ACTUARIAL SOCIETY OF SOUTH AFRICA

EXAMINATION - MEMO

9 May 2024 (am)

Subject A311 — Actuarial Risk Management Core Principles

Paper One

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

Examiner comments: *Generally, the question was answered well, but weaker candidates failed to apply their knowledge to the specifics of the situation set out in the scenario given. While there was some credit given for describing how these products work generically, application was required to score well.*

Private medical insurance

The medical scheme would have provided financial assistance in paying for

- Medical care costs
- ...e.g. hospitalisation following stroke.
- Emergency transport to hospital – e.g. ambulance.
- Recovering in hospital.
- Medication related to condition
- Specialist consultations
- Physical therapist/rehab in-hospital
- May include out-of-hospital benefits for therapy/rehab/treatment.
- Comprehensive cover would have afforded her some choice/flexibility in choices of doctors...
- ...and facilities.
- Eligible benefits would likely have been paid on an indemnity basis.

Limited credit was given for contrasting state vs. private healthcare (e.g. treatment options, waiting times etc.), but that was not the intention of the question.

Critical illness

- She would have received a lump sum benefit payment upon diagnosis of the stroke...
- ...given that the product is comprehensive and the stroke is serious, it is likely that the definition was met for a substantial payout.
- Lump sum can be used to provide financial protection against any of the following needs:
  - Pay off debts.
  - Finance additional care...
  - ...especially if there are limits/exclusions/co-payments on the medical scheme benefits.
  - Pay for additional equipment/devices to help her move around or communicate...
  - ...or to make modifications to her house.
- Lump sum could simply be a windfall payment that may be used as she sees fit...
- ...e.g. treating the family to a holiday.
- Unclear if she is still employed (unlikely), but if she was the CI policy would have afforded her additional income.

Long-term care

- She would have received a lump sum or regular payments...
- ...on either a cash or indemnity basis...
- ...upon meeting the requirements (failing number of ADL's).
- May have covered the cost of nursing care (or provided a nurse to provide such care)
- This would have provided her with financial protection against expense of paying someone to provide care...
- ...or to provide additional domestic services following stroke.
- Protection against the loss of income of a relative/friend who has to provide care/services.
- May have afforded her accommodation in a care facility.
- Provided funds for assistive devices or home/lifestyle modifications.

QUESTION 2

Examiner comments: *The question was answered reasonably well. In part (i), weaker candidates would often state that a certain driver of the valuation was responsible, without referring to the fact that it was higher/lower to what was expected in the previous valuation exercise. Candidates also struggled to generate enough distinct points for the marks available. Part (ii) was purely bookwork and was well answered by stronger candidates. Weaker candidates did not know the bookwork list and struggled to generate enough ideas.*

(i)

- The actuary may have changed method or assumptions since the last valuation. This may be due to
  - Inappropriate assumptions (perhaps used by a different actuary)
  - A change in statutory basis
  - A change in regulatory requirements
  - Actual experience over the last three years may have caused the actuary to revise the assumptions.

Actual experience over the last three years may have differed to that assumed in the last valuation with respect to:

- Investment returns being poorer than expected.
- Salary increases being higher than anticipated.
- Withdrawals being lower than previously or anticipated...
- ...if withdrawal benefits are lower than member liability and result in surplus being generated.
- Pensioner mortality being lower than anticipated.
- Expenses of the fund being higher than expected.
- Pension increases granted in the three-year period may have been higher than affordable.
- Employer contributions not being paid or received late.
- Employer contributions may not have been high enough (i.e. incorrectly calculated at the last valuation)
- Benefits were changed or improved in the last three years without increasing contributions.
- Fraud or mismanagement of funds.
- A large change in the age and service profile of the fund may have occurred – for example many younger people exited.

(ii)

- Assumptions used...
- ...as well as comments on why changes were made, if any.
- Actuarial method used
- Value of liabilities accruing over the year
- Increase in past service liabilities over the year
- Investment return achieved over the year
- Surplus / deficit position of fund
- Change in surplus / deficit over the year (or since last valuation).
- An analysis of the surplus / deficit change.
- Membership profile...
- ...as well as membership movements.

