

# **EXAMINERS' REPORT**

*June 2013 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. Factors to consider:

- The investments of the insurer should be appropriate to the nature, term and currency of its liabilities.
- The investments should also be selected so as to maximize the overall return on the assets (income and capital), subject to the risks being taken being within the financial resources available to it.
- The extent to which the company may depart from investing in appropriate investments in order to match its liabilities, depends amongst other things on the extent of the company's free assets.
- Since the liabilities of this business are fixed in monetary terms, the most suitable match for these liabilities would be fixed income assets such as government bonds and corporate bonds.
- However, if the company is looking to enhance the profitability of this business through maximizing returns, it may want to consider retaining or increasing the equity proportion of the assets underlying the business.
- However, investing in equities will increase the risk of the assets not being able to meet the liabilities:
  - Hence the company should consider how much free assets it has and how much of these it is willing to use as a cushion against this risk.
  - This consideration should also involve looking at the other products that the company has and how much risk it has on its books from those businesses.
- The company may also use a greater proportion of corporate bonds to back these liabilities instead of using only government bonds keeping in mind the additional returns that these bonds provide in respect of the additional default risk.
- The company may also consider investing a certain proportion of the fund in index linked assets such as index linked bonds to meet the expenses outgo arising out of this business.
- A combination of equities and fixed interest may also be used to match inflation-linked expenses, provided the equity holding does not lead to unacceptable risk.
- The company should also ensure that the term of the fixed income assets is in line with the term of the liabilities, and that the currency of the assets and liabilities is the same.
- The company should also consider whether it wants to start writing business in this fund again or simply run the fund as a closed book which will affect the liquidity requirements of the fund which need to be taken into account within the investment strategy.
- The company should also adhere to any internal guidelines as well as external regulations pertaining to investments allowed in such policyholder funds such as those pertaining to the kind of assets that can be invested.
- The company should also consider any differences in tax treatment of various assets within the fund and how that might impact the returns of the fund.

ii. Matching process:

- The matching of assets and liabilities can be established by carrying out projections of asset and liability cashflows at regular intervals.
- The above should be carried out for a range of scenarios.
- Stochastic techniques should be used at least for the assets and potentially some aspects of the liabilities cashflows such as lapses.
- The above scenarios should be used to identify the extent of cashflow and duration mismatch between assets and liabilities and how they compare to the threshold identified by the company as to the maximum mismatch that the company is willing to accept.
- A similar methodology could be used to assess the need to modify the investment strategy by either changing the kind of assets or the terms/currencies of the existing assets.

*This question was reasonably well answered in general. For part (i) a few candidates answered this question from the perspective of with-profits business, and made points about discretionary benefits and policyholder reasonable expectations. Many candidates mentioned that corporate bonds may be used as an alternative to government bonds to enhance returns, however very few made the point that part of the excess returns from corporate bonds is compensation for higher default risk.*

*In part (ii) too many candidates focussed on particular features of the projection model, rather than on the overall process.*

## QUESTION 2

i. Factors to consider:

- Expected claims distribution (and claims volatility).
- Expected volumes of business.
- Other in-force life cover.
- Experience on other reinsurance.
- The confidence and familiarity of the company in underwriting this business.
- Other products' retention levels.
- Impact on regulatory capital requirements of different retention limits.
- Risk appetite of the company.
- Free assets of company.
- Importance of a stable free asset ratio to the company.
- Price of reinsurance.
- Whether a profit share is included.
- Impact of various retention limits on profitability and probability of insolvency.
- The opinions of the reinsurer as they should have experience in this regard.

ii. Use a questionnaire only (including medical and non-medical questions).

Problems with this:

- Non-disclosure by applicants is possible
- Questionnaire might not cover everything that needs to be asked.
- Applicant might not be aware of their medical condition.
- Questionnaire may need to increase in length
- Success will be dependent on sound claims underwriting.

Price conservatively to recognise the risk of anti-selection.

Problems with this:

- Might not be possible to price sufficiently for the anti-selection, as the selective effect may just get worse the higher the price and you may just end up with a lot of sick people only.
- Makes the product very expensive and possibly unmarketable.

