

EXAMINERS' REPORT

November 2016 examinations

Subject F102 — *Life Insurance* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

(i)

Possible reasons include:

- ABC may consider the price offered to be very good value for money.
- ABC might not have sufficient experience of selling this product.
- ABC may need solvency relief, which could be achieved by passing on all of the risk to the reinsurer.
- ABC may not see this as a core part of their business, and thus be happy for the reinsurer to take on all of this risk and manage the portfolio.
- ABC may have no particular risk appetite for that particular market segment.
- ABC may want to reduce the volatility of its claims experience.

(ii)

Reasons why the reinsurer might agree:

- If the reinsurer has priced correctly the quoted price should result in the required level of profit to the reinsurer.
- Expenses will probably be spread over a larger premium than initially expected, so it should generate even better profit than originally priced.
- The reinsurer may agree to reinsure 100% of the risk to maintain a good relationship with ABC if the remainder of ABC's reinsurance programme is profitable to the reinsurer.

Reasons why ABC might not agree:

- ABC has no interest in the experience and management of the portfolio if 100% of the risk is reinsured.
- This could lead ABC to be less vigilant on underwriting and claims decisions.
- The reinsurer may specify strict underwriting and claims assessment requirements as part of this agreement.
- This is especially true if the reinsurer cannot re-price the business at a later point in time.
- The request to reinsure 100% of the business may lead the reinsurer to re-evaluate its pricing (the reinsurer may have been too aggressive in the pricing initially).

(iii)

Risks taken on:

Counterparty risk / Credit risk – The reinsurer may be unable to pay the claims as they arise.

Legal risk – A reinsurance contract will need to be entered into, and no contract is completely clear and unambiguous.

Systems risk – ABC will need to pay over the reinsurance premium (which have to be calculated) and ensure that the reinsurer is informed of every life covered. This will need to be done electronically and thus systems risks arise.

Operational risk – ABC will remain responsible for the underwriting and claims. Failure to perform these processes as per the reinsurance contract would introduce operational risks.

Students lost out on a few easy marks due to not reading the question properly.

Part i was answered satisfactorily, but part ii was answered poorly with a large number of students missing the point that 100% reinsurance reduces incentive to manage the underwriting and claims properly. Most students also missed the point that the reinsurer had already tendered, so the reinsurer clearly has terms on which at least a part of the risk can be accepted. So to say that the reinsurer is concerned about the distribution channel or product design does not make sense. The question targeted why it may or may not be feasible to take a 100% share.

In part iii most students mentioned the credit risk, but many students lost easy marks by not mentioning the legal and operational risks being introduced.

QUESTION 2

(i)

A key principle is that terms after alteration should be supportable by the earned asset share at the date of alteration so as to avoid the company making a loss.

The profit expected from the contract after alteration should be appropriate e.g. if small change, then same profit as before the alteration, big change, then bigger change to profit in other words the method should be fair in terms of extracting a suitable amount of profit from the altered policy.

Should take into account 'boundary conditions' i.e. should consider which alterations are similar, and then terms offered should be similar/consistent between those alterations.

At later durations, be consistent with projected maturity values, allowing for premiums not yet received

Be consistent with surrender values, so that surrender values pre- and post-alteration are approximately equal.

Method adopted should be stable in that small changes in benefits should result in small changes in premium (ignoring expenses of the alteration).

Terms offered should avoid lapse and re-entry.

Any increase in benefit may be subject to additional evidence of health (depending on scale of change and when it occurs in policy's lifetime).

The costs associated with carrying out the alteration should be recovered.

Method should be easy to calculate and to explain to policyholders.

The method should consider potential for selection against the insurer, and allow for this in the basis, or disallow such alterations.

(ii)

Policyholders' circumstances could change eg redundancy, making future premiums unaffordable

Policyholders' needs may change, making contract unsuitable eg if they have repaid their interest-only mortgage and hence policyholders would find the flexibility to make policy PUP attractive.

Policyholders may prefer continuation of contract in PUP form so as to still have life cover, compared to the alternative of surrendering the contract.