QUESTION 3

Examiner comments: *Even though the content in part (i) is mainly bookwork and quite topical, many candidates struggled to generate enough ideas. A great number of candidates focused solely on the environmental, rather than the financial, consequences of climate change. Part (ii) and (iii) were answered better, but to score well a lot of application and distinct ideas were required.*

(i)

In order to limit the impact of climate change on the financial system, regulators are working on regulations whose aims include ensuring that financial institutions:

- 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, pricing and managing climate-related risks
- Incorporate 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.
- This will address concern among policymakers and financial regulators of the damage climate change could have on the financial system.
- Also recognises that the financial system can play an important role in in transitioning to a low carbon economy.

(ii)

Physical risks

- First order effects of environmental changes could cause disruption of activities of some the underlying companies being invested in (e.g. loss of property).
- For insurance companies their liabilities could be impacted thereby reducing their share price.
    - For example sea level rise or natural disasters destroying premises and or equipment.
- Large-scale climate events such as natural disasters could also impact the economy of a country/region being invested in...
- ...with businesses returning lower profits and hence a drop in share value.
- Pollution events by underlying companies may result in huge fines reducing shareholder value.

Transition risks

- Global efforts to mitigate climate change may cause certain companies to implement changes...
- ...which might be costly affecting shareholder return.
- Or certain industries' share prices may fall while others rise...
- ...as they fall in or out of favour due to increased focus on climate change.
- Some activities related to climate change may be regulated.
- Clients are also more climate change aware...
- ...and may force you as portfolio manager to consider environmental issues in your investment process.
- This introduces extra costs and complexity to the investment process.
- ...and more onerous reporting.
- There may be upside in investing early in green technologies...
- ...however this again comes with risk as these are new technologies.

(iii)

- Exclude certain companies or industries which are not aligned with good ESG practices from your portfolio.
- Actively seek out companies with good ESG policies...
- ...or those which are involved in developing technology related to environmental concerns.
- Include all companies (regardless of ESG) but actively engage (via shareholder activism or engaging with the companies themselves) to improve behaviour of these companies.
- When valuing companies adjust the risk discount rate to allow for impact of climate change (indirectly “downgrading” them).
- Formulate a clear strategy of what policies/behaviour etc. is acceptable or not when evaluating current/potential companies to invest in.

QUESTION 4

Examiner comments: *While most candidates could identify the basic issues to be considered in the setting, many missed the fact that there would almost surely also be an increase in premium for policyholder taking up the option. Stronger candidates also clearly demonstrated some commercial awareness and some appreciation for what reasonable/practical options for part (iii) could be. Part (iv) required consideration of the impact on not just policyholders, but also the company potentially.*

(i)

- Differentiate product from competitors'...
- ...or respond to them launching similar option.
- Attractive to target market (value the option).
- Attractive to distribution network.
- May thus increase sales.
- May be able to increase profit margin on product if found valuable.
- May be an effective way to increase premium income without the additional costs of expensive medical underwriting (especially if successfully priced in).
- Regulations requiring such an option on life insurance products (unlikely).

(ii)

- Anti-selection is the key risk for introducing the option.
    - Likely those in poorer health who will benefit from an underwriting-free increase in cover will exercise the option.
    - This means that the cost of providing cover will increase (experience of those taking up the option will be worse than overall experience).
    - And higher sums assured being paid out sooner.
- There is a risk that the pricing of the option does not sufficiently allow for this increased risk
    - Resulting in losses
- The price of the option may end up making the product significantly more expensive.
    - Which may result in it being less attractive to the target market.
    - Resulting in lower sales or more customers opting for competitors' products.
- Increased complexity of product may affect its attractiveness and hence sales.
- If there is reinsurance on the existing product, there might be some risk that the option would not be covered by original treaty, which could complicate reinsurance administration.

(iii)

- Limit the amount by which sums assured can be increased...
    - ...e.g. as proportion of original.
- Limit the number of times option can be exercised, e.g. only once
- Limit the exercise to specific points in time
    - e.g. only after a fixed amount of time has elapsed, say 10 years
- Exercise only allowed upon specified life events occurring,
    - e.g. marriage, birth of a child
- Limit the age at which option can be exercised, e.g. max age of 65
- Stricter medical underwriting at outset
- Only allow option exercise on policies meeting certain conditions,
    - e.g. not made paid-up; not having taken any premium holidays, etc.

