

**Subject F202 — Life Insurance
Specialist Applications**

2 November 2010 (am)

EXAMINERS REPORT

Question 1

- i. Describe how you would analyse the withdrawal experience, mentioning any problems you might encounter.**

This was a straightforward question. While many candidates scored well, some produced solutions that were too vague.

We would first want to perform checks on the data to ensure its accuracy. For example, performing checks against accounting data or independent valuation data.

We would need to choose a period over which to do the investigation. The longer the period the more data included, but the greater the risk of distortion by trends or changes in conditions.

A key variable in the analysis is duration in force. We would calculate the numbers of policies still in force at each duration as a percentage of policies originally written in the group.

We would have considerably more data for shorter durations in force (policy years 1 to 5) than for longer durations, as the business has been sold for only eight years. We would have no data for durations above eight years. We would probably have to group the data in first year, second year and durations thereafter to obtain sufficient credible data.

We might consider the experience on similar product lines to help guide in the setting of the assumptions, particularly those for longer durations. Also industry experience could be helpful.

One problem is that, because of the falling volumes, the bulk of the shorter duration data is from a few years ago and may no longer be relevant.

We would want to analyse the direct sales force and IFA data separately.

Other possible classifications include payment method, premium frequency, original term, gender and age, premium size. However there is unlikely to be sufficient data to split down by these factors.

We might also wish to study trends. Again the volume of data may be a problem, especially for recent years. Any such trends would have to be interpreted carefully, because they would have been affected by whatever caused the slump in sales, economic conditions and also bad publicity leading up to the statement of intent.

- ii. Discuss how you would use the results of the analysis to produce suitable withdrawal assumptions to be used in the valuation.**

Most candidates scored relatively well on this question, although most candidates failed to consider the need to incorporate compulsory margins.

The results of the analysis would have to be used with great care, and may need to be adjusted to be suitable for current conditions.

In particular, the factors such as economic conditions and bad publicity would need to be allowed for. The company would have to take account of its expectations for the future in adjusting the past data.

It would also have to take into account any expected legislative changes and commission structures.

The experience of the two channels may differ substantially.

Taking the above into account, you would have to decide on a best estimate assumption per duration. In practice you would most likely start with the previous set of assumptions and adjust these given the latest experience.

As the requirement is for valuation, the basis will need to be prudent. The margins and the direction of the margins required may differ depending on whether there are surrender values payable. At durations where no surrender values are paid, these would be treated as lapses, and where surrender values were payable, these would be treated as surrenders.

We must be mindful of any model constraints when the assumptions are set (i.e. the assumptions must be in such a form that they can be inserted into the model.)

iii. Describe how you would determine the initial, renewal and claim expenses for the valuation.

This was another simple question testing a standard experience analysis. It was generally well answered.

The assumptions would be derived as part of the expense investigation in total. For this purpose the total expenses for the year would have to be sub-divided into initial and renewal expenses. And the renewal expenses would have to be split between premium related, ongoing and claim expenses.

In practice the expenses for the full year would not be known at the point that the assumptions were set. One would therefore have to use the actual expenses as far as known and the projections for the remainder of the year.

Once-off and project expenses would not be included in the per policy expenses so these would have to be separated out. Care must however be taken that any expenses that are treated in this manner really are once-off. In particular if there is a history of carrying out one off projects each year, for example infrastructure improvements, then these costs should not be removed.

With respect to how expenses are allocated, for some departments the allocation would clearly fall into one of the categories. However for some departments where this is not clear, time-sheets will have to be completed so that the expenses can be allocated appropriately.

Overheads that do not fall obviously into one of the categories would have to be allocated in a pragmatic manner. Examples of this would be office rent which could be allocated per square meter for each function.

Per policy expenses would then be determined by dividing the numbers by the relevant metrics. For example per policy acquisition expenses would be determined by dividing by the number of new policies sold. Claim expenses would be determined by dividing by the number of claims and renewal expenses would be determined by dividing by the number of policies in force on average over the year.

Compulsory margins should be added to the assumptions for valuation purposes. An inflation adjustment must be made from the average date at which the expenses applied to the average date the assumptions will apply in the valuation. As the book is declining, particular care will need to be taken to ensure that the cost inflation is accurate.

iv. List the prescribed margins required according to PGN104 per assumption.

This was a simple bookwork question and most candidates scored very well.