Other valid comments or examples of how policyholders' needs/circumstances/risk profiles could have changed, were given credit.

(iii)

Asset share is likely to be significant, especially at later durations, so providing a paid-up (PUP) benefit would be fair and affordable.

Competitive pressure from other insurers that offer PUP benefits.

Product differentiation if other insurers do not offer PUP benefits.

Regulation may require PUP benefits to be offered.

PRE based on information provided at time of sale or from terms specified in contract.

If no paid-up values are offered, the policyholder may surrender the policy, leading to

- Potential losses, if initial expenses have not been recovered
- Loss of potential future profits

Policyholders and their advisors may value the option, making the product more marketable

Policy still contributes towards fixed overheads

Assets do not need to be sold at unexpected and possibly unfavourable times

An ongoing relationship with policyholder is maintained providing marketing opportunities

The policyholder may be able to restart premiums at a later date

(iv)

The total profit expected from the paid-up contract will depend on the relationship between the method and basis for calculating the policy value before alteration (profit released at time of alteration), and method and basis for calculating policy value after alteration (profit expected to emerge over the remaining term).

So create an equation of value: Policy value before PUP = Policy value after PUP + alteration expenses.

PUP sum assured should be consistent with surrender values so that surrender values before and after conversion are approximately equal.

Therefore use the surrender value at time of PUP as the policy value before alteration, thereby releasing same amount of profit at time of PUP, as would be released for surrendering policy as well as covering costs of alteration

The policy value after PUP would then be: $(PUPSA)_t Ax+t:n-t + e_{ax+t:n-t}$ (annual expenses associated with PUP policies) + $CAx+t:n-t$ (claims expenses),

And to ensure that policy still contributes to profit after becoming PUP, this should be calculated using some margins in the assumptions so as to ensure that such margins will get released as actual experience turns out better than expected.

(Marks can be awarded for any other well-reasoned suggestion eg current premium basis for policy value after PUP to ensure contribution to profit after making PUP.)

(i)

Mainly bookwork.

(iii)

Many candidates failed to generate enough points by failing to consider how offering a paid-up policy could be beneficial to the company (or more beneficial than losing the policy.).

Some candidates mentioned policyholder needs being met by offering such an option whilst question specifically mentioned that this was not required.

(iv)

Candidates who scored well stated how profit could be extracted at point of alteration (by considering difference between value on some well explained prospective basis vs earned asset share) and how it could be extracted after alteration by difference between well

explained prospective basis and actual experience. Full marks could not be given if candidates suggested realistic prospective for 'before' value and then a prospective basis with margins for 'after' value, as that would not lead to a 'reasonable' amount of profit, but rather 'excessive' profit to be made on paid-ups.

QUESTION 3

(i)

Longevity risk and policyholder behaviour

Conventional annuity

The life insurer carries the longevity risk of the annuity book i.e. it will have to fund the annuity payments should policyholders live longer than expected.

As this is a developing country there may not be adequate data to understand longevity trends increasing the risk exposure to the life insurer.

Special unit-linked annuity

Longevity risk is transferred to the policyholder.

There will be minor mortality risk at early stages of the policy.

Investment risk

Conventional annuity

The investment risk is carried by the life insurer.

The life insurer needs to ensure that the assets chosen to back the liabilities are adequate to cover the annuity payments into the future.

As the market is developing, there are unlikely to be assets of adequate duration to back the annuities increasing the investment risk (reinvestment risk).

Special unit-linked annuity

The investment risk is transferred to the policyholder to some extent.

The life insurer will, however, still be exposed to investment risk due to the following:

- Investment guarantee
- Its income from the product is dependent on the asset management fee which is charged on the underlying assets under management.

Investment guarantee for unit-linked business

Offering the guarantees exposes the insurer to significant investment losses if market returns are negative.

This risk can be even more significant in this case, due to the markets in this developing country potentially being volatile.

Offering the guarantees will increase the reserving and capital requirements of the company.

This may increase the capital strain for this product.