Impose a pre-existing condition exclusion.

Problems with this:

- You are relying on claims underwriting, and you might not be able to identify and/or prove all cases at claims stage.
- In addition, claims underwriting can be very unpopular and have negative marketing consequences.

Apply a waiting period or accident-only period for cover.

Problems with this:

- While it removes the risk of immediate claims due to anti-selection it doesn't remove the risk of people with generally poor health selecting against you.
- As policyholders may need the cover from outset this may not meet their needs.
- Could pose a reputational risk if deemed unfair.

Only accept cases where people have recently (e.g. within the last year) gone for medicals for insurance purposes (either with your company or another company).

Problems with this:

- It severely restricts the size of the market you can sell the product to.
- People who have had health issues develop since their last medical might still select against you.

*Overall this question was reasonably well answered.*

### QUESTION 3

i. Reasons why surplus may be less than expected:

- Mortality was lighter than assumed in the valuation basis, i.e. fewer deaths occurred. This could be due to random fluctuations or due to medical advances. This resulted in more annuity payments being made than expected, and a higher than expected reserve at the end of the period since more policies than expected survived the year.
- Investment returns were lower than assumed in the valuation basis resulting in a lower asset share at the end of the valuation period. The yield curve will have moved during the period. A mismatching loss will have occurred if the increase in reserves due to the change in yield curve exceeds the difference between actual and expected returns.
- Actual expenses were higher than assumed in the valuation basis. This resulted in the assets backing the policies being less than expected.
- Strengthening of the reserving basis leading to an increase in reserves. This can be the result of an experience investigation and consistent losses in the past, with the expectation that this will continue into the future or new regulations prescribing the reserving basis.
- New business strain on new policies issued, since the reserve at the end of the year exceeded the asset share on new policies written. This would typically be caused by margins in the reserving basis, rather than the business being priced unprofitably.
- Prior errors in the valuation data or model requiring correction may lead to increased reserves and a loss on the valuation basis.

ii. Steps that could be taken:

- Firstly a thorough analysis of surplus needs to be carried out to determine the source(s) of the lower than expected surplus.
- If it is found that the reasons are once-off (e.g. a particularly poor bond market performance due to adverse market movements), you may opt to do nothing in the anticipation of it not being repeated.  
This will have no effect on the EV.
- If it is found that the valuation basis is too weak and does not reflect experience expected in future, the basis may be strengthened where necessary to increase the reserves, for example.
  - Mortality could be reduced.
  - The investment return assumption may be reduced.
  - The expense assumption could increase.
  - Increase the expected expense inflation level.

All of the above will reduce the net asset value part of the EV. The value of in force will increase, but to a lesser extent than the increase in reserves, so overall the EV will reduce.

- If the loss was caused by once-off items, and the valuation basis is considered overly-prudent, the basis may be weakened to reduce the loss for the year, however future valuation results will be less favourable due to the weaker basis. The impact of this action will be to increase the embedded value (net asset value increases by more than the margin reduction in the reserves).

Other steps that may be taken include:

- Re-price the product.  
This will improve the EV of new policies only.
- Change investment strategy to increase investment returns.  
This will not have an immediate effect on the EV but may lead to higher profits and hence higher EV in future (assuming no change to assumptions).
- Implement measures to cut expenses.  
This will not have an immediate effect on the EV but may lead to higher profits and hence higher EV in future (assuming no change to assumptions).
- Ensure that adequate procedures are in place to identify and process annuitant deaths.  
Under-reporting of annuitant deaths can be a significant operational risk.