(iv)

- There may be additional anti-selection by existing policyholders who now get given the option to increase cover.
  - Only the ones believing they would benefit from the exercise.
  - Given the additional premiums they would need to pay for the higher cover
  - Initial pricing did not include this option, so offering this option to existing policyholders may make their premiums too high to justify anyone in good health to take the option
  - Exacerbating the anti-selective effect of those taking up the option
- For new business, the cost of the anti-selection and the option can be built into premiums from day 1.
- However, not offering the option to existing business may be deemed unfair by current policyholders, causing them lapse/move to competitors
  - And/or result in bad reputation/press
- There may be a lapse and re-entry effect by existing policyholders who want the option,
  - Which will result in additional underwriting and administrative costs
- So, all in all, it is unclear what would be the correct approach w.r.t. existing policyholders and the option.
- May need to consider slightly different terms and conditions (as above), but still allow some option to increase to avoid risk of bad press/lapses.

QUESTION 5

Examiner comments: *Overall candidates performed well in this question. Stronger students achieved most of the marks available by not just outlining the benefits of reinsurance from bookwork, but also tying it back to the context given by means of good examples.*

- Receive technical support from the reinsurer through access to expertise and data of the reinsurer in areas such as:
  - Assisting with terms and conditions for products like critical illness and income protection to ensure they align with the pricing basis used.
    - Especially useful given complex nature of CI and IP definitions.
  - Setting the mortality and other decrements assumptions for pricing...
  - ...possibly through the use of experience data from the insurer.
  - New business underwriting and claims underwriting support
    - which is important for products like critical illness and income protection which can be complex (note to marker: complexity point similar to point above, only give credit once)
  - The above will be critical for NGA as a new company without market experience.
- Reduce claims volatility and hence ….
  - smoother profits
  - reduced capital requirements
  - an increased capacity to write more business
  - and ability to achieve scale quicker.
- Limit large losses arising from…
  - … a single claim or event like a single company having a fire that results in death of a significant portion of its employees.
  - … cumulative events related to workers in a factory contracting the same critical illness.
  - … geographical and portfolio concentration by insuring companies in the same industry that may be impacted by the critical illness or disability due to similar exposure (e.g. mining).
- All the above would reduce the risk of insolvency and …
- … increase capacity to write large schemes and risks.
- Some proportional arrangements may provide some financial reinsurance solutions.

Examples

- Excess of loss reinsurance where the cost to NGA of large claim(s) is capped with the liability above a certain level being passed to the reinsurer.
- NGA would use risk XL to protect NGA from single large claims (e.g. of senior people with large sums assured).
- NGA would use aggregate XL and catastrophe XL to protect itself from a single event or incident that would impact a whole company, scheme, or industry.
- This would enable NGA to accept risks that might give rise to large claims…
- …and stabilize its technical results by stabilizing claims fluctuations.
- Proportional reinsurance, NGA could agree a quota share (or surplus) with a reinsurer...
- ...where an agreed proportion of each risk (surplus) or constant for all risks (quota share) is transferred to the reinsurer.
- This will allow a reduction in volatility of overall result.
- Also allows more business to be written.
  - could allow NGA to accept many different types of risks, and
  - diversify or spread its portfolio of risks.
- Given it is a new company some sort of financing reinsurance agreement could possibly be arranged...
- ...to alleviate new business strain (especially on the individual life business).

QUESTION 6

Examiner comments: *Most candidates were able to articulate the basic link between interest rates, money supply, demand for goods and inflation in part (i). Relatively few considered the impact on exchange rates as well as the other effects considered in the bookwork. In part (ii) weaker candidates displayed a lack of basic understanding of the workings of a bank. The bookwork here is generally very simple, but candidates provided confusing and unnecessarily complicated answers.*

(i)

- It will increase costs for borrowers with floating interest rate debt (such as the interest rate on home loans). This will weaken demand for other goods, reducing price pressures in the economy.
- It will also promote saving and discourage borrowing. The effects also weaken demand, reducing price pressures in the economy.
- A higher interest rate will tend to strengthen the rand's exchange rate by improving returns on rand-based investments therefore encouraging more people to save money in rands. A stronger rand also reduces the price of imported goods and therefore reduces inflation.
- By raising rates, the central bank signals a commitment to reduce inflation. Price and wage setters will factor this expected reduction into their wage and price decisions which reduces inflation expectations in the economy.
- Higher interest rates will affect asset markets by, for example, moderating house prices. This can reduce the wealth of asset owners and cause them to reduce their purchases, slowing the economy and inflation.