The markets are unlikely to have available instruments to hedge the exposure, so it will be difficult to reduce reserving and capital requirements by hedging the guarantees.

The company is unlikely to have the necessary skills and it may not be cost effective to obtain the skills to manage the risk and valuation of the guarantees.

The cost of the guarantees may be prohibitive and result in lower value for the clients over the long term. This will impact on the insurer's reputation.

Expense risk

For both products there is a risk that expenses are higher than expected due to inflation being higher than expected or poor management of costs.

Expense risk is exacerbated by the flexibility that policyholders have on the unit linked product: if the rate at which policyholders draw down on their unit funds is greater than the rate expected, the fees earned on the assets under management will be lower.

Competition

Conventional annuity

This product is currently offered by other competitors in the market. There is therefore a risk that new business sales reduce and margins come under pressure as competition increases.

Special unit-linked annuity

The product is not offered by other providers at the moment so it may be possible to include higher margins.

If the product is successful, however, there is a risk that competitors will enter the market compressing margins.

Furthermore, unit linked annuities may be transferred between providers so there is a risk of losing business to competitors in the future. This is not a risk for the conventional annuity.

Volume of new business

Conventional annuity

High levels of new business volumes will increase the initial capital strain on the insurer, possibly putting pressure on the solvency of the insurer.

Special unit-linked annuity

There is a lower risk of high volumes causing strain/insolvency as the product offers no longevity protection, and therefore has relatively smaller reserving requirements.

There will however still be new business strain as the upfront costs (3% commission + administration) exceed the income (98% allocation) and the investment guarantee will most likely result in additional reserves and/or capital requirements being held at policy inception. Volumes will therefore still need to be actively managed if the insurer is unable to recognise any of the future profits from the product upfront (via actuarial funding or negative non-unit reserves).

Distribution – risk of poor advice

Conventional annuity

Brokers understand the product well as it is a common and simple product in the market.

There is low risk of poor advice.

Special unit-linked annuity

Brokers may not understand the product well as it is new to the market. There is risk of mis-selling if adequate training is not provided to brokers.

This risk is increased by the fact that this is an annuity that does not cover longevity risk, which is something that policyholders might not be used to.

Systems and controls

Conventional annuity

As this product has been on offer for a long time, systems and controls are likely to be adequate.

Special unit-linked annuity

The new product will require significant system development in order to conduct unit pricing and allow for the restrictions on drawdowns.

There is high operational risk due to the need to create new processes.

Data risk

Conventional annuity

Product has been sold for a long time so adequate data to price. However developing country so there may still be volatility.

Special unit-linked annuity

No data on which to base fee structure and pricing. Will be difficult to know what average rate of drawdown will be to set the fee.

Regulations

As the unit-linked product is new to the market there is a risk that the regulator may introduce regulations related to the product that may result in further development and system costs if the product needs to be changed.

There may be a risk of tax changes that impacts the profitability of the product.

There is a risk of fraud on both annuities but greater on conventional annuity as need to track death of individuals.

Reputational risk

Conventional annuity

Low as the product is simple, clients understand what they will receive upfront. The only risk is if the insurer cannot meet annuity payments.

Special unit-linked annuity

There is a reputational risk as there is a risk that policyholders do not understand the product. If investment markets collapse, policyholders could be materially impacted.

There is a risk that the unit-linked fund is depleted before the death of the policyholder leading to reputational risk.

The reputational risks related to investments are exacerbated by the fact that there single investment fund determined by the insurer.

(iii)

Reduce the premium allocation rate to 97% (or less).

The company could employ actuarial funding or use negative non-unit reserves.

The maximum commission upfront could be reduced from 3%.

The company could introduce a bid offer spread charge.

The investment portfolio guarantees could be removed.

Overall the question was reasonably answered. Quite a few candidates did not understand how a living/linked annuity worked compared to a conventional annuity and thus did not identify the risks correctly. Some candidates did not lay out the structure of their answers well resulting in overlap and/or missed points. A good approach would have been to run through each risk type and then consider the impact on each product.