*This question was handled very poorly by most students.*

*In part (i) most students indicated that the loss is due to experience being worse than “pricing assumptions” or “expected levels” (not indicating what expectations, probably because they didn’t know and didn’t want to commit themselves, or worse, didn’t realise that there are different levels of expected assumptions, depending on purpose). Many students were careless and used vague statements like “mortality experience was poor” or “mortality experience was worse than expected” without providing greater clarification. “Errors in the data/model” earned no credit without further clarification.*

*For part (ii) a surprising number of students suggested that the basis can be weakened to eliminate the loss, without providing any further justification. In general this is **not** a viable option to reduce the reported loss, as while it will improve the result for the year in which the basis is weakened, it will make future valuation results less favourable.*

## QUESTION 4

i. Advantages:

- Such a standardization would have to be agreed by the various insurers, so the companies’ expertise would be pooled to come up with the best solution.
- There will be a sharing of current and future expertise on the topic of medical advances, which will bring costs down for the various players in the market.
- The standardized definitions are likely to be free of ambiguity.

- This could lead to quicker (and hence cheaper) claims settlement, because there should be less room for dispute.
- From a marketing perspective, standardized definitions could result in:
  - easier comparisons between different companies' products;
  - improved explanations by the salesforce;
  - better understanding by policyholders of the products;
  - possible improvements in sales.
- Standard definitions should make it easier to collect industry wide data, which should lead to better information on which to base pricing.
- These benefits also apply to reinsurers.

ii. Product design:

- In order to pay at different levels for a condition, the benefit design will require different levels of severity to be specified.
- Each level of severity will have its own level of cover.
- Each level of severity for a condition would require medical claim qualification criteria.
- Under the existing product, cover is likely to cease when the claim is made.
- This is also likely to happen if the new product makes a claim at the full sum assured amount.
- The new product design should specify:
  - how cover is reduced/ reinstated after partial claim, and
  - what happens if a milder condition progresses to a more serious one.
- In light of the possibility of a wider range of claims that could be made under the new product, one can expect that there may be different/stricter underwriting requirements for the new benefit.
- The impact on administration and system requirements will need to be considered.

Pricing:

- The current product requires an incidence rate per condition by age.
- The new product will require an incidence rate per condition, per severity by age.
- It can be argued that in light of the wider range of possible claims, there may be more expected claims administration expenses.
- The new product is likely to need higher margins owing to the greater uncertainty relating to claims experience.

iii. This is not necessarily the case

- At the most basic level, it is not stated whether the products cover the same conditions, so one cannot make a conclusion.
- Assuming they do cover the same conditions, much would depend on the levels at which the less severe claims are covered - it may be that the less severe ones are covered at very high % (e.g. 75%, 80%) and that these may be expected to occur

more frequently than 100% claims, and that the difference in tier level is made up by the increase incidence of claims.

- Underwriting, product development costs and admin expenses may be higher for a tiered product than a product without tiered benefits, leading to higher expense loadings on the office premiums.

*A wide range of answers was given for this question. Overall performance was poor, although many candidates did answer parts of the question reasonably well.*

*Several candidates gave generic comments such as “consider reinsurance, regulatory requirements” etc., which did not gain credit.*

## QUESTION 5

i. Calculation of the asset share:

- Asset share is the accumulation of monies in less monies out.
- Monies in include:
  - Investment income at the actual rate of return (incl. an allowance for unrealised capital gains).
  - Premiums.
  - Share of profit from other business (e.g. without-profits business), if applicable.
- Monies out includes:
  - Expenses on the contract, incl. commission.
  - Cost of benefits, incl. guarantees and options.
  - Tax on investment income, net of any expense relief.
  - Transfer of profits to shareholders.
  - Cost of capital necessary to support contracts.
  - A contribution to free assets supporting smoothing.

ii. Regular Reversionary Bonus:

- Usually declared annually.
- Once declared it is guaranteed.
- Options include simple, compound and super-compound, where:
  - Simple: % of Sum Assured
  - Compound: % of (Sum Assured + Bonus already declared)
  - Super-compound: % of Sum Assured + different % of Bonus already declared
- Usually set lower than long term interest rate and used to distribute stable profits emerging, e.g. investment returns from coupons on bonds.

### Terminal Bonus:

- Bonus that is declared on a claim event (i.e. maturity, death or possibly on surrender).
- The bonus could be:
  - % of Sum Assured; or
  - % of (Sum Assured + Reversionary Bonus).
- Used to distribute volatile sources of surplus such as capital gains and from other sources such as withdrawal and mortality if policyholders share in these profits.

