Actuarial Society of South Africa

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Subject A311 — Actuarial Risk Management

PAPER TWO

EXAMINERS' REPORT

This subject report has been written with the aim of helping candidates. This report summarises the main points that the examiners were looking for and some common problems encountered.

QUESTION 1

<u>Examiner's comments:</u>

Part (i) was a bookwork question which most students did well on. Part (ii), while mostly bookwork, was less well answered, with few finding enough comments for the marks available. It was disappointing to see some students explain surplus reinsurance as excess of loss reinsurance.

(i)

- Reinsurance leads to a reduction in claims volatility and hence:
  - smoother profits
  - reduced capital requirements
  - An increased capacity to write more risk…
  - …and subsequently achieve diversification…
  - …or economies of scale quicker.
- Reinsurance can limit impact of large losses arising from:
  - a single claim on a single risk
  - a single event
  - cumulation of events
  - geographical or portfolio concentrations of risk.
- This in turn would reduce the risk of the company going insolvent
- …as well as enable them to write larger risks.
- Access to the expertise of the reinsurer is often a big benefit of reinsurance.
  - Smaller and start-up insurers may benefit from this expertise
  - Assistance with underwriting and/or claims services may be available
- Reinsurers can also provide data and/or rates as part of this assistance.

(ii)

- Under proportional reinsurance the reinsurer covers an agreed proportion of each risk.
- This proportion may either be constant for all risks, i.e. quota share…
- …or vary by risk covered, i.e. surplus.
- Both forms must be administered automatically and hence require a treaty.
- Once the proportion of retained cover is set, all future claims on that risk will be shared between in the insurer and reinsurer using that proportion.
- Premiums will also be shared in that proportion…
- …but it is likely that there may be some reinsurance commission payable from the reinsurer to the cedant...
- …to compensate them for their higher expense base in writing and administering the business.

QUESTION 2

<u>Examiner's comments:</u>

In part (i) most candidates managed to score marks for options relating to contributions and investments. Some students wrote several points on investment choices but failed to list options beyond contributions and investments. In part (ii) there were many instances of poor exam technique where students did not specify whether their points were referring to the member or sponsor and, in some cases, the students made comments that indicated that they did not know that there is a difference between the fund and the sponsor.

(i)

- She may be able to decide whether to join the fund or opt out.
- She may be offered different investment choices.
- She will need to choose a commutation amount at retirement
- She may need to select a particular type of annuity at retirement…
- …as well as what percentage to allocate to a spouse's annuity…
- …and what level of increase she would prefer.
- She will be able to choose when to retire – early retirement, later retirement
- She may be able to choose the level of life cover offered by the fund
- She may be able to select the amount she contributes to the fund
- There may be an option to preserve her fund balance if she leaves the employer, or to take it in cash

(ii)

Members - advantages

- flexibility of investment choice to cater to personal circumstances
- members may be able to construct a portfolio which "matches" their retirement choices (e.g. annuitize versus cash)
- encourages members to pay attention to their retirement savings as they will need to consider the options.

Members - disadvantages

- Member behaviour – could switch at the worst possible times – e.g. switch into low risk straight after market correction
- May encourage members to focus on short term – not appropriate for retirement
- Members will need to make a choice and may not be financially sophisticated enough to make this choice

Sponsor - advantages

- choice may make fund more attractive to member
- other industry funds may be offering this

Sponsor - disadvantages

- Poor take-up due to apathy may mean choice not widely exercised
- More governance and possible costs as need to identify and appoint a number of managers and portfolios
- Reputation – members may make inappropriate choices and blame the fund/sponsor for a poor investment outcome
- Administrative complexity – possible more scope for error

QUESTION 3

<u>Examiner's comments:</u>

Candidates performed reasonably well with this question, but in some cases did get confused with the differences between risk management at enterprise as opposed to business level.

(i)

Advantages of managing risk at the business level

- Parent company decides on its overall risk appetite…
- … and then divides this between the business units.
- The management of each business unit then manages the risks of the business…
- … within the allocated risk appetite
- Business units may "bid" for risk to ensure that risks are allocated to those areas with the highest expected return
- Each business unit feels a sense of responsibility / direct involvement in risk management
- The management teams of the various business units are most closely involved in understanding the risks …
- … and how to deal with them.

