EXAMINERS' REPORT

November 2018

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.

The level term life policy provides for the financial needs of the family in the event of death of the policyholder while the children are still of school going age.

Term life cover is provided at lower cost for the same level of benefit than other products that could also meet this financial need (e.g. whole life cover).

A low cost product is particularly important for young families where disposable income is low.

The option to extend the term of the cover for a further five years provides an additional benefit without the concern of additional underwriting if the insured's health has deteriorated, which allows for an extension of the term if the child has not yet finished school or is pursuing further education

ii.

The insurer is exposed to the following risks:

- Mortality experience e is worse than expected; this is the main risk of the policy.
- Anti-selection at the start of the policy and at the date of exercise of the option to extend the term of the contract.
- These risks may result in the additional premium for the option to extend the policy being insufficient to meet the actual costs of the option.
- Selective withdrawals since healthy lives may withdraw to get a cheaper policy with no option, especially if the loading for the option is high.
- Early withdrawal at times when the asset share is negative.
- Expense risk can be substantial, as the premiums are relatively small.
- Expense inflation may be higher than expected.
- There is some concentration risk, since one death or event, might trigger multiple policies.
- Given the low level of reserves, investment risk is minimal.
- New business volumes and/or mix risk.

iii.

The following items would appear in a cashflow model

a.

- Option up-take
- Mortality rates before and after option take up
- Benefit levels
- Expenses relating to administering the option
- Premium rates on standard lives at time of exercising the option
- Withdrawal rates
- Allowance for the additional reserves before and after the take up of option

b.
Stochastic projections allow a probability distribution function to be assigned to future unknown parameters in particular take-up rates and mortality rates after the extension of the contract.

An understanding of the variation in results (with probabilities attached) might be useful to assess the cost of the option through a distribution of results, which also allows the life insurer to set the premium at various levels of prudence.

In a stochastic model the interaction between variables can be explicitly included, enabling the effect of the interactions to be assessed. For example lower take-up rates would imply worse mortality.

But stochastic models are relatively complex.

Results are sensitive to:
- the distribution chosen
- values of the parameters of the distributions chosen

Also, it may be difficult to select a distribution and model these variables reliably.

In these circumstances a deterministic approach with testing of appropriate scenarios may provide results that do not differ materially from results using the stochastic approach, so the cost of the option could be modelled using a deterministic cashflow model.

Examiners' comments:
Part (i) was generally well answered, but many candidates missed the comment on term insurance being cheaper. Many candidates commented on this being a contract to transfer wealth from one generation to the next, which it is clearly not, given the limited term of the contract.

Part (ii) was also well answered, with most students scoring well. Better candidates explored the risk around the option to extend the term as well, as opposed to the generic comments around term assurance risks.

Part (iii) was answered well, but many candidates forgot to include the standard premium rates applicable at the time.

Part (iv) saw most students only commenting on generic aspects of stochastic modelling, with little attempt at commenting on which variables might be modelled stochastically or where might we expect to observe some interaction between variables. The best answers included comments around the fact that a deterministic approach might very well give the same answer. Many students commented that stochastic model will give "non-zero" costs to the option, which is more applicable to investment options, in fact we can expect that any deterministic approach will also give a non-zero cost to an option such as this.

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QUESTION 2

i.
Underwriting can help by:
- Protecting the insurer against anti-selection.
- Identifying the lives with substandard health risk.
- Identifying special terms to offer to the substandard risks.
- Helping ensure that all risks are rated equitably.
- Helping ensure that mortality experience is consistent with the pricing basis.
- Reducing the risk from over-insurance (through financial underwriting).
- Can also assist with claims underwriting to make sure only valid claims are paid.