### Special Reversionary Bonus:

- Bonus declared on an ad-hoc basis.
- Used to distribute surplus from sources that are unlikely to arise again (e.g. surplus from a demutualisation exercise).

### iii. a. Impact on policyholders

- Equity:
  - The reversionary bonuses may need to be lower due to poor recent returns to maintain equity between existing policyholders and new policyholders.
  - Given that most of the profits historically were distributed with a terminal bonus, the reversionary bonuses may not have caused any over-distribution and the existing rates may thus still be equitable.
  - However, if the data error resulted in an over declaration on reversionary bonuses in the past, this may mean that the current level of reversionary bonuses are inequitable, which further justifies a reduction in reversionary bonus rates.
- PRE:
  - Due to policyholder reasonable expectations, lowering the bonus rates may need to be done slowly over a number of years.
  - The company may be able to justify lower bonuses due to returns being lower as a result of the recession. This may mean that policyholder reasonable expectations are still being met.
  - However, this may not improve the free asset position as quickly as required as lower reserves will only result if the expected future bonuses included in the prospective reserve calculation are reduced.
- Free assets and investment strategy:
  - The lower free assets will result in decreased investment freedom which may lead to a shift of the assets to less risky investments.
  - This may further lower the long term return expectations, necessitating a decrease in the reversionary bonus rate.
- Market Conditions:
  - The company may need to maintain lower bonuses for a long period to return the fund to its ideal free asset level. If conditions are reversed in the future it can return to its normal bonus levels.

#### Impact on shareholders:

- Lower reversionary bonuses will result in lower profits being transferred to shareholders.
- However, given that most profits are distributed by the terminal bonuses, reducing the reversionary bonus rate may have a relatively small impact on profit transfers to shareholders (depending on the extent of the reduction in the reversionary bonus).

#### b. Impact on policyholders

- Equity and PRE:
  - Distributions to policyholders should be equitable. The higher asset share previously may have resulted in an over declaration to previous policyholders i.e. previous terminal bonuses were too high.
  - The statutory actuary will need to consider whether it is equitable to lower bonuses as a result of the error (only).
  - The company may be liable to pay out the additional amounts lost due to inequitable distributions.
  - Given the past practice of the company, policyholders (and financial advisors), would have develop some expectation of terminal bonus levels (even though terminal bonus rates are likely to be more volatile than reversionary bonus rates). Reducing the terminal bonus may affect PRE as a result.
  - Given that terminal bonus rates are generally more volatile than reversionary bonus rates, the company probably has more scope to reduce terminal bonus rates (compared to reversionary bonus rates).
  - This reduction in bonus rate will have a relatively large impact on claims (e.g. due to maturity) in the short-term.
  - The needs of these policyholders, in particular, may not be met (e.g. if the product was supposed to repay the capital on a home loan).
- Surrender Values:
  - Surrender values may not fully reflect the terminal bonuses.
  - If the data error causes reputational damage and there are a large number of withdrawals, surrender profits may be possible which may improve the free asset position of the fund.
  - This may however, affect equitable distribution of profits.
- Free assets and investment strategy:
  - If the valuation assumption for terminal bonuses is decreased the free asset position may improve.
- Market Conditions:
  - The recession is likely to result in lower returns decreasing terminal bonuses.
  - If markets improve, the future terminal bonuses may be increased.

### Impact on shareholders

- The lower terminal bonus rates will result in lower earnings being generated for shareholders and if the company cannot sustain its current dividends, the dividend declarations will decrease.

The following points are relevant to both a. & b.:

- May have a negative impact on the share price, affecting shareholders. It may also make it more difficult for the company to raise sufficient capital in the future.
- This may lead to:
  - an increase in surrenders;
  - future new business being lost to competitors if competitors are declaring higher bonuses;
  - making it more difficult for the company to cover its fixed expenses.