QUESTION 4

(i)

Need assumptions for both the best estimates and margins to be included.

Mortality: pre claim and during claim (see below)

Claim termination rates, which are dependent on recovery rates and mortality rates

Discount rate/ investment return (to set up reserves): before claim and once claim is in payment

Expense assumptions

- Renewal expenses and any on-going commission
- Claims assessment at claim inception and at any subsequent re-assessments
- Expense inflation rate

(ii)

The actuary will need to:

- Choose a suitable investigation period.
 - Long enough so that the results are credible (enough data).
 - Recent enough so that the results are relevant.
- Create homogenous groups.
 - E.g. males and females; occupational classes
 - Balanced against having sufficient data in each group so that results are credible.
- Data issues may have to be dealt with (e.g. anomalies in the data etc.).
- Calculate exposed to risk and the number of claims received per group, used to calculate crude rates for each group.

The actuary will then compare the results to the existing assumptions and either:

- Adjust the existing assumptions if the internal experience cannot be considered to be fully credible, or
- Graduate the crude rates to replace the existing assumptions.

Further adjustments would be required to ensure that the assumption can be applicable to future expected experience, in particular there is a need to allow for:

- The policy conditions (e.g. deferred period and replacement ratio) will influence the claim inception and claim termination rates.
- Trends over time (e.g. due to medical advances).
- Correlation with economic environment (e.g. there is often higher claim inception during economic down turn).
- The potential impact of government provision of welfare and tax.

Finalising the assumption would also involve considering other sources, to assess reasonability (e.g. standard table, reinsurer or global data).

Include a margin for prudence.

(iii)

Potential impact on risk rates:

The company will now receive claims from relatively less severe disability conditions. As a result, one can expect an increase in the claim inception rates.

However, claim termination rates are also likely to increase, at least at early claim durations.

- That is because it is more likely that claimants for the less severe conditions will recover.
- However, once benefits are in payment, some claimants for the less severe conditions may try to “prolong” payment, so the termination rates may not increase by as much as one would initially expect.

Potential impact on mortality:

The average mortality for claimants is likely to decrease, given that now more relatively healthy lives will be included.

Potential impact on expenses:

Claim assessment costs will increase, both at:

- initial claim stage (due to more claims having to be assessed), and
- the management stage of claims in payment (more frequent follow ups will be necessary to manage claims from relatively less severe conditions).

Unlikely to have a significant impact on the investment return/ discount rate.

(i)

Most candidates failed to identify a sufficient number of assumptions and some identified pricing rather than reserving assumptions.

(ii)

Few candidates gave a sufficiently detailed description of the full process to score well. Some candidates failed to answer the question and considered mutli-state models rather than the inception disability approach.

(ii)

Most candidates identified the impact on claims inception and expense experience. Better candidates considered the impact of larger number of less severe claims on the claim termination and mortality rates.

QUESTION 5

(i)

Profitability

The premiums need to be sufficient to cover claims, expenses and make a contribution to profit.

The contribution to profit should be sufficient to meet the shareholders’ required return for this product.

Critical illness incidence assumptions should cover the risk involved and allow for future changes in the risk.

Expense loadings need to cover the marginal costs relating to the policy as well as make a contribution to overhead expenses.

Revenue from the product will need to cover the costs of developing and launching the product (e.g. marketing).

There are likely to be high initial expenses high lapses early in the duration of the policy (i.e. the asset share is negative) will impact on the profitability of the insurer.

Sensitivity of the profit to changes in expected experience (e.g. claims or business volumes) should be investigated.

The design of the product should aim to reduce the sensitivity of the profit of the insurer to adverse changes in experience e.g. reduce initial expenses to reduce losses on lapses at early durations.

The extent of cross-subsidies (e.g. relating to expense loading for small and large policies will exacerbate the sensitivity of profit to mix and volume of business).

The cost of reinsurance will impact on the profitability.

Lower profitability might be acceptable if the company can cross sell other (more profitable) products to the same policyholders.