Investment return – reduction of 25bps on the assumed investment return. (or for unit linked products and explicit increase in the reserve equal to the PV of 25bps of fund charges.)

Mortality – 7.5% increase on risk product.

Longevity – 7,5% reduction

Morbidity – 10% increase

Claims termination – 10% decrease for disability business

Medical business – 15%

Expenses – 10% increase

Expense inflation – 10% increase

Lapses – 25% (adjustment sign depending on which leads to a higher reserve.)

Surrenders – 10% (adjustment sign depending on which leads to a higher reserve.)

Implicitly, one may not take credit for future premium increases if this would decrease the reserve.

Question 2

- i. **Describe the taxation basis of the IPF and how the assessed loss would have arisen.**

This was another bookwork question. Well prepared candidates were able to score high marks.

The IPF is taxed according to the four funds tax basis. The taxation basis is described in Section 29A of the Income Tax Act. Broadly the idea is that excess income over and above the allowable expenses and transfers is taxed at an average rate applicable to individuals.

The tax rate t is currently 30%. The tax payable in the year is then $t * (I - Ae * E - 0.5 * Ae * T)$ where

I is the interest (Int), rental income (R) and foreign dividend income F received in the fund, as well as taxable capital gains. The taxable capital gains are 25% (the inclusion rate) of the net realised capital gains without indexation.

E are the expenses allocated to the fund

T are the profits or transfers from the IPF fund to the Corporate Fund – each year on a statutory basis assets and liabilities are calculated and then equalised. T is defined as the movement between the IPF and CF to set statutory assets equal to statutory liabilities.

Transfers into the IPF are not treated as taxable income. Ae is a formula that pro-rates what percentage of the Expenses are allowable. There was scant scientific basis for this (it being a rough estimate of income as a proportion of total return), but the current revised formula is of the form

$(Int + R + F) / \{Int + 2,5 R + 4.75 (L + F)\}$ with L the local dividend income.

Where $I \leq Ae * E + 0.5 * Ae * T$, the value of E is limited until the equality holds and this amount of expenses are then carried forward as an assessed loss to be set off against future income.

The components of the premium under pure risk products are mainly risk premiums, expense allowance and a profit loading. Such products do not normally build up large reserves and thus the amount of investment income is much less than the expenses associated with the contracts.

The pattern of costs is also one of significant upfront costs – commission and underwriting.

- ii. **Describe how this could be done and discuss the factors that the company will have to take into account**

This question was disappointingly answered. Many candidates exhibited little understanding of a very simple product – one which is sold extensively in South Africa. Many also appeared unaware of the tax effects of reinsurance (both on the ceding company and reinsurer).

These products are all excess I (XSI), in that the amount of interest income generated is much larger than the expenses. Underlying assets generally consist of bonds or similar interest bearing assets. The investments aim to match the guarantee.

If a company was to reinsure their GCBs into the life office, the interest income would be greater than the expenses, and thus the assessed tax loss would reduce without any tax being payable in the IPF fund i.e. no tax payable on bonds.

In such cases an insurer would reinsure 100% of the risks underlying the product. Therefore the assets and liabilities are removed from their statutory balance sheet, implying the tax effect of writing the business is negligible.

The life company may have to apply to the registrar to extend their licence to also be able to write this class of business if they are not already authorised to do so.

The life company will have to place limits on the amount of such business that could be written, since once the assessed tax loss was fully utilised, the IPF would then become liable to tax on any excess interest income.

However even once the assessed loss was fully utilised, the company could still accept some reinsurance contracts to the extent that the income generated on these did not exceed the expenses on the term risk products sold by the company.

The life company would have to model the expected tax position of the fund over the term of the insurance contracts accepted to ensure that the tax position did not change from an XSE to an XSI position in total.

The life company will have to extend its IT systems to be able to hold the records of the inbound insurance contracts. Depending on the contract design the system may have to be able to handle regular payments to pay for surrenders. The Reinsurer therefore has increased operational risk.

Enhancements will be required to the systems tracking assets, since these policies may have to be invested in separate portfolios from the existing business. In particular the reinsurer will have to ensure proper matching.

The life company will have to expand their statutory reporting to also include the new business being sold.

The life company would receive a margin as compensation. Depending on the transaction, it may wish to take on credit risk on the underlying assets. This would however require expertise that may not be currently available.