*The majority of candidates scored well in parts (i) and (ii), which were standard bookwork questions. Part (iii) was a challenging question and answers were generally poor. Candidates that did not do well on this question typically gave a very limited range of distinct points and/or did not use the information provided in the question. Some candidates suggested that a reduction in reversionary bonus rates would allow the company to adopt a more aggressive investment strategy.*

## QUESTION 6

- i. An analysis of surplus will show the sources underlying the total profit. For items of experience, the profit will be based on the difference between actual experience and expected (as per valuation basis).

If any of the items appear to be significantly different from the prior valuation, then this could indicate a problem with the data.

Specific checks:

- Check for unusual/unrealistic values in the analysis.
- Check the ratio of new business profit to premium income for new business (new business margin) – if this has changed in an unexpected way from last time, this could be due to a data problem.
- Check the investment profit against investment manager's report showing return over the period compared to prior valuation.
- Check experience profit items against accounts e.g. mortality, surrender, expenses profit/loss against benefit payments in the accounts and compared to prior valuation.
- Check initial expenses in the account against new business profit and volumes.

If the sum of the components does not add up to the total profit (calculated from the change in total liabilities and assets), i.e. if there is “unexplained” profit/loss, this could indicate data errors.

- ii. In general the statutory valuation basis is likely to be more prudent than the pricing basis.

Mortality:

- Valuation basis is likely to have higher rates.

Investment return:

- Valuation basis is likely to include a lower return assumption.
- The low reserves on these policies mean that this is not one of the important assumptions.

Expenses (and expense inflation):

- Valuation basis is likely to assume higher expenses.
- Also likely to assume higher expense inflation.
- The gap between investment return and inflation will be lower in the valuation basis.
- Variable expenses, e.g. commission, are likely to be the same in both bases.

Tax:

- Likely to be the same in both bases.

Lapses:

- Needs to be more conservative for reserving, but depending on various factors a higher or lower lapse assumption could be more prudent.

Items not normally part of the valuation basis:

- Initial expenses.
- Initial commission.
- Profit margin.

*For a bookwork question this was answered very poorly. For part (i) several candidates gave the rote explanation of what an analysis of surplus is used for, rather than what the question asked for.*

*In part (ii) several candidates did not read the question, and talked about “bonuses”. A surprising number of candidates said that the supervisory basis would be less prudent than the pricing basis! Too many candidates lost marks because they simply didn’t list the assumptions, and which one would be more prudent. Many candidates spent time on how you would come up with the assumptions, which is not what the question asked.*

## QUESTION 7

### i. Reasons:

- The earned asset share (EAS) per policy is, broadly speaking, the accumulated value of premiums less the policy's share of actual benefits and expenses paid, and is an estimate of the assets available per policy.
- Profit on surrender is equal to the EAS per policy less the surrender benefit paid.
  - The profit on surrender is thus zero when the surrender benefit paid is equal to the EAS.
  - The minimum surrender benefit is zero, which means that there is always a loss on a surrender when the EAS is negative (early on in the policy term).
- The original pricing basis will include margins and profit loadings (i.e. the pricing basis is prudent).
- The difference between the EAS and the prospective reserve on the premium basis represents the accumulated value of the historic margins and profit loadings included in the premium.
  - If the surrender value paid is similar to the prospective reserve on the premium basis, the insurance company retains the difference between the margins included in the premium basis and actual experience, which generally would lead to a profit.
  - If the actual experience is worse than expected (incl. margins), a loss will be incurred on surrender.
- The difference between the prospective reserve on the realistic basis and the prospective reserve using the pricing basis represents the present value of future margins included in the pricing basis.
  - If the surrender value paid is similar to the realistic reserve, the difference between the EAS and the realistic reserve represents the current value (at date of withdrawal) of both historic and future margins.
- The above analysis can be used to guide the company in its decision on what is a fair amount of profit to extract when it decides on the actual surrender value basis.

### ii. The following are principles that apply to all alterations

- PRE
  - Early on the SV is zero, which means that the policyholder essentially just buys a new policy.
  - Policyholders may find this unacceptable.
- Profit Contribution
  - The premium for reduced Sum Assured is based on the current new business rates and the alteration would be consistent with the margins on new business.
  - In addition, profit is being extracted by the use of the Surrender Value:
    - Because the reserve on the premium basis is used, historic margins are retained by the company.
    - However, at early durations, when the asset share is negative, there is a loss on the existing policy.

