.5%; and
- On fixed interest securities, a widening of credit spreads.

This question part was generally well answered. Some candidates could not recall the actual stress tests, and a small number of candidates read the question to mean “discuss the ICA”.

- (iv) The with profits insurance capital component is equal to Admissible assets less Peak 1 mathematical reserves less LTICR less RCR less [Peak 2 working capital less RCM]

$$\begin{aligned} &= [65.0 - 2.3 - 1.8] - [60.0 - 5.5] \\ &= 60.9\text{m} - 54.5\text{m} \\ &= £6.4\text{m} \end{aligned}$$

The CRR = Max (ECR, MCR)

$$\begin{aligned} \text{ECR} &= \text{WPICC} + \text{LTICR} + \text{RCR} \\ &= 6.4 + 2.3 + 1.8 = £10.5\text{m} \end{aligned}$$

$$\begin{aligned} \text{MCR} &= \text{LTICR} + \text{RCR} \\ &= 2.3 + 1.8 = £4.1\text{m} \end{aligned}$$

Hence CRR = £10.5m

This question part was testing the application of the regulations and was generally well answered. Some candidates lost marks by not giving enough explanation, and in particular many missed the points around the minimum capital requirement, and did not test for the maximum of the two.

- (v) **Practical difficulties in calculating asset shares**

Life insurance companies often have difficulties in calculating accurate asset shares (either at a product class level or at individual policy level) primarily due to the very long term nature of some of the business and short comings in the data recorded for each policy/asset class on the books of the insurer.

Information will be required regarding the premiums paid by the policyholder in each year since the commencement of the policy i.e. premium records for

the last 20-30 years, particularly if policies have been altered (e.g. made paid up).

Whilst the main IT systems may record this level of information (and they may not especially for legacy business), it may be very difficult to extract this information for actuarial valuation purposes, due to the complexity of the data and the difficulty/cost in specifying the requirements and pulling the data off in the format required.

Information will be required regarding the expenses incurred by the company each year since the commencement of the policy/cohort of policies, and the expenses which are attributable to that cohort of policies.

Whilst the company is likely to have a record of the total expenses incurred each year e.g. by analysing the expenses reported in its annual company accounts, it is unlikely to have carried out a detailed expense investigation each year to ascertain how expenses should be apportioned between various classes of business, and various policy cohorts.

At best a broad brush approach may be used for many of the earlier years, when there is a lack of data available, by apportioning expenses based on factors such as sums assured or premium size or on a per policy basis, with the possibility of apportioning expenses more accurately in the most recent one or two years, when detailed expenses information may be available.

It is unlikely that the company would have the manpower or be willing to expend the effort/cost of carrying out a full retrospective expense analysis for each year.

Information regarding the cost of insurance cover for a cohort of policies will be required, this may not have been measured in detail historically.

Data relating to the miscellaneous profits that have arisen over time on various classes of non-profit business or from surrenders and lapses, that should be taken into account in the calculation of the asset shares will be required.

The life insurance company is unlikely to have very good data relating to the miscellaneous profits that have arisen e.g. on classes of non-profit business or on surrenders and lapses, over the years.

In the past it is likely that these profits were used to augment the free assets of the with profits fund, especially for a mutual life insurance company, rather than them being attributed to asset shares.

The costs of guarantees and capital support, is a relatively recent actuarial development that has taken place in the last 5–10 years.

Prior to this, life insurance companies are unlikely to have recognised the cost of providing guarantees (including implicit guarantees such as providing the level of regular bonus that might be anticipated by with profits policyholders)

and hence it is unlikely that life insurance companies would have an accurate calculation of this component of asset shares.

Model points may have to be used if there are too many policies, but as asset shares do not require stochastic projections, it's likely that individual policy asset shares can be calculated.

This question part was generally poorly answered. Many candidates listed the elements of the asset shares with very little discussion around the practical issues of setting the historic assumptions. As this is a mutual no marks were given for mentioning shareholder transfers. Many candidates went into detail around difficulties with systems and calculations. Given the level of computer power now this is unlikely to be a significant issue.

END OF EXAMINERS' REPORT