ii.
Simplified underwriting, relative to stringent underwriting:
- The majority of the underwriting will be done from the application form and underwriting questionnaire.
- The underwriting could be done over the telephone. This would replace part/all of the questionnaire.
- No medical tests would be required – unless something on the questionnaire suggests that tests are required.
- No visit to a medical specialist (nurse or doctor) for a check-up would be required – unless something on the questionnaire suggests this is required.
- Very limited financial underwriting, perhaps just stating income, or a salary slip to prove income (although the latter is rare in South Africa).
- There are likely to be more accept/decline cases, and less specially rated cases or cases with exclusions.

iii.
Stringent medical and financial underwriting may be a barrier to making sales, because:
- It slows the process down, which may result in the policyholder not completing the process, or going with another insurer which has a quicker process.
- The broker is also more likely to suggest an insurer that has a simpler and/or faster underwriting process.
- People often do not want to be subjected to the hassle/inconvenience of medical tests and many questions.
- If there is financial underwriting, people may not want to provide details of their earnings, or assets and liabilities.
- The more stringent the process, the more likely the insurer is to find something wrong, and hence load or decline the case.

There are costs associated with stringent underwriting, and a more simplified approach could result in significant cost savings to the company. For example:
- Fewer medical tests.
- Less time spent by the underwriters.
- Lower administration cost.
- These costs may not be commensurate with the improvement in mortality due to underwriting, cost savings may lead to lower premiums overall.

iv.

The company could enter into a quota share reinsurance arrangement.

This will:

- Allow a sharing of the mortality losses (if any).
- Provide access to technical assistance in setting the underwriting process.

The company should ensure that its new process is in line with the industry, if other companies are offering this approach. If it is not in line it is at risk of being selected against.

The company will need to train its underwriting staff how to underwrite, and identify risks, with less information than they are used to.

Marketing can be used to target a healthier sub-group in the target market with this product.

The claims process needs to be amended to allow for potential misrepresentation at the initial underwriting stage.

The premiums need to be recalculated based on the expected mortality for the product under the new underwriting approach. All other things being equal, the premiums should increase, although the cost savings need to be taken into account.

The process should be monitored to check if lives with significantly different mortality (than expected in the recalculated premiums) are entering the risk pool. This can be done at application stage, i.e. gender, age, socio-economic class split, or at claims stage, although it is probably too late by then.

If it is possible to change the design of the contract the company could introduce a waiting period for non-accidental death, or introduce exclusions for pre-existing conditions.

Reviewable premiums can also assist to correct any underestimation of the risk cost.

But these changes may be unpopular with policyholders and be inconsistent with principles of treating customers fairly.

Examiners' comments
Part (i) was bookwork and very well answered, with the vast majority of candidates listing at least four of the available points.
In part (ii) most candidates could comment on the lack of medical tests and/or doctor's visits, but few explored the fact that underwriting could now be done via telephone and/or internet channels, which can also be seen as simpler way of getting cover. Better candidates also realised that simplified underwriting is unlikely to have a lot of complicated special terms associated with it.
Part (iii) was also well answered, with most candidates correctly identifying marketability and costs as major considerations.
In part (iv) many candidates did not generate enough ideas and missed some easy marks as a result.

QUESTION 3

i.

Possible reasons for the higher than anticipated incidence rates:

- The pricing basis may have been based on incorrect data. The company may have had little data for pricing during those years, and therefore failed to account properly for claims incidence.
- The company may have modelled critical incidence claims incidence incorrectly. For example, interactions between risk events may have been modelled incorrectly. Given that these products were new at the time, and Dreadsure may have had no experience in pricing the product.
- The policy definitions may have been too loose and inconsistent with what was assumed when pricing. Resulting in more claims than expected due to court decisions in favour of the policyholder
- The underwriting process may have failed to properly control the risk being brought onto the books during the early stages of offering the product. Exposing the insurer to anti-selection.
- Advances in medical technology may have improved the identification and diagnosis of critical illnesses. This means that more cases are diagnosed prior to patients' death – leading to more claims.
- The claims verification process may have been too weak resulting in acceptance of fraudulent or exaggerated claims.

ii.