- In addition, because the original pricing basis is used to spread the surrender value, the margins included in that pricing basis should emerge in the future.
- Expenses
  - No allowance appears to be made for expenses incurred on the alteration.
  - There is a double-counting of initial expenses, because the new business premiums include a loading for these expenses.
  - However, there is no allowance for the cost of alteration, which partially offsets the double-counting of initial expenses.
- Boundary Condition
  - Paid-up is a boundary condition for a reduction in sum assured and this design should be checked for consistency with the paid-up basis.
  - A surrender is another boundary condition, and the proposed alteration value is by definition consistent with the surrender value on the existing policy.
- Lapse and re-entry risk
  - The premium on the altered policy is by definition less than the premium for a new policy with the same sum assured, which limits the lapse and re-entry risk.
- Small change in benefit
  - However, a small reduction in sum assured could possibly lead to a relatively large change in premium rates, depending on how the current premium basis compares to the original premium basis.
  - This could lead to a smaller premium on the altered policy (compared to the current premium), for approximately the same sum assured, encouraging alterations.
  - There could even be an increase in premium for a reduction in sum assured.
- Frequency of changes
  - The basis only changes when new business premium rates change (which should not be very frequent).
- Ease of administrating and communication
  - It could be argued that this basis is not excessively complicated to calculate (given that it uses the existing SV).
  - However, it may be difficult to explain to policyholders.
- Competition
  - Premiums calculated under this basis, should be compared for competitiveness in the market – it the company wishes to be competitive with respect to such alterations.

*Part (i) was bookwork, and was answered well by the stronger candidates. However, the answers from some candidates were very poor.*

*Answers to part (ii) were generally disappointing, for the following reasons:*

- *The range of points made was very limited.*
- *Some candidates just listed the criteria that an alteration basis should meet in general, without explaining how this specific proposal meets / does not meet these criteria.*
- *Some candidates commented only on problems with the surrender value basis, which does not answer the question.*

## QUESTION 8

### i. Needs met:

- The death benefit can provide a lump sum for:
  - Payment of liabilities due on death, e.g. funeral cover, inheritance tax, etc. or repayment of a debt.
  - Money for the insured's dependants.
- Can pass on wealth from parents to children in a tax-efficient way.
- Can provide a savings element through the unit fund.
- The presence of surrender values can provide emergency funding prior to death if required, e.g. on a critical illness which is not covered.
- The critical illness benefit can provide policyholders with a lump sum which could:
  - Assist in replacing lost income (either during recuperation or after recovery and moving to a less stressful job).
  - Facilitate early retirement.
  - Meet fixed liabilities, e.g. repaying a mortgage or loan.
  - Assist towards meeting medical or other costs related to the illness, e.g. the installation of a lift at home following a stroke, or employing a care-giver.

### ii. Risks accepted by policyholders:

- Benefits not received due to:
  - insolvency of insurer;
  - policyholder may be diagnosed with a critical illness, but the illness may not be one of those specified in the contract (even if it is colloquially regarded as a critical illness);
  - there may be exclusion clauses on the contract, e.g. in respect of pre-existing conditions.
- Benefits less valuable than expected due to:
  - performance of the assets underlying the units worse than anticipated resulting in lower benefit payments;
  - regular risk benefit charges increasing at a rate greater than expected and eroding the unit fund;
  - surrender penalty being higher than anticipated causing surrender benefits to be lower than anticipated;
  - benefits not properly understood/explained (e.g. assumed they will keep pace with inflation);
  - benefits can be eroded due to high inflation or unanticipated increases in costs which the policy was intended to cover;
  - not received when expected;
  - taxation changes impacting on amounts received.
- The premiums, despite not increasing, could become unaffordable, e.g. due to unemployment, forcing an unfavourable surrender.

iii. a. Morbidity (critical illness inception):