Marketability and competitiveness

The marketability and competitiveness of the product will depend on the product offering of the insurer's competitors.

The competitiveness of the product will depend on the competitiveness of the premium for this product.

Level premiums may have the advantage of certainty, but may be high initially for young policyholders with low disposable income.

Focus on core conditions and fixed sum assured makes the product relatively simple and more marketable and should make the product cheaper than other critical illness offerings that cover a wider variety of conditions.

Due to the technical nature of claims definitions, these may be difficult for policyholders to understand.

This product may need to be sold through brokers and sales agents so that features of the product can be explained accurately to policyholders.

Risk characteristics

The uncertainty relating to future claims experience (e.g. critical illness diagnosis rates) for critical illness is likely to increase the risk of the product, particularly since level guaranteed premiums will apply for the duration of the contract.

Risks may be exacerbated by a lack of data on critical illness claims experience or changes in future diagnoses of conditions due to medical advances.

Margins may be included in the premium for the higher levels of uncertainty but this will contradict the need for competitive premiums.

The insurer should consider whether there are any features in the product design or target market that would increase the risk of the business (e.g. targeting workplaces where there is a higher risk of employees suffering from lung cancer).

The insurer will need to consider whether underwriting processes will be sufficient to manage the anti-selection risk reinsurance may be used as a risk mitigation strategy.

(ii)

Pricing using a deterministic model:

- Determine a set of model points which represent the expected new business based on the profile of the existing business allowing for any expected changes in the profile.
- Set assumptions for the expected critical illness diagnosis rates, mortality, morbidity, lapses, expenses, investment returns and tax.
- These assumptions should reflect that expected future experience of the lives covered and the economic environment.

- For each model point project the cashflows allowing for projected solvency and reserving requirements.
- The following cash flows are required in the projections: premiums, claims, expenses and investment returns on reserves.
- The future profits are then calculated as the net cash flow, less the increase in reserves.
- The company should discount the projected profit at a risk discount rate that reflects the return required by the company and the level of risk attached to the profits.
- The premiums will be set so that the company achieves its required profit target.
- The premiums need to be considered for marketability.
- This may lead to reconsideration of the design of the product, changes to the distribution channel, reconsideration of the profit requirement etc.
- The profit from these model points, scaled up for the expected new business can be incorporated into a model of the whole company.
- It may be possible that the required level of profit can be reached in aggregate without each individual model point being profitable in its own right.
- However if this is the case the company may be exposed to the risk of a change in the mix of business.
- Once acceptable premiums have been determined for the model points, premiums for all product variations can be determined.

This question was relatively poorly answered.

(i)

The majority of candidates failed to write sufficient points to score well. Candidates failed to discuss a wide enough range of points in sufficient detail, A number of candidates made vague points e.g. uncertainty in claims and failed to relate points to the product in the question with a sufficient level of explanation.

(ii)

Better candidate gave a logical step-by-step explanation of the full modelling process. Weaker candidates only considered parts of the modelling process.

QUESTION 6

(i)

Features of the gross premium valuation method:

- an explicit allowance is made for expenses
- an explicit allowance can be made for vested and expected future bonuses
- the future premiums valued are the actual (“office”) premiums expected
- any differences between the pricing and valuation bases will immediately be taken as profit or loss
- a prudent basis should defer the release of profit over the lifetime of the policy
- reserves may initially be negative for non-linked business, partly due to initial expenses and partly due to capitalising the expected future profit
- the reserves tend to be quite sensitive to changes in basis

(ii)

This solvency margin provides an additional level of protection to policyholders (protection against insolvency, protection against systemic risk, to maintain market confidence, to reduce the risk of reserves being insufficient, to act as an early warning system for the supervisor) against future experience being worse than reserved for under the supervisory reserving basis. The required margins in the reserve calculation and solvency margin calculation should reflect the risk of the insurer.

There is a direct relationship between the level of prudence in the supervisory reserves and a suitable level for the required solvency margin.