Claims incidence per stage = Cancer diagnosis rate $\times$ (1 – 30-day mortality rate)

Claim incidence rate for Stage 1 cancer

$$= 0.0006(1 - 0.002)$$
$$= 0.0005988$$

Total claim incidence rate

$$= 0.0006(1 - 0.002) + 0.0002(1 - 0.05)$$
$$= 0.0007888$$

Hence, the proportion of claims relating to Stage 1 cancer

$$= 0.0005988/0.0007888$$
$$= 0.759$$

iii.
Possible impact:

- There will be a change in the cancer claim inception rate.
- The rate would be expected to fall significantly.
- However, the reduction will not be of the order of 75% (as calculated above) as many of the Stage 1 claims which will be excluded may arrive as Stage 2 claims in the future.
- The move will most likely result in the dissatisfaction of current policyholders.
- Policyholders many challenge the review of benefits and may claim that they were not informed about the reviewable contract clause or they had been told such reviews would only be to enhance benefits.
- The regulator may be concerned about the fair treatment of customers implication of the change.
- Particularly if the benefits are reduced and pricing of the product remains unchanged.
- Lapses on existing business are likely to increase, depend on how aware and responsive policyholders are to the changes.
  - ➢ It is likely that policyholders managed by brokers will be the most likely to lapse, while direct marketing policyholders are the least likely to lapse.
  - ➢ Lapses are likely to be selective, with those in worst health (who may not get cover elsewhere) remaining, resulting in worsening of claims experience.
- This may be unpopular with the distribution channel(s).
- The product may become less competitive compared to other products in the market.
- This will damage new business being written.
- It is likely to damage Dreadsure's reputation in the market, particularly if this is not something being done by other insurers in the market.
- It may cause Dreadsure to lose new business on its other products.

Examiners' comments:
In part (i) many candidates failed to give a sufficiently detailed explanation for the suggested reasons for higher than anticipated incident rates.
In part (ii) a disappointing number of candidates failed to take the survival period or Stage 2 cancer incidence rates into account correctly in their calculations.
For part (iii) weaker candidates failed to give a wide enough range of points relating to the implications around fair treatment of customers and the reputation of the insurer in the event of the change to the policy conditions.

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QUESTION 4

(i)
The insurer could use actuarial funding.
For the unit-linked contract the full value of the unit fund will only be required when certain contingent events occur e.g. when the policyholder dies, the insurer can therefore hold the actuarial present value of the unit fund rather than its fully funded value.
The fund management charge therefore needs to be greater than that necessary to cover the actual fund management expenses.
The insurer initially holds fewer units in the fund than would be expected to be bought for the given amount of premium.
The insurer buys back the "missing" units over time using the fund management charges.

The insurer could use negative non-unit reserves.
This method can be used provided it is permitted by the insurance regulatory regime.
The non-unit reserve will be negative if the expected present value of the charges (unallocated premium, risk charges and annual fund management charge) is greater than the expected present value of the outgo in the form of mortality benefits and expenses.

(ii)
Determine a suitable period of data for the experience investigate, balance relevance with sufficiency of data.
Divide the data into homogenous groups, using the following factors: type of product, duration in force, sales channel, age and gender of policyholder, premium/ sum assured.
Ensure that there is sufficient data in each group for analysis to be credible.
For the first year persistency rate: divide policies that survive to end of first year by the exposure for contracts issued in the year rate (excluding deaths and maturities). Follow similar process for year 2 etc.
Investigate any trends or unusual values in the data.

(iii)
Possible reasons:

- Losses due to higher than expected mortality than allowed for the pricing of either or both contracts.
- Higher than expected expenses.
- Higher expense inflation than allowed for in loadings for expenses / charges for either or both contracts
- Fall in fund values for unit linked contract resulting in lower fund management charges than required for on-going expenses.
- Losses due to adverse movements in investment values for assets backing the index-linked contracts, to the extent that assets are not an exact match to the index.
- Lower business volumes leading to lower contributions to fixed expenses
- Different business mix than expected leading to losses from cross-subsidies assumed in the pricing
- High sales resulting in capital strain on the insurer.
- Increased competition in the market.
- Higher than expected withdrawals at early policy durations (when the asset share is negative).