The costs of setting up the reinsurance arrangement need to be compared to the potential profit. If the insurer currently invests in non-interest bearing assets, the transaction would increase its Ae, with knock-on effects.

The company would want to consider alternative uses for the tax loss (such as writing the GCB itself).

Taking on the business will increase the reinsurer's capital requirement and/or new business strain. It would have to consider whether it is in a position to sustain the impact.

There is a legislation risk in that changes to tax legislation could remove the opportunity. The reinsurance contract would have to address this.

iii. Discuss any additional factors that the company will have to take into account if they decided to enter the Guaranteed Capital Bond market directly.

This was a simple application question. Those candidates who were able to consider the practical implications of the new product were able to produce convincing solutions.

The life insurer does not sell any savings contracts at all presently. The sales force will have to be trained and certified to be able to market this new class of business. In addition, the target market of the sales force may not be appropriate to the new class of business.

The level of new business will be much more difficult to control as they will not be large pre-determined tranches as in the case where the policies are bulk reinsurance products.

Significant new development will be required, for example the setting up of the pricing basis, contract wording, valuation systems, administration systems.

Systems will have to be amended to be able to handle single premiums and also single premium commissions as these are not sold at present.

The GCB market is very competitive and processes will need to be put into place to be able to regularly re-price to remain competitive.

The claims department will have to be expanded to be able to pay out maturities, albeit only in five years time. Also, if surrenders are allowed, a process will need to be put into place to be able to pay these out. The current products do not have either of these claim processes.

This business is now classified according to IFRS as 'investment business', whilst its existing business is 'insurance business'.

The company would have to consider the implications of its reputation/size on the marketability of the GCBs. Would potential investors be wary of a guarantee provided by a small insurer / new entrant to the GCB market.

- iv. A government working party has now suggested that risk products and investment products be taxed separately. The suggestion is that investment products continue to be taxed as currently, but that risk products be taxed on profits. Discuss the possible reasons for this suggestion and likely actions by life insurers to mitigate the impact.**

This was a difficult question that tested higher order skills. Although the marks were generally very low, the question did tend to distinguish the better candidates from the rest.

The government's primary agenda will be to maximise their tax revenue from the insurance industry.

The current "I minus E" approach allows for the expenses generated by risk policies to be offset against the investment income of investment policies. Presumably by taxing these separately, the government will expect more revenue from investment products, as the taxable income will be greater, as well as more income from the risk products as these are expected to generate profits and thus taxes.

The suggestion that risk products be taxed on profits would imply that the life office no longer pays tax on behalf of the policyholders, but that only the profits are taxed in the shareholders fund. This would still be in line with the general "I minus E" approach as far as the risk policyholders are concerned, except that no calculation is performed since the result will always be no tax. And no unrelieved expenses carried forward will arise.

Policyholders of pure risk products do not benefit directly from the performance of the investments underlying their policies, therefore the working party may question whether it is appropriate to tax the investments as if they were held in the policyholders' hands.

Risk business, especially pure risk business, may be considered by the working party to be closer to short-term insurance business, or non-insurance business, which are taxed on profits.

There may be unexpected consequences, as the life companies may adjust their investment mixes so that less taxable income is generated by the investment products by converting more of the returns to capital gains.

The life companies will be affected differently due to their current mix of business. Where companies have sold sufficiently large quantities of GCBs, they may wish to lobby the government that the new taxation regime only be introduced when these policies mature, or alternatively that the new tax regime be phased in.

The GCB contracts will (should) have clauses that allow the life companies to alter the values should the tax regime change. However, such changes could lead to reputational risk. The alterations made to the value would ultimately be determined by market forces and what the competitor life offices do.

There will have to be some rules put into place to address universal life type of contracts where the product can vary from predominantly risk to predominantly savings. One suggestion would be to tax these products as investments, except for the risk premiums and risk benefits that are allocated to the risk taxation class with some share of the expenses.

Question 3

(i) Lowering the interim bonus rate:

Most candidates were able to score well on this question. However, some did not distinguish between an interim bonus rate and the annual declaration, and therefore spent time on issues that were not relevant.

Lowering the interim bonus rate may negatively affect Company B's reputation, as clients may interpret it as an indication of financial difficulties.

This could lead to increased lapses, and may affect the company's other products.

The company would consider the conditions under which competitors reduced interim bonuses, and whether any have done so recently.