Advantages of managing risk at the enterprise level

- Group risk management function is established.
- The risks of the various business units are identified …
- … and then the results combined into a risk assessment model at the enterprise level.
- Enterprise risk management involves considering the risks of an enterprise as a whole…
- … rather than considering individual risks in isolation.
- This approach makes allowance for the benefits of diversification or pooling of risk
- It provides insight into the areas with undiversified risk exposures or too much concentration of risk…
- … where the risks need to be transferred or sufficient capital set aside to cover.
- Such an approach is important in ensuring efficient capital use across the group.
- Enterprise risk management is also more effective in enabling a company to take advantage of opportunities to add value.
- Understanding risk better across the whole enterprise can allow the company to take greater risks in order to increase returns.

(ii)

- Business unit risk management works best when the business units have a high degree of risk correlation …
- e.g., the business units are all life insurers operating in different geographic areas

- Enterprise-wide risk management has maximum value when the business units are very diverse (in different industries and across different geographies) …
- … such as a multinational diversified financial services group

QUESTION 4

Examiner's comments:

Part (i) was from newer bookwork in the A311 course material and unfortunately few knew the material well here and hence scored few marks. Many made a lot of comments on climate change and why this is bad, as opposed to what regulations aim to achieve. Responses in part (ii) were reasonable in general, but in some instances almost only generic investment concerns were noted with little application to the setting and the implications of the proposal on the firm.

(i)

Regulators are working on regulations which aim to:

- Develop actions and policy to mitigate the effect of climate change …
- … and adapt to it
- consider climate risks in business decision making and strategic planning
- effectively disclose and report on climate-related risks and opportunities
- adopt a consistent and reliable means of assessing …
- … and managing climate-related risks
- incorporate environmental, social and governance (ESG) factors into investment management decisions
- incorporate financial risks from climate change into existing risk management processes
- use scenario analysis to inform risk identification …
- …and to estimate the impact of financial risks arising from climate change
- consider the impact of climate risks on the ability to meet obligations…
- towards policyholders and other key stakeholders.

(ii)

Topics that may be considered in your response

- Aims and mission of the NZAMI
- Other signatories to the NZAMI
- What does carbon neutrality mean?
- Arguments in favour of the existence of man-made climate change
- Arguments against the existence of man-made climate change
- What happens if climate change is not arrested?
- Impacts of the NZAMI on the Assets R Us investment universe
- Direct costs to Assets R Us of the NZAMI
- Indirect costs to Assets R Us of the NZAMI

QUESTION 5

Examiner's comments:

This question was poorly answered by most students, although there were no unusual complexities in the question. Many answers exposed a lack of understanding of how commutations work (a retiring member has the choice to convert a percentage of his annuity proceeds into a lump sum), as well as a weak understanding of how defined benefit funds operate in general. Some students saw the word "option" and went down completely the wrong track in their thinking. The other major problem was that students did not appreciate that a commutation option is only exercisable once and only at retirement, and that members who elect to commute part of their pension are not expected to buy another annuity with the lump sum proceeds.

(i)

- The investment return assumption should reflect the assets backing this option.
  - This is likely to be bonds of medium to long term.
  - The investment return assumption should be based on market values…
  - … as, in order to pay the lump sum, the assets will have to be realised.

- An allowance must be made for any guaranteed pension increases
- Decide about the allowance to be made, if any, for discretionary increases.
  - It may be that a conservative allowance is made if the scheme has an established practice of providing discretionary increases.

- The commutation factors should vary according to the age of the member.
  - A mortality assumption will need to be set based on a mortality table …
  - …appropriate to those likely to exercise the option.
  - The mortality basis needs to reflect whether there is the risk of selection against the scheme.
  - Members in poor health might be more likely to exercise the option.
  - Such selection risk can be controlled by amending the assumptions used, …
  - … by assuming heavier mortality …
  - … and imposing restrictions on the exercise of the option.
  - On the other hand, it may be felt that selection risk is minimal in that the option may be attractive to all members, …
  - … as people will prefer to receive the money now rather than later….
  - … such as if there are any tax incentives given on taking the pension as a lump sum.

- The aim may be for the exercise of the option to be financially neutral to the scheme.
  - Using a best estimate basis will be fair to both the member exercising the option and the scheme.
  - However, the views of the sponsor and trustees should be considered …
  - … the sponsor might want harsher terms to be offered on the commutation option to reduce scheme costs or ease liquidity concerns.
  - … Or less harsh terms if the sponsor wants to encourage take up of the lump sum…
  - … to reduce its future longevity risk.

- For practical reasons it is likely that fixed factors will be used that are not changed too frequently.
  - This makes it easier to communicate to members and easier to administer.
  - However, using fixed factors is inconsistent with market-related investment returns.
  - Furthermore, a decision needs to be made as to what triggers an updating of the factors.