Examiners' comments:
Part (i) was bookwork and relatively well answered. A few candidates failed to identify negative reserving as a second reserving method to reduce new business strain.
For part (ii) and (iii) better candidates gave a comprehensive explanation of the process for setting lapse rates and a wide range of possible reasons for the loss making business.

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QUESTION 5

i.
The insurer will determine cash bonuses as follows:

- The insurer will sub-divide the book of with-profits policies into homogenous groups with similar features.
- It will then assess the actual experience of each group of policies and compare that to the expected experience.
- This will identify what the sources of surplus were for each group of policies, and allow the insurer to attribute mortality, investment and expense profits directly to the groups of policies on which they arise.
- In determining a final dividend for each group of policies, the insurer may decide to retain some profit for smoothing purposes or to improve the solvency position.
- The cash dividend will then be distributed separately to each group of policies according to the following formula:

  Cash dividend = $(V_0 + P)(i'' - i) + (q - q')(S - V_1) + E(1 + i) - E''(1 + i'')$

  Where:

  V_0 is the value of the policy at the beginning of the year on the valuation basis

  V_1 is the value of the policy at the end of the year on the valuation basis

  P is the gross premium of the policy

  i is the (expected) valuation basis rate of interest

  i'' is the actual rate of interest earned over the year on the group of policies

  q is the (expected) valuation basis mortality rate

  q' is the actual mortality rate experienced by the group of policies

  S is the policy sum assured

  E is the (expected) valuation basis expenses

  E'' is the actual expenses experienced under the group of policies

ii.

The change in approach will have to be carefully considered in the light of contractual obligations towards existing policyholders.

Possible advantages:

- The use of terminal bonuses, as opposed to fully distributing all surplus each year through a cash dividend, will improve the solvency position of the insurer.
- It may also assist the insurer in following a less constrained investment policy, which may improve returns under these policies.
- The insurer will be able to enhance the smoothing of bonuses, which may better fit the needs of some policyholders.
- Bonuses will now relate more directly to benefits and clients may feel that they better understand what to expect from policy benefits.
- The change in approach may make the policies and their benefits more comparable with competitor products.
- Policyholders may be trying to save for a specific goal and bonuses that accumulate to maturity (as opposed to paying out in cash each year) may suit their objective better.
- Reversionary bonus levels and ultimately maturity benefits may seem bigger to policyholders in relation to the cash bonuses that can be afforded for a similar premium and experience under both approaches, which may help to enhance new business volumes.
- The new approach may be simpler and less costly to administer.

Possible disadvantages:

- The change will defer the sharing of bonuses with a policyholder, which may be perceived as less favourable for policyholders than the previous practice.
- Policyholders may not value the increased death cover benefits and may have purchased these policies specifically for the annual cash dividend and may now not be able to meet their objectives.
- Policyholders may feel that the new approach is less fair than the current method.
- It is a material change in approach and existing policyholders may feel that their reasonable expectations are not being met.
- For this reason the insurer may have to apply the change in approach only to new policies from a certain date and continue existing policies under the old approach.
- As a mutual insurer, under the new approach, the insurer will lose its ability to pay an annual dividend to policyholders and may lose favour with potential customers when compared to proprietary insurance company competitors.
- There may be large expenses associated with the required system changes and client communication.