The company would have to consider the significance of the product, i.e. its size in relation to the rest of its book. Smaller, older products may be less in the public eye, allowing the company more freedom.

The company may estimate the probability that the annual bonus declared is less than the current interim bonus rate, and the likely extent.

This would be affected by the current funding level.

The company should consider the length of time to the next bonus declaration. The shorter the outstanding period, the less benefit is to be derived from a change.

Related to this is the speed with which any change could be implemented on the policy administration systems.

Any change should be consistent with Policyholder Reasonable Expectations, which may have been formed by the PPFM, marketing material, policy contracts, as well as previous changes to interim bonuses (or failure to change the interim bonus rate in similar circumstances).

However, one should consider the impact on PRE of not lowering interim bonuses. If not done now, it may limit future potential to reduce interim bonuses, possibly in more severe circumstances.

It is important to understand the potential "cost" of maintaining a high interim bonus rate until the next declaration. This cost is directly related to the number of maturities and deaths expected in the period.

These costs are borne (at least primarily) by policyholders, and will result in diminished future bonus potential. It is therefore necessary to ensure equity between different generations of policyholders.

Naturally the size of the change proposed is critical, i.e. the excess of the currently in place interim bonus rate over the proposed rate.

Often smoothed bonus business will be administered on legacy systems. This may impact on the ease or difficulty of making the change, as well as the expense of doing so. The potential operational risk should be well understood.

The company may be more willing to implement a new interim bonus rate if there is a realistic possibility of the product's funding level dropping below 92.5%, which would require either disclosure of the fact, or an injection of shareholder funds.

The decision may also be informed by the existence of maturity guarantees, their moneyness, and whether any shortfalls are funded by shareholders or other policyholders. Shareholder and policyholder interests should be weighed, to ensure that shareholders are not unduly favoured.

(ii) Change to monthly bonuses, with fixed formula:

This was a relatively simple question but was not well answered. Many candidates seemed to have only superficial understanding of the issues affecting smoothed bonus products. Many candidates produced solutions that were too generic, without expressing an opinion on the appropriateness of the bonus formula.

Policyholders generally prefer:

- the certainty of fully vesting bonuses, which removes the grey areas surrounding the potential cancellation of non-vested bonuses.
- the simplicity of monthly bonuses as opposed to annual bonuses declared in arrears, with the use of interim bonus rates, and
- the transparency of using a bonus formula rather than a 'black box'. Clients often do not understand, and are suspicious of, the discretion exercised by insurers.

A product with such a bonus formula is more comparable with newer products available elsewhere in the market, which should improve its marketability.

A disadvantage is that products with fully vesting bonuses are more capital intensive, and entail a higher cost of investment guarantees. Company B would need to quantify this effect.

A formula also reduces the discretion available to the company, which may be restrictive in unforeseen adverse circumstances.

Need to make sure that the policy contract, correspondence and PPFM allow such a change to be made.

The insurer would need to consider whether its admin systems are able to handle the change to monthly bonuses.

Comments on formula:

Using the LTR in the formula declares the bonus based on a future expectation of returns in the market and not purely historic experience.

Six years is a long smoothing period, which may result in dissatisfied clients who experience significantly poorer bonuses than the underlying returns over an extended period.

It may also be prudent to employ a smoothing period which is asymmetric around the target funding level – the company may want to employ a shorter smoothing period when the product is underfunded.

Bonuses will be marginally less smooth, but the cost of guarantee will be lower.

Using the LTR as defined will result in bonuses being declared when interest rates are high, even when in an underfunded position. The formula may be adjusted, but at the expense of increased complexity.

The LTR also does not take short term investment expectations into account (i.e. it does not allow for the shape of the yield curve).

The LTR should also be reduced for tax on expected investment returns, as well as those expense charges / policy charges which are levied within the smoothed bonus fund.

Aggressive switching of assets into riskier asset classes immediately increases the LTR and therefore bonuses, compounding the risk that is introduced.

This risk may be managed by removing the asset class risk premiums, or using appropriate asset class restrictions / bands in the guidelines of the underlying assets.

The target funding level is above 100% to reduce the cost of smoothing.

However, 105% is a very high target funding level. This will keep bonuses low for a long period, especially given a natural pull to 100% as premiums are received.

It is also not equitable between generations of policyholders as it significantly delays the declaration of bonuses.

A more appropriate target would be between 101% and 103%.