- Any relevant legislation should be considered …
  - … such as minimum conversion terms or whether the terms should be unisex.

- Consider the consistency of any new terms with those offered in the past by the scheme.
- Consider the approach taken by competitor schemes.

(ii)

- A maximum amount that can be commuted…
- to ensure that members have sufficient pension to live on.
- There may also be tax regulations for members who commute …
- … such as limiting the tax-free amount
- However, it may be in the interests of the scheme to allow small pensions to be commuted in full …
- … to reduce the administration costs associated with paying small pensions.
- A minimum amount that can be commuted …
- … to ensure that the administration costs can be justified.
- Ring-fencing of any dependants' pensions, …
- …so that members can only commute their own benefit.
- Option is unavailable where the member has taken ill-health or early retirement.
- If the scheme is concerned about selection risk, then some limited medical underwriting could be carried out on exercise.
- Exercise of the option is at the discretion of the employer and/or trustees.
- Option is irreversible once exercised.

QUESTION 6

Examiner's comments:

Overall students missed out on making some of the easier observations in part (i) and generally fell short of making enough comments for the 12 marks. The question clearly stated that both the block of flats and vacant land were included in the purchase and needed to be valued. A disappointing number of students never mentioned the vacant field, while others only commented on the field. A few students assumed a stochastic model would be a good way to value the property – this is too complex and requires a lot of data; a deterministic discounted cash flow model was sufficient

Part (ii) was reasonably well answered in general. Poorer attempts gave reasons why the investor would invest in the property company compared to alternative investments, rather than answering the question on what information is required.

(i)

- The flats themselves would be valued using a DCF approach
- The departure point would be the current rentals agreements in place
- You would discount the expected rental proceeds from the property
- Allowing explicitly for management expenses and tax – ie net rental income
- One would need to make allowance for expected or agreed rental growth
- Expenses should be split into ongoing maintenance expenses…
- …plus once-off regeneration/upgrade projects.
- Expected net rental income should then be discounted at an appropriate discount rate
- This discount rate will be calculated based on a risk-free real rate plus margins for property specific factors such as:
    - Illiquidity of the property (related to property size)
    - Expected inflation
    - Voids in rental
    - Quality of tenant
    - Quality of building
    - Alternative uses of the property
    - Location of the property
    - General Economic uncertainty/outlook for property market as a whole
    - Development potential of property/land
- Some of the factors above may also be allowed for in the cashflows themselves, e.g. allowing for vacancies by assigning a probability less than 1 for each cashflows.

- The piece of empty land might require a more subjective approach since it appears not to be generating a regular income at present.
- One could consider whether the land can be sold separately.
- If so, one can look at the values of similar empty plots of land in the same area.
- A simple DCF approach can be used to place a value on future income from shows/events…
- …but these are unlikely to be as stable as rentals income from the flats.
- Alternatively, one can consider whether this block of land can be developed further.
- In this case one would again consider a DCF approach…
- …explicitly allowing for the cost of development…
- …as well as the duration of such.

- While subjective, one can also consider whether there is any development that can be done on the empty field that would raise the value of the flats themselves…
- …such as sport facilities, medical facilities, retail spaces etc.
- If the potential upside from this is significant it might feed back into the future rental expectations in the valuation of the flats themselves.

(ii)

- Net asset values per share of the property company compared to share price…
- …where NAV represents the value of underlying properties.
- Quality of management of the property investment company…
- …as well and their track record.
- Quality of underlying properties
- Diversification of underlying properties…
- …for example by location and type of property

- Gearing of the company (how much it has borrowed)
- Liquidity of shares in the property investment company
- History of income distributions from the company
- Similar information as above on their counterparts to make a comparison possible

QUESTION 7

<u>Examiner's comments:</u>

Part (i) was generally well answered, but many left out easy points on reinsurance. Part (ii) was poorly answered since candidates did not seem to have read through the whole question and answered some of part (iii) here, i.e. describing the liabilities. Also, many wrote about the level of solvency despite being specifically told to omit this. In part (iii) many candidates did not generate enough ideas for the number of marks and only covered the basic points. Answers were also very generic, and many candidates failed to use the information given in the question. Very few, for example, referred to the information about the declining solvency. Many also suggested that the existing structure offered poor liquidity which is not correct for the types of assets provided.