iii.
It may face the following challenges:
- Bonus declarations will have to be reasonable given policyholder reasonable expectations created through policy contracts and marketing material.
- Policyholders will expect real returns under these policies, which are normally obtained through investments in equity and property. Given the recent investment performance of these two asset classes, it may be a challenge to obtain real returns over certain durations.
- Given the volatility of returns from equity and property, it will be a challenge to smooth bonuses, especially annual reversionary bonuses.
- It may be difficult to initially determine a suitable bonus level and the sustainability of reversionary bonus rates may come under pressure.
- Under these conditions, the insurer may want to make more use of terminal bonuses, which will make final policy benefits less certain for policyholders.
- This may lead to reduced new business volumes compared to competitors that provide more guaranteed type savings products.
- Terminal bonuses may even need to be negative in some cases.
- The volatility of returns will cause large fluctuations in the earned asset shares of these policies from one year to the next. This will lead to increased capital requirements, making these policies either less profitable to the insurer or providing less value for money to the policyholder.
- Policyholder confidence in the product may fall, leading to higher withdrawal rates.
- The policyholders may perceive surre nder values to be unfair or too volatile.
- The insurer will be new to managing reversionary and terminal bonus rates under the new methodology, which may lead to it making mistakes with bonus declarations. This will either cost the company money or lead to potential client losses.

Examiners' comments:
Part (i) was bookwork, but was poorly answered by most candidates. Many candidates simply provided the formula and did not state the obvious/easy process points related to subdividing policies into homogenous groups, comparing actual to expected experience and attributing mortality, investment and expense surplus to the policies on which they arise, or holding back a portion of the surplus to aid smoothing.
Part (ii) was largely application of bookwork, but was still answered less comprehensively than expected by most candidates, indicating a lack of preparation or understanding of the impact.
Part (iii) was a more advanced application question, with most candidates struggling to produce a comprehensive answer.

QUESTION 6

i.

A passive valuation approach is one which uses a valuation methodology which is relatively insensitive to changes in market conditions and a valuation basis which is updated relatively infrequently.

The advantages of the passive approach are that:
- it is straightforward to implement;
- involves less subjectivity; and
- will result in stable profit release.

An active approach is more closely aligned to market conditions with assumptions being updated on a more frequent basis.

The advantages of the active approach are that:
- it provides management with a more relevant and up-to-date balance sheet allowing more informed decision making; and
- it enables management to take necessary corrective action earlier than if a passive approach was used thus reducing the risk of insolvency.

ii.

The impact on the solvency of the business is dependent on the net impact of the release of prudential margins and addition of risk margins and the impact of the move to a zero-coupon risk free bond curve instead of discounting using a 10 year point on the government bond curve.

The move from prudential margins to a best estimate basis will result in a reduction in the policyholder liabilities for the whole life cover product.

The policyholder liabilities will be increased by the inclusion of risk margins which allows for the cost of capital of the product.

The financial implications of the move to a zero-coupon risk-free bond curve will depend on the term of the remaining cashflows on the in-force book and the shape of the zero-coupon risk free bond curve.

If most of the cashflows are concentrated in the term less/more than 10 years and the zero-coupon risk free bond curve is upward sloping, the value of the liability will increase/decrease.

If most of the cashflows are concentrated in the term less/more than 10 years and the zero-coupon risk free bond curve is downward sloping, he value of the liability will decrease/increase.

iii.

a.

The policyholder liabilities for the conventional life annuities will increase for the lower mortality and increased longevity assumption.

The whole life cover policyholder liabilities will reduce for the impact of the lower mortality.

The capital requirement and risk margin for the conventional life annuities will likely increase if the stress to determine the capital requirement is a proportion of the mortality and longevity improvement assumption, whereas the capital requirement and risk margin for the whole life cover products will likely decrease if the mortality stress is a proportion of the mortality assumption.

b.

The increase in yields will reduce the policyholder liabilities for all three products.

The capital requirement will reduce due to the impact of the higher discount rate on the stressed cashflows.

Particularly for the whole of life product and conventional life annuities which have long durations.

Consequently the risk margin should reduce for the products, in particular for the whole life cover and conventional life annuities.

c)

The use of the illiquidity premium for the 5-year investment product results in an increase in the yield for discounting the policyholder liabilities for this product.

The size of the policyholder liabilities will consequently reduce.

The capital requirement may increase if the regulator requires capital to be held for the risk that the illiquidity premium assumption is incorrect.