A phase-in period may be used, where the target grows slowly over time from 100% (or the current funding level) at the time of introducing the new formula, to the long range target.

(iii) Shrinking smoothed bonus funds:

Candidates who identified the main issues (adjusting bonuses, investment strategy, expenses, etc.) were able to score relatively well. Too many candidates went into significant detail on how to increase new business, which earned few marks.

Any actions taken by the company must meet PRE, and will therefore be limited by policy contracts, the company's PPFM, past action, marketing material (including any stated investment guidelines), etc.

Any actions must balance the interests of policyholder and shareholder, to ensure that the discretion allowed to the company is not exceeded or abused.

The greater the changes implemented, the greater the need for thorough communication of the changes to clients.

The primary risk associated with a shrinking bonus fund is that bonuses become more volatile – smoothing works less well with fewer policies.

The result may be zero bonuses for a protracted period (or even cancellation of non-vested bonuses) or a tontine effect, where the last remaining clients are enriched.

If the policyholders are explicitly charged for the cost of capital, the shrinking fund will have higher capital requirements due to greater volatility (assuming no actions are taken to reduce the risks). The capital charge required would therefore be higher.

Bonuses:

Maintaining a higher bonus stabilisation reserve will act as a cushion against volatility. It will then be necessary that the fund is closed to new business, or else new clients will unfairly be allowed to participate in an exceptionally large surplus.

If the fund is closed to new business, then bonus rate reviews will need to become more frequent. This will help achieve the target that all the assets in the fund are distributed to all the policyholders fairly by the time the last policy matures.

Non-vested bonuses (including terminal bonuses) may be increased at the expense of vested bonuses. This would, however, only be useful if the Board would seriously consider cancelling such non-vested bonuses at a later date. It would also offer little benefit to clients, unless it allowed the maintenance of a more aggressive investment strategy.

However, these actions must not unduly penalise clients who choose to surrender.

Alternatively, if the investment approach is to be made more cautious, clients may appreciate it if the company vests existing bonuses, and declares out the existing bonus stabilisation reserve. This would assist in ensuring that clients who prefer not to leave are not prejudiced.

Investments:

To reduce the volatility of investment returns, and therefore bonuses, the company may invest in less risky assets.

Any changes must not have an excessive effect on expected returns.

If exposure to equity is reduced, this may allow the guarantee charge / capital charge to be reduced, partially mitigating any effect on expected returns.

The company may use derivatives to hedge against significant market falls.

As the fund is expected to be in a net cash outflow position, it would be prudent to reduce exposure to illiquid assets,

or consider if other portfolios within the company will be willing to purchase these assets at a later stage.

The expected future cash flow profile of the product may be projected. By adjusting the portfolio's bond holding to more closely match the expected cash flows, the interest rate risk is reduced (similar to matching non profit annuities).

Mortality:

Reinsurance (especially risk premium reinsurance) may be introduced / increased to reduce fluctuations in mortality experience profits.

Expenses:

If there are areas where administration deals with this product only, i.e. where processes are not shared with other product lines, the loss of scale will increase unit costs.

It may be possible to rationalize costs by, for example, making complex alteration options unavailable. {Award a mark for sensible alternative example.}

Other issues:

It may be possible to join the smoothed bonus fund with another fund, if there is one which is sufficiently similar.

The company would use stochastic modelling to ascertain the size of the potential problem (the likelihood of guaranteed biting and their cost, as well as the volatility of bonuses), as well as the effects of mitigating actions.

To the extent that PRE restrict changes being made within the fund, the insurer may choose to manage some of the risks outside the fund. The guarantee premiums may be used for this purpose.

Alternatively, if the shareholders share in a proportion of the fund's profits, these profits may be sacrificed / put at risk to allow changes to be made within the fund.

The company should weigh the potential costs associated with the risks of the shrinking fund (or the cost of mitigation) against the risk of negative client reaction (i.e. reputational risk).

The company may use a notional fund (i.e. give returns – and hence bonuses – based on one investment strategy, while actually investing in a more conservative manner). This strategy would have a cost when investment returns are high, but should then coincide with increased profits in other parts of the business.

An alternative to managing the winding down of the fund is a re launching, rebranding or improvement of the product to attract new business.

The company may approach clients with an offer to move to another fund / product, possibly on attractive terms. This poses its own issues as some client will inevitably choose to remain with the current product.

END