(i)

Outflows:

- Expected Motor vehicle claims related outflows
  - including seasonal variations in claims
- Reinsurance premiums
- Other business related expenses
  - For example, administration costs, underwriting costs
  - broker commissions
  - Business development costs – marketing, new business
  - Regulatory levies
- Tax payments

Inflows:

- premiums from members
- Policyholder co-payments (excesses)
- Reinsurance recoveries
- Investment incomes should be modelled separately…
- …from investment proceeds from asset sales and maturities

(ii)

Additional considerations

- Asset and asset valuation regulations (e.g. placing a limit on asset classes or a limit on the extent to which assets can be counted in assessing solvency)
- Liability projections – taking into account uncertainty of amount and timing
- Statutory minimum capital and liquidity requirement, regulations
- Expected claims inflation
- Business/growth strategy and planned premium increases
- Policy trends incl. new business, renewals, terminations, risk profile

- Catastrophic events and the extent to which they can be removed by reinsurance
- Asset characteristics (means, variances, co-variances)
- Shareholder/board risk tolerance

(iii)

The characteristics of the liabilities are:

- Real in nature
- Although the short term of the liability means that inflation is not too much of a concern
- Mostly Short term with some claims taking a bit longer to settle.
- Reasonably predictable from year to year although there could be some degree of uncertainty for unexpected weather-related events
- Claims are likely settled in local currency,…
- …however, to the extent that spare parts are mostly imported the insurer will be at risk of local currency devaluation.

Comments on asset mix

- A high level of surplus should mean that the company can take on additional investment risk, so an investment in equities could be appropriate as this will help match the real nature of the liabilities.
- Equities provide a higher expected return than other assets which could assist in maintaining a strong solvency position.
- However given the expected decline in solvency position, the company may need to reduce its exposure to volatile assets (such as equities) which could lead to insolvency if values fall significantly
- The allocation to shorter dated bonds (both index-linked and nominal) is also appropriate as these are asset classes with reasonably stable market values.
- An allocation to inflation linked bonds also provides some match to inflation-linked liabilities.
- A high degree of liquidity will be needed to meet the day-to-day claims…
- …particularly if premiums are being squeezed thus requiring assets to be realized.
- The company appears to have sufficient liquid assets with around one-third of its asset in money market
- Equities are also marketable but due to variable market values care should be taken that assets will not need to be realised at inopportune times.
- One would therefore rather not use equities for liquidity unless absolutely necessary
- The existing asset classes are therefore appropriate; however the company may wish to gradually lower its allocation to equities,…
- …in favour of fixed income and index-linked should the solvency position worsen as expected.
- The company should consider to what extent offshore asset exposure is needed to offset rising expenses from depreciation of local currency:
    - Exposure can be direct or indirect (e.g. shares of local companies operating offshore)
- They could also consider reducing the downside risk of its equity portfolio by investing in downside risk protection using derivatives.

QUESTION 8

Examiner's comments:

Part (i) and (ii) were answered reasonably well, with the better candidates commenting on both the income statement and balance sheet. Weaker candidates confused assets with provisions and treated the provision as an asset and hence made inaccurate comments about improving solvency etc. Many also made comments that alluded to the fact that the provision would eventually have to emerge as profit. This would only be the case if the provision was more than what was required when the experience emerges.

Part (iii) saw most candidates outline the main areas of the ACC correctly, but better candidates kept things simple, practical and made the most obvious comments. Mortality experience with Covid-19 would be limited at this point, so many comments on stochastic modelling etc. generally scored less. Better students recognised that the company surely has a reserving model already and that if the assumptions can be changed in a sensible way, this can go a long way to quantifying the extra provisions required. Comments on new business underwriting and pricing were generally fine. The part on monitoring the experience was often vaguely answered with students not articulating what they are actually tracking and what they will do with the information,

(i)

Income statement

- This provision would be reflected as a claims expense in the current income statement.
- This would reduce the profit reported for the current financial period…
- …which may also lead to a reduction in profit attributable to shareholders…
- …and a reduction in the dividend payable
- In future income statements any Covid-19 claims expenses would be offset…
- …by releases/reductions in this provision.
- If the initial provision was too high/low it might result in net releases/increases in future…
- …and hence a deferment of the current year's profits/losses.

Balance sheet

- This provision would reflect as a liability in the balance sheet
- This would result in an increase to the overall liabilities of LifeCo…
- …and hence a deterioration in the solvency position of LifeCo.