As the 5-year investment product does not have many uncertain assumptions, the risk margin is expected to be small (potentially a risk margin for expense risk). There is therefore likely to be minimal impact on the size of the risk margin.

The risk margin may increase marginally if capital is held to support risk of the illiquidity premium not materialising.

Examiners' comments:
Part (i) was a bookwork question and most candidates performed well.
Part (ii) was poorly answered. Many candidates identified the changes that would arise from the margins, however, few candidates identified that a market consistent approach should use a full yield curve rather than a single point on the curve.
Part (iii) was fairly well answered with candidates identifying a number of the impacts correctly. Some candidates struggled with the understanding of the difference between impacts on the liability and impacts on the capital requirement.

QUESTION 7

i.

The liability characteristics and the most suitable matching assets:

- Income Protection (IP) pays a regular income, usually to retirement age, to an insured who becomes unable to work due to illness or accident.
- The term of the liabilities depends on the policyholder age profile. It is likely to be medium- to long-term (e.g. up to 30 years for a young insured). There is unlikely to be a surrender value on without-profits IP (which would have reduced the term of the liabilities).
- The nature of the benefit (and hence matching assets) depends on the policy conditions. Benefits can either be fixed (level or fixed increase) or linked to an index (prices or wages).
- Fixed benefits are best matched by:
  - ➢ fixed interest stocks of suitable term, probably government-issued;
  - ➢ corporate issued stocks can increase the expected return through the liquidity premium if stocks can be held to maturity, however the extent to which credit risk can be accepted depends on a number of factors e.g. solvency level and risk tolerance.
- Index-linked benefits (linked to price inflation) are best matched by CPI-linked bonds.
- Index-linked benefits (linked to wage inflation) are best matched by a basket of high-quality real-return assets e.g. property and equities. However, there is a risk of needing to sell assets at inopportune times due to short-term asset volatility.
- The extent of index linkage may differ for benefits out of claim and within claim, and the asset mix must reflect this.
- The nature of the insurance company's expenses are likely to be real (linked to wages) due to staff costs.
- Hence real type assets (index-linked bonds, property and equity) are suitable.
- The currency of the liabilities depends on policy conditions. Policies usually pay IP benefits in a foreign country if the insured is working in that country at the time of claim event.
- The insurer should invest in the same currency as the liabilities for a matched position.
- The variability of experience depends on target market, location and policy conditions, which can make the experience uncertain and variable.
- This requires assets to be more liquid and less volatile than for more stable and predictable life products.

ii.

The cause(s) of the reducing solvency level should be investigated:

- One (and possibly the main) cause will be new business strain from strong sales growth. Changing investment strategy in this case is not likely to have much impact, and at best might only delay insolvency.
  - ➤ The insurer may need to find alternative sources of capital or alternatively reduce sales growth and/or sell a less capital-intensive product.
- The uncertainties and guarantees of a without-profits IP product are likely to result in relatively high capital requirements.
  - ➤ Reducing the level of guarantees e.g. making the premiums reviewable, may help reduce new business strain.
- The insurer should satisfy itself that the expected deterioration in the solvency position is not due to an inadequately priced product (and that strong sales growth may be due to this) leading to projected losses.
- Expense inefficiencies might contribute to the reducing solvency level, and changing investments may not have enough impact to offset this.

The director is correct in that property and equity returns are normally expected to be higher than other asset classes,

However the suggestion may have limited effect:

- If the benefits are index-linked (in particular to wages), the asset mix may already include property and equities as matching assets.
- While these asset classes may be expected to produce higher returns than other assets, they can also experience higher short-term volatility.
- This volatility may require higher capital requirements may lead to a higher chance of insolvency.