The level of prudence in the reserves (i.e. prescribed margins) implies that the minimum solvency margin required as protection for policyholders should be lower.

(iii)

Firstly, the insurer's historic expenses need to be investigated to estimate the expected level of future expenses.

The historic expenses will then need to be adjusted for various items, e.g. once-off expenses need to be removed from the analysis and known future changes, e.g. cost savings, can be allowed for including an allowance for trends that are shown by the past experience.

For reserving, the renewal recurring expenses would be the most important expenses that would need to be allowed for:

- Hence the investigation needs to differentiate between initial and renewal expenses,
- Once-off and recurring expenses, and
- Fixed and variable expenses

Expenses would also need to be allocated to this product, as the company might have other products but the company might also use expenses data from other similar products.

The most appropriate way in which expenses should be allowed for needs to be determined, including:

- Per policy expense
- Percentage of premium
- Percentage of sum assured
- Percentage of assets/reduction in discount rate

Other expenses that might be considered are the following:

- Termination expenses on claim (i.e. claims underwriting expenses), and
- Termination expenses on withdrawal
- Investment expenses

Some expenses can be allocated directly to specific buckets while other expenses have to be split across various buckets, using for example time sheets.

To allocate expenses to a policy level it is necessary to consider the expected volume and mix of business.

Generally only per policy expenses need to be increased by inflation.

For past data historic inflation between the date of incurring the expenses and the valuation date needs to be allowed for.

The inflation assumption can be based on the gap between nominal and real yields in the market can be increased to allow for the expected difference between salary inflation and CPI. The inflation assumption should also be consistent with the investment return assumption.

The assumption can be benchmarked against the current assumption and against industry data or against the pricing assumption.

The assumption can also be based on a market consistent approach, i.e. it can be based on quoted prices for administration outsourcing agreements.

Comments:

- *This is a straightforward bookwork question and candidates who knew the bookwork did well.*
- *Some candidates lost easy by marks by not specifying their answers clearly. For example, they said that the gross premium valuation allows for expenses. This did not score any marks: to score marks it is necessary to say that this method **explicitly** allows for expenses, since even the net premium valuation allows for expenses, although this is implicit.*
- *Many candidates wrote that reinsurer can be approached to assist with setting the expense assumptions: this is unlikely, as reinsurers will usually not have access to their cedants' expense assumptions.*
- *For part (iii) many students referred to an "expense investigation", but didn't define what was meant by this.*

For part (iii) many students confused the terms "direct expenses" and "variable expenses" with each other. These two items are not always the same: direct expenses relate directly to a specific product and/or function, whereas variable expenses depend on the number of policies that are sold. For example, rent can be a direct expense if the specific rent relates to a single product, but it is not a variable expense

QUESTION 7

(i)

The extent to which deferral of profit distribution is achieved depends on the size of the terminal dividend relative to the dividends paid out during the lifetime of the contract (reversionary bonuses).

The greater the terminal dividend element, the greater the deferral of profit distribution since the profits are only distributed on maturity or surrender of the contract.

Both bonus distribution methods support declaring bonuses using a combination of reversionary and terminal bonuses.

In practice, the contribution method provides less deferral of profit distribution than the additions to benefits method.

(ii)

Since it is a small company, it would need to defer the distribution of profits as much as possible for the following reasons:

- To provide a cushion of free assets to absorb worse than anticipated experience (e.g. claims experience).
- To enable the insurer to write more new business than would otherwise be possible, since the insurer will have sufficient free assets to absorb the new business strain associated with writing new business.
- To finance the acquisition of new sales channels, product developments, systems, etc.
- To provide the insurer with the investment freedom to invest in riskier asset classes, such as equities, to achieve higher investment returns; which can be passed on to policyholders.

- Profit deferral provides a cushion against which movements in volatile asset values can be absorbed without threatening the solvency of the insurer.
- To keep capital requirements as low as possible.
- To meet the expectations of the with profits policyholders. The policyholders may have expectations that the insurer will smooth investment returns, by deferring profit distribution in years when investment returns are very good and distributing more than earned during the years when investment returns are poor.