(ii)

- Will result in an overstatement of profit in the current period…
- If this is released as dividends…
- …, then these earnings will be unavailable to absorb future deterioration in the solvency position when provision need to ultimately be raised.
- It would introduce significant volatility in the company's results where a good year is followed by a very bad year.
- The solvency position will look better than it really is…
- … which might result in available capital being used to make riskier investments/acquisitions, …
- …or enter more unmatched asset/liability positions.
- When the understatement of provisions becomes known, shareholders may take a dim view of the company's ability to manage/understand their business…
- …which might put downward pressure on the share price…

- …or their ability to raise finance in future.
- The company's reputation may suffer in the media.
- The longer the company waits to take corrective actions, the more likely they are to lose credibility with stakeholders (e.g. shareholder, brokers, clients).

(iii)

Specifying the problem

- This additional provision is necessary to make sure that LifeCo can meet all policyholder obligations…
- …as well as represent an accurate view of the company's financial condition.
- This provision would represent the expected net present value…
- … of the additional future liabilities arising as a result death claims as a result of Covid-19…
- …that were not anticipated as part of the current pricing basis.
- This would require an understanding of the impact of Covid-19 on the current mortality bases employed in the business.
- The nature of this impact likely to be complex and significantly different by factors such as…
- …age and duration,…
- …socio-economic status, and…
- …vaccination status.
- Consideration may need to be given to what allowance should be made for new business in the near future…
- …given that pricing/underwriting changes would take some time to implement.
- Longer term changes to new business underwriting requirements might also be required…
- …which have an impact on the mortality basis used for new business…
- …as well as the marketability of LifeCo's products.
- This may include different rates for vaccinated vs. unvaccinated clients.

Developing the solution

- Assumptions would be required for the increase in mortality rates as a result of Covid-19
- Observed in-house mortality experience can be used for this,…
- …but given that it is still early in the pandemic, the data might not be reliable.
- Published mortality data/statistics/research can also be considered.
- For the calculation of the initial provision the current valuation can be used as a starting point…
- …and rerun with the amended mortality rates…
- …to gauge the increase in the present value of net future liabilities on existing business.
- At each future valuation date, this exercise would need to be repeated…
- …but using the latest adjustments for Covid-19.
- It is likely that the company would also incorporate some scenario analysis/stress testing…
- …to see the extent to which the company can still be solvent under very adverse future scenarios
- These scenarios must take into account the knock-on effects of the pandemic to e.g. asset values, investment income, business volumes.
- For new business, the company may need to gear themselves for more frequent changes to the pricing basis…
- …to incorporate the latest trends and experience as it emerges.
- It is also likely that the adjustments to the bases may not necessarily be the same for pricing and for solvency purposes…
- …the latter likely being more prudent.
- The team would need to engage with the product development team…
- …as well as take into account sales/marketing considerations…

- …when deciding how to handle a person's vaccination status at new business …
- … and at time of rate reviews

Monitoring the experience

- LifeCo should endeavour to try and flag/identify Covid-19 related deaths as accurately as possible.
- Emerging mortality experience should be compared to what was expected…
- …on the basis of a no-Covid scenario.
- This would assist in understanding the excess deaths being experienced.
- This monitoring will feed back into the assumptions being made for new business...
- …as well as the provisions that were raised.
- New business volumes should be monitored carefully.
- While an increase in new business might be expected given the increased awareness of dying...
- …significant increases might be indicative of anti-selection.
- If new business is significantly down, …
- …this may indicate that the basis is too prudent…
- …or the underwriting approach is being poorly received.

General commercial and economic environment

- It might be possible to try and learn from the approaches other companies might have taken to raise provisions for Covid-19 related deaths.
- The markets may be comfortable with a conservative approach…
- …especially if widespread provisions for all life assurers are being observed.
- It would be important to consider the approaches competitors are taking with regard to changes to their new business processes/pricing…
- …for example, whether they will be loading unvaccinated applications.
- One would also need to be heed any legal requirements of governments.

Professionalism

- One should consider any new guidance already issued by professional bodies on Covid-19 provisions.
- Existing guidance notes and/or regulations around valuations may also include instructions around discretionary provisions.
- It is likely that this provision would require significant interaction with various professionals…
- …such as medical experts, accountants, statutory actuaries, company executives and shareholders…
- …and the team should behave professionally in all these situations, recognizing that more than one valid opinion may exist on a topic.
- Given the sensitive nature of vaccination status…
- ….there is significant scope for conflict of interest between various stakeholders, …
- …which should be managed carefully/objectively.
- Given the abundance of emerging information on this topic…
- …there would be a requirement to remain up to date with the latest research.
- The approach taken to set/review these provisions should be thoroughly documented…
- …and peer reviewed if possible.