Other issues to consider

- Rental income from property may provide regular cashflows to support regular income protection benefit payments, but cashflows from equities may not provide a suitable match.
- Property and equity are not a suitable match for short-dated liabilities or for fixed liabilities – this increases the liquidity risk of the insurer.
- The mismatch created increases insolvency risk and is likely to lead to higher capital requirements.
- The insurer will need to hold a minimum level of liquid money market investments as working capital and to meet short-term claims and expenses.
- Direct property investment is very illiquid and only the largest insurance companies could achieve acceptable diversification, and hence indirect investment is likely to be more suitable.
- A large-scale sale and reinvestment of the assets currently held will incur significant trading costs and other costs (e.g. unfavourable price changes due to the insurer's switch, taxes) and these costs might outweigh the benefits.

iii.

If the director's intention is to increase mismatch risk in order to maximise shareholder returns, then this might be acceptable provided:

- Higher mismatch reserves or capital requirements resulting from higher risk investments do not negate the benefit of higher returns from property and equity.
- The increased probability of insolvency due to a resulting mismatch is within the company's risk tolerance.

If the intention is to increase free reserves over time, the company should consider other aspects of the business as well as investments, namely sales and distribution strategy, product strategy, reinsurance strategy and expense management.

But although the holdings in equity and property may be increased it is likely that the insurer will continue to hold other asset classes.

Examiners 'comments:

For part (i) better candidates identified the various possible benefit structures (fixed, increasing with price inflation and increasing with salary inflation) and identified possible matching assets. Many candidates discussed factors to consider when setting an investment strategy that were not relevant to matching assets.

For part (ii) many candidates failed to consider possible reasons for the reducing free asset position and alternative responses to addressing this risk. Many candidates failed to give a sufficient range of points in their justification of the response to the director's suggestion.

Part (iii) was poorly answered, candidates who scored better demonstrated how their response and justification of the response would differ from part (ii).

QUESTION 8

i.
Embedded value is calculated as the sum of:
- The shareholder-owned share of net assets, where net assets are defined as the excess of assets held over those required to meet liabilities.
- The discounted value of future shareholder profits arising on existing business; often referred to as 'present value of future profits'.

ii.
Net asset value:
- The assets may be valued at market value or may be discounted to reflect 'lock-in' to the extent that assets backing solvency capital requirements are invested more cautiously and as a result are expected to earn a lower return.
- The insurance liabilities are valued on the supervisory basis.

The future cashflows on the existing business are projected on the embedded value basis and are used to estimate the future shareholder profit.

These cashflows include future premiums, investment income, claims and expenses, plus the release of supervisory reserves.

The cashflows are discounted at an appropriate risk discount rate to determine the present value of future profits (PVFP).

The risk discount rate incorporates a risk margin for unpredictability in the emergence of profit.

The PVFP is effectively the release of any margins within the supervisory reserves relative to the embedded value basis used.

The embedded value basis is usually a realistic basis.

The insurance liabilities used in the calculation of the present value of future profits are consistent with the insurance liabilities in the calculation of the net asset value i.e. the projected future liabilities are on the supervisory basis.

Tax on profits and investment returns is allowed for, as appropriate.

iii.
Moving from a prudent to a best-estimate basis for determining supervisory reserves will result in a release of reserves at the point in time that the basis changes which will increase the net asset value.

As reserves have reduced the release of reserves over the policy lifetime will be reduced reducing the level of the present value of expected future profits.

The impact of any possible increase in the solvency capital requirement due to the move to a risk-based approach may have the effect of reducing the embedded value if assets are discounted to reflect 'lock in' of assets to support the solvency requirements that are expected to be invested more conservatively.

Examiners' comments:
Part (i) was pure book work. Many students correctly identified the two components, but lost marks by failing to indicate "shareholder's portion of" in one or both of the components.
Part (ii) was again bookwork or the application thereof, but the question was answered less comprehensively than expected. Many students missed marks by not describing the basis for valuing assets, or by getting confused with a market consistent valuation method. Most students

were able to list the basic steps of projecting the cashflows, listing the cashflow components and discounting the cashflows at an appropriate rate, but missed the points on the valuation bases applicable to the cashflow components and the reserves.

For Part (iii), most students identified the impact on the NAV, but missed the reduction in the release of reserves component.

END OF EXAMINERS' REPORT