(ii)

- Net interest income
  - The net interest the bank makes on loans will initially increase on the floating interest rate debt
  - This will be followed by a decrease in new loans as the cost of borrowing will be higher
- Non-interest revenue
  - The fees that the retail bank earns on transactions will likely reduce as people spend less in the economy.
- Trading income from the trading book
  - This will depend on the positioning of the bank on its balance sheet in terms of short term vs long term investments and floating vs fixed income investments
  - A bank holding fixed income and long-term investments will have to recognise mark to market losses
  - For a bank holding short term and floating rate investments there will be less of an impact, and they could see an increase in trading income as they invest in higher yielding investments
- Operational expenses
  - No immediate impact but may see lower future expense increases due to lower inflation expectation and a stronger currency.
- Cost of Credit
  - This will increase as more customers default or fail to repay their loans on time due to affordability issues.
  - This will increase the cost of credit.

QUESTION 7

Examiner comments: *Part (i) was bookwork and well answered by most. Under part (ii) many candidates scored reasonable marks, especially given the large number of relevant ideas compared to the marks required. However, many suggested the doctor would purchase an annuity or income drawdown product with the lumpsum from the pension fund. This did not make sense given his age and the timeframe he would need the assets for. Many also suggested he join a pension fund as a future need but given that he is self-employed this did not get credit. Candidates needed to specifically suggest private pension provision. In many instances points around critical illness, disability etc were laboured to the detriment of other issues such as the short-term cover required. Some candidates had poor exam technique by first listing all the needs, then the required products - with no link between the two.*

In part (iii) many candidates did not read the question carefully. The question asked for an investment strategy for the lump sum from the pension fund, not an overall long-term investment strategy for the doctor for his future lifetime. Answers provided were often very generic, listing the standard factors to consider for any investment strategy. Candidates were required to tailor this to the situation in the question to score well. Few covered the interest rate risk associated with the mortgage.

(i)

Indicative advice
- Giving an opinion without fully investigating the issues – such as in response to a direct oral question.

Factual advice
- Advice based on research of facts, e.g. legislation.

Recommendations
- Advice based on researched and modelled forecasts, alternatives weighted, and recommendations made consistent with requirements, work normally peer-reviewed, (give credit if candidate show basic understanding of recommendations relative to other two types above.

(ii)

Current needs

Maintaining his and his family's current lifestyle for example:
- Continuing to pay the mortgage
- Day to day living costs – schooling, food etc.
- Products:
  - An investment product for the lump sum from the pension fund which pays income and is not too risky

Protect his assets such as his home and contents and vehicles
- Against losses due to fire, flood, theft, accidents etc.
- Products:
  - Household and contents insurance
  - Vehicle insurance

Protect the business premises and equipment
- Against losses due to fire, flood, theft, accidents etc. (similar to personal property)
- Products:
  - Business buildings/contents insurance
  - Cover for equipment
  - Fidelity cover for his new practice (if staff are employed)
  - Medical malpractice cover (or professional indemnity insurance), given that he is a doctor

Protect himself and his family against illness or accidents or need for medical treatment

- Products:
  - Medical insurance for himself and his family

He may need capital to start the new practice

- for example to purchase equipment
- Products:
  - A loan from the bank (or use some of his pension lump sum)

Future needs

Once the practice is established it will be covering all day-to-day expenses. Circumstances could arise where he may not be able to work.

- Him being unable to work due to illness or disability
- An unforeseen event such as a pandemic
- Products:
  - Income protection cover and disability cover
  - Unemployment insurance cover
  - Business interruption cover

Should he die, his family would need an income for the foreseeable future

- Product
  - Life insurance policy
  - Credit life insurance policy (to cover mortgage)

Saving for his retirement and old age

- Products:
  - Private pension provision
  - Long term care insurance

Children's education (both primary and tertiary)

- Product: education savings policy/investment
  Medium term real return savings
  - May be tax beneficial products targeting these types of savings.

Saving for holidays and other short-term non-essentials

- Product
  - – liquid saving accounts (fixed deposits and other investments).