Factors to consider when determining the bonus distribution approach

Policyholders may, however prefer greater certainty that comes from less deferral, or they may prefer the expectation of higher returns overall that deferral might bring.

Shareholders who may prefer the certainty of early distribution and less deferral.

The extent to which deferral of profit distribution is achieved depends on the balance of the profit distributed via terminal bonus, as opposed to reversionary bonus.

Terminal bonuses provide the greatest deferral of distribution of profit so company should aim for as much distribution in terminal bonus form as possible provided that contracts will still be marketable.

For reversionary bonuses, a super-compound reversionary bonus structure achieves the greatest deferral of profit distribution, followed by a compound bonus structure, with a simple reversionary bonus structure achieving the least deferral of distribution of profit.

So the company could propose a super-compound bonus structure, provided that it is marketable.

When declaring its regular bonuses, the company should be aware that PRE will be formed by these bonus declarations and hence should make sure it's in line with bonus earning capacity of the book of business.

The bonus philosophy should satisfy the requirement of equity between different groups and different generations of policyholder.

Ideally each policyholder should get the share of the surplus earned by their policy. This should be determined by reference to policy asset share.

The system should be flexible enough to deal equitably with different types of surplus. The need for this arises as different sources of surplus result in surplus that emerges in different patterns. Special reversionary bonuses under additions to benefits method will allow for this.

Weaker candidates seem to struggle with discussing a sufficient range of points to justify a distribution approach.

(i)

Generally well answered book-work.

Some candidates did not focus on describing the differences in the extent of profit deferral under the two surplus distribution methods. No marks were awarded for generic explanations of the "Contribution Method" and the "Additions to benefits" method.

(ii)

Better candidates tailored their answers to the specifics of the question. Weaker candidates listed generic consideration items, without explanation. Candidates generally struggled to generate enough distinct and well-explained points to gain full marks.

QUESTION 8

(i)

The distribution channel may impact on the product experience as follows:

Expected mortality and withdrawal experience through the following:

- financial sophistication of the target market
- who initiated the sale
- extent to which distribution channel explains product features accurately
- level of underwriting
- demographic characteristics

Expected expense experience through the following:

Sales volumes will be affected by how well the distribution channel does which will impact on expense experience and number of policies that can cover overhead expenses.

Expenses of the different channels to the company may also be different i.e. extent of admin required to get policies on the books.

(ii)

A guaranteed annuity option (GAO) is likely to be exercised when interest rates fall below the implied guaranteed rate. Hence the company could use the market value of any derivative which will offer a payoff in such circumstances, e.g.

- Interest rate floor (i.e. a put option on interest rates, with the strike rate being equal to the implied guaranteed interest rate).
- A call option on the bonds that would be necessary to ensure the guarantee was met, i.e. at an exercise price which generated the required fixed rate of return.
- Alternatively, the GAO is also equivalent to an option to swap floating rate payments at the option date for fixed rate receipts sufficient to meet the guaranteed annuity payments (swaption).

The practical difficulties include:

- Suitable options or swaptions may not be available (e.g. that match the insurer's specific level of implied guaranteed interest rates, or specific policy maturity dates).
- If derivatives exist, they may not be traded on the open market, so that prices are not easily obtainable.
- The derivatives might not be sufficiently marketable and liquid i.e. quoted prices might not be appropriate for the volumes required by the insurer.
- Over-the-counter derivatives (versus exchange traded) expose the insurer to greater credit risk, which is likely to reflect in a lower price; thus suitable adjustment for credit risk should be made by the insurer to avoid under-valuing the guarantees, however this may be difficult and subjective.

iii.

The company is likely to currently be invested in a mixture of fixed-interest securities of appropriate duration to match the guaranteed sum assured and bonuses already declared and assets producing higher returns (e.g. equity and property) for the discretionary part of the liability.

The level of investment in higher risk assets will depend on the level of reversionary bonuses and the level of free assets.