- The main risk is that the rate of inception of the critical illnesses covered is underestimated.
- The extent of the risk will depend on the data available, and how applicable it is to the eventual policyholders.
- The company is small and recently-established, and so is unlikely to have sufficient credible data of its own to reliably estimate the inception rate.
- Adverse experience may be due to:
  - random fluctuations;
  - advances in medical science leading to earlier diagnoses of critical illnesses, etc.
- The risk is essentially related to the timing of the payment of the sum assured (as some payout will ultimately be made regardless).
- The risk is greater than for a death benefit only because payment depends on a potentially subjective diagnosis of a certain critical illness – which may be challenged resulting in unanticipated outgo.
- The risk is lower than on a conventional critical illness policy owing to the presence of a unit fund.
- There is a risk of anti-selection from people suspecting they may carry a high risk of being diagnosed with a critical illness.
- The presence (and length) of an initial waiting period will impact the risk.
- The fact that risk benefit charges may be varied after the first year reduces the risk.
- However, this may lead to:
  - policyholder dissatisfaction;
  - withdrawals;
  - reduced new business;
  - the unit fund being exhausted.
- Fluctuating claims levels could be a problem as the company is small and may thus have limited capital.
- Selective withdrawals may exacerbate the morbidity risk.
- Moral hazard could also be a problem if the definition of the critical illnesses covered is not tight.

b. Expenses (and expense inflation):

- The only expense charge on the contract is the annual management charge, which must thus meet all initial and renewal expenses.
- The risk is that the annual management charge will not meet the expenses actually incurred.
- The initial expenses and expense charges are mismatched:
  - the largest charges occur late in the policy when the unit fund has grown, whereas the highest expenses arise at outset ; and
  - non-unit expenses are covered by unit related charges.
- Poorer investment growth than anticipated could thus result in initial expenses not being recouped.

- This mismatch can be improved by the use of actuarial funding (which anticipates future unit related margins).
- If investment performance relative to expense inflation is poorer than anticipated renewal expenses may not be recouped.
- Changes in the mix of new business from that anticipated will be a problem as there are likely to be cross-subsidies in the expense recoupment.
- Lower than expected new business volumes is also a risk as fixed expenses may not adequately be recouped.
- The rate of the annual management charge, unlike the risk benefit charge, is not variable and so expense overruns cannot be dealt with by increasing charges.

iv. Capital requirements will be influenced by:

- Contract design (the extent to which it allows reserves and solvency margins to be kept low):
  - The unit-linked design should have lower capital requirements, e.g. through the use of actuarial funding to reduce unit reserves.
  - The lower guarantee on the unit-linked policy (from the variable benefit charges) should also help reduce the capital requirements.
- Frequency of premium payment (getting premiums in earlier will reduce capital requirements):
  - The without-profits policy would have lower capital requirements, as all of the first year's premium is received at outset.
- Relationship between premium and supervisory reserving bases (the stronger the supervisory basis relative to the pricing basis the greater the capital requirements).
  - This may differ by type of product and will depend on the regulatory regime.
- The level of initial expenses (higher initial expenses imply higher capital requirements):
  - The initial expenses under the two contracts may be similar.
  - The variable benefit charge on the unit-linked policy, however, may mean that its underwriting could be less strict, reducing initial expenses.

*Part (i) was generally well answered. Some marks were lost for imprecise comments such as “to provide protection against death”. Some candidates gave the advantages of the product as opposed to the needs met.*

*Part (ii) was reasonably well answered by most candidates. Several candidates, however, did not explain their points well enough, e.g. listing “investment risk” or “high charges” without explaining how these cause risk to policyholders.*

*In part (iii) many answers were too generic, e.g. listing “model, parameter and random fluctuations risk” without attempting to explain what was meant by this and how these may be of relevance here. Furthermore, it is worth noting that “high morbidity / expenses” are not risks, but rather morbidity / expenses higher than expected which are.*

*Part (iv) was a fairly straightforward application of bookwork. Many candidates did poorly in this question, illustrating that they did not know the bookwork, or gave poor explanations of the factors demonstrating that they did not understand their relevance.*

**END OF EXAMINERS' REPORT**