(iii)

- The liability is short term as the business is expected to provide an income after 3-5 years
- The liabilities in this case are real as they represent day-to day expenses
- However the term is (hopefully) short so unexpected or long- term inflation not as important
- A considerable liability is the mortgage payments on the home
  - This represents a significant risk if interest rates rise during the period
  - An increase in interest rates would increase the cashflow from any cash assets, but not in line with the increase in mortgage payment
  - This could be "hedged" by switching to a fixed-interest mortgage
  - The implications of paying of part (or all) of outstanding bond should be considered.
- The liabilities are highly predictable as they represent day to day expenses
  - Assuming insurance has been sought for unexpected expenses as in (ii)
- Expected returns on potential assets should be considered as the higher the expected return, the longer the money will last

- Both capital and income will be drawn down as the amount is expected to be exhausted after 3-5 years.
- Therefore, assets which generate income must be considered.
- Liquidity of assets is important as assets will be sold regularly to provide for expenses.
- Due to the short-term nature of the liability and liquidity needs, only assets with stable market values should be considered.
- This can be achieved with money market investments, however these are neither real nor provide high returns, so may run out sooner.
- To achieve higher returns and more stable asset values, some diversification should be introduced.
- Tax efficient vehicles should be used where applicable.
- Practical constraints should also be considered depending on the absolute size of the assets.
- Expenses associated with the investment strategy must be considered – for example paying a financial advisor a percentage of assets may be quite expensive.
- Risk appetite must be considered...
    - Given that he is venturing out on his own, he may have a higher risk appetite.
    - This must be tempered against the fact that he is providing for his family's day to day needs.
- Also consider whether the client does have some other source of income to fall back on
    - parents, wife finding employment, raising a short-term loan etc.

QUESTION 8

Examiner comments: *Most students seemed to understand parts (i) and (ii) of the question but failed to generate enough ideas to score well and many candidates repeated the same point in different ways. Part (iii) was a hard question and most candidates struggled to generate sufficient ideas to score well. Some stated very generic regulation related principles, without making some suggestions as to what this would mean for the legislation in the context of the question.*

(i)

- Improved home ownership and quality of life in the country.
- Higher economic growth through the building of new homes.
- Higher employment rate as the economy grows.
- Inflation protection for pension holders through holding a real asset like a property.
- Protection against devaluation of the currency as property is considered a real asset in most developing countries.
- Improved diversification in the assets of pension funds members…
- …especially if owning property as an asset class was not generally an option previously.
- Pension fund holders can in future use their equity in their house to generate real income in retirement.

(ii)

- Pension fund holders can sell the property immediately after purchase to obtain the equity in cash…
- …managed by only allowing pension fund holders to sell properties that they fully own.
- Erosion of their pension funds especially if they are close to retirement...
- …Managed by having a reducing maximum accessible percentage as one gets closer to retirement.

(iii)

- Eligibility criteria for allowing pension fund holders to utilise part of their pension fund balance for the payment of equity contribution towards securing a residential mortgage.
  - Only those still contributing towards their pension might be eligible.
  - Whether a members should have contributed towards their pension fund for a set period.
  - Whether members close to retirement can be allowed to access their pension funds
  - Whether a member who recently accessed a portion of their pension funds would also be eligible
- The process that should be followed in the application process to access the pension funds for equity contribution. This would include:
  - The different stages of the application process
  - The required documents for each stage
  - The timelines for each stage of the application
  - The application forms and process to follow.
  - Whether one requires a property offer letter signed by the property owner or their legal representative
  - Requirements for the verification of property valuation and existence
- Qualifying criteria for mortgage providers that are eligible to participate in offering pension holders mortgages and their registration process.
- Objection process and timelines if the application is denied or a member would want to withdraw the purchase of their property.
- Available options if the pension holders die during the application process.
- The maximum amount or percentage of the pension fund that can be applied as equity contribution for residential mortgage .
- What would happen if the maximum available amount is lower than the equity contribution required by the Mortgage Lender…
  - …whether the applicant can top up the difference and how.

- Whether married couples, who are pension fund holders, shall be eligible to make a joint application, subject to individually satisfying the eligibility requirements set out in these Guidelines to meet the equity contribution.
- The records of applications received or approved or declined that each party to these applications should keep and…
    - …the length of the period the records should be kept.
- The returns each party to these applications should keep and…
    - …the frequency of submission of these returns.
- Whether pension fund holder can sell the property immediately after purchasing it using a portion of their pension.
- Administrative sanctions that can be levied to parties to the transactions that do not follow process…
    - … and an objection process and requirements.