Impact of the guaranteed annuity option (GAO):

- There may not be a direct impact on the investment strategy for the with-profits (WP) asset portfolio if the insurer is satisfied that the investment risk relating to the guarantee is not likely to impact on its targeted solvency position.
- The company could decide to purchase suitable derivatives in investment markets to hedge the GAO liability (if these assets exist and are available at a reasonable cost).
- The company could also follow a matching strategy by investing in longer duration fixed-interest securities to manage the exposure to changes in the interest rates due to the GAO.
- However, this may go against policyholder expectations for maximising maturity benefits on with profits policies.
- It will also be very difficult to determine the proportion of investments that need to be switched to longer duration fixed interest securities, due to this depending on the proportion of policyholders that decide to convert their maturity benefit to an annuity (which is very uncertain)
- If the insurer wants to depart from the matched position the insurer could use asset liability modelling to determine the cost of the GAO and its impact on the solvency level of the insurer under different asset allocations and select assets that maintain a balance between additional returns and the solvency level that is acceptable to the insurer.
- In the event of a mismatch, additional reserves may be required. This is likely to be invested in low volatility assets e.g. cash.
- In the event that the GAO liability is not matched, shareholder might want to reduce risk elsewhere e.g. by closer matching of the guaranteed liability under the WP portfolio, which in turn may lead to lower returns and bonuses for WP policyholders.

Impact of adding brokers and direct selling to distribution:

Withdrawal experience:

- Policyholder withdrawals may be higher for sales by brokers: brokers may try to “churn” business between companies to maximise commission income, or for justified reasons such as switching to more competitive products.
- Policyholder withdrawals are likely to be higher for direct sales: the absence of advice may lead to more policyholders realising that policies purchased were inappropriate for their needs. This is especially true for complex products such as this one, which has both with-profit features and a guaranteed option.
- The impact of higher withdrawal rates on investments is that:
 - Asset duration should be shorter (e.g. shorter term bonds).
 - A greater proportion of assets need to be liquid (e.g. cash).
 - Depending on surrender value penalties and policyholder expectations for surrender values, asset values may need to be more stable (e.g. hold fewer equities).
 - The overall impact may be lower returns and lower bonuses.

The need for competitive terms:

- Business sold through brokers needs to be very competitive. The impact on investment strategy is that there is greater pressure for higher returns and higher bonuses. This can be achieved by investing in higher risk assets (e.g. equities).
- Business sold through direct channels is potentially less sensitive to competitive pressures although clients might be less sophisticated and less tolerant of volatile returns, this would suggest a lower risk investment portfolio is needed.
- Following different investment strategies for the different distribution channels might not be possible initially, due to the volumes from the new distribution channels being too small, with unique investment strategies only being followed when volumes are sufficiently large.

The overall impact should reflect all of the above factors and should strike a balance between them.

The question was poorly answered in general.

(i)

The majority of candidates failed to consider a sufficiently wide range of points. Weaker candidates structured their solutions around the three types of distribution channels resulting large number of repeated points.

(ii)

The majority of candidates failed to consider a range of possible derivatives structures that would replicate the guarantee and to give a sufficient range of practical difficulties. Stronger candidates identified when the guarantee would bite and were able to explain replicating derivative strategies. Weaker candidates gave vague points e.g. call options and discussed irrelevant points e.g. constructing replicating portfolios and risk of guarantee in detail. Some students discussed mortality options rather than investment guarantees.

(iii)

Many candidates failed to give sufficiently detailed description of the appropriate strategy for existing product structure and then use this to build discussion for changes in strategy. Many candidates failed to demonstrate understanding of assets that would match the cashflows for the annuity at guaranteed rates.

Some students discussed less important issues (e.g. matching expenses) at the expense of discussing assets that match the liabilities. Many students did not consider the impact of a change in investment strategy on meeting policyholder expectations for bonus declarations and failed to consider mismatching and the effect of the solvency requirements and free assets on the investment strategy.

A number of students discussed changing the bonus distribution strategy, rather than the investment strategy.

END OF EXAMINERS' REPORT