Actuarial Society of South Africa

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Subject A311 — Actuarial Risk Management

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

<u>Examiner’s comments:</u>

Overall, this question was answered well by most candidates. For part (i), better candidates would consider on aspects other than ownership and profit distribution, but also matters such as access to capital and benefit offerings. Part (ii) was well answered with many points available for linking education to lifestyle factors/choices, occupation, wealth etc. Part (iii) saw many candidates only considering the treatment/education/benefits enjoyed by the insurer's policyholders as contributing to their 'responsible citizenship'. Whilst this is surely part of it, other considerations such as the policies adopted, the treatment of external stakeholders/staff, dedication to community upliftment, corporate governance, ESG practices, etc. all also contribute to 'responsible citizenship' reputation.

(i)

- Mutual societies are usually set up to address welfare of a defined group of people
- Stated otherwise, a mutual generally only starts for altruistic (not for profit) reasons.
- Capital required to establish the mutual society is borrowed and repaid as profits emerge
- There are no shareholders for a mutual…
- …and hence all future profits (after paying the loan) belong to policyholders
- In the case of a public listed company, capital is raised on financial markets – e.g., by issuing shares.
- Shareholders for a listed company may receive dividends from profits which emerge
- Since there is no requirement for shareholder returns…
- …benefits for a mutual should be better than a listed company.
- However, here is no opportunity for a mutual to raise capital in financial markets
- This means that capital intensive products are harder to launch and may be more expensive than for a listed company
- In a mutual society, inherent conflict between the need to reserve profits to build an estate to ensure long-term solvency and the promise to maximise benefits for the members

(ii)

- Education influences the awareness of components/choices of a healthy lifestyle, …
- …most of which reduce morbidity and mortality rates.

The effect can be apparent in aspects such as:

- an increased income…
- …which leads to better access to healthcare …
- … and higher levels of personal security.
- Choice of better diet
- More regular exercise
- Personal health care
- Moderation in alcohol consumption
- Understanding dangers of smoking and drug abuse
- Awareness of a safe sexual lifestyle.

(iii)

- Strong corporate governance framework in place…
- …not tolerating unethical or dishonest actions by their employees/leadership…
- …or stakeholders/business partners

- Keeping executive leadership accountable
- Very transparent with their business practices.
- Involvement in charitable work e.g. sponsorships/foundations etc.
- Strong emphasis on supporting equitable treatment of all staff and partners
- Supporting transformation/diversity initiatives
- Making responsible choices around environmental matters,…
- …e.g. going paperless, having “green” office space, limiting carbon footprint, recycling.
- Taking a strong view of consumer privacy…
- …and data governance/security.
- Taking customer satisfaction very seriously.

QUESTION 2

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

This question was answered poorly by most students even though part (i) was mostly a bookwork question. Students struggled to generate points in the notes which to some extent also showed that they did not understand the concepts involved.

Part (ii) was an open question, with a wide range of ideas that could be considered. Candidates that understood the concept of NAV and used information in the question (e.g. commented on the unlisted equities) did better.

i)

Advantages

- Factors affecting one company in an industry are likely to be relevant to other companies in same industry
- Much of the information will come from a common source and be presented in a similar way…
- …which makes it easier to stay informed on a specific sector.
- No single analyst can be an expert in all areas
- Gives structure to decision-making process since it assists in portfolio classification and arrangement.
- Certain industries require specific expertise to value (e.g. banking and insurance or property companies) which may not be part of every analyst's skillset

Disadvantages

- Many companies operate across sectors
- Analysts who only focus on a handful of companies may lack the broader view of the economy and other factors important to portfolio construction
- There may be better opportunities outside of sector the analyst focuses on, yet he/she is reduced to only including companies in their sector.
- Some asset managers may not be large enough to justify an industry specialist for each and every sector of the economy.

(ii)

What it means

- This means that the market capitalization of ITC (number of shares x share price) is lower…
- …than the value of the underlying investments held by ITC.

Why it might be happening

- ITC may be out of favour with investors – due to corporate or management issues
- There may be a general fall in equity markets not echoed in the value of the underlying unlisted assets
- The expenses and running costs of the ITC need to be allowed for in the pricing…
- …and hence deducted from any income generated by the underlying assets
- In investing in ITC you should expect to be paying for management skills of those picking the underlying investments
- The shares of ITC itself may be more illiquid…
- …and this may be reflected in the pricing as they will be less attractive.

- There is loss of control over underlying assets when investing in ITC thereby further reducing the relative attractiveness
- There may be tax differences between holding ITC shares versus those of the underlying companies
- There may be unrealised capital gains tax that would crystallise if ITC sells a subsidiary
- Income distributions from ITC can be expected to be lower than the aggregate of the underlying companies as ITC may retain income for future projects
- Valuing of underlying unlisted companies is uncertain/subjective…
- …and hence the market might price the share with a margin (discount) to accommodate this
- Governance considerations e.g., voting rights for ITC shareholders may be different to those in the underlying companies.

QUESTION 3

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

The first part of the question is a bookwork question and was well answered. The second part was poorly answered and many candidates demonstrated a very weak understanding of VAR.

(i)

Allows business to

- Identify any new risks faced by the business
- Obtain a better understanding of the risks faced by the business…
- ..in terms of quantifying the materiality and financial impact of individual risks
- Determine appropriate risk and control systems to manage specific risks
- Proactively monitor and manage the effectiveness of risk and control systems
- Assess whether risks faced are changing over time
- Assess the interaction between individual risks
- Appropriately price, reserve and determine any capital requirements for its business.

Other stakeholders also benefit:

- Current/potential shareholders have a better understanding of the business
- Credit rating agencies have additional information to rate the business
- Regulator has a greater understanding of the business…
- …and areas that may require more scrutiny.

(ii)

Advantages
- The simplicity of its expression
- The intelligibility of its units, i.e. money
- Its applicability to all types of risks
- Its applicability over all sources of risk …
- … facilitating easy comparisons between products …
- … and across businesses
- Its inherent allowance for the way in which different risks interact to cause losses
- The ease of its translation into a risk benchmark.

Disadvantages
- It gives no indication of the distribution of losses greater than the VaR, …
- …as it does not reveal how much is likely to be lost should a loss occur that is greater than the VaR
- It can under-estimate asymmetric and fat-tail risks…
- … as it does not quantify the size of the tail
- The sensitivity to the choices of data, parameters and assumptions
- If used in regulation it may encourage herding …
- … thereby increasing systemic risk.

QUESTION 4

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

Students performed well on this question. In part (i) candidates often repeated the same idea or were very vague in what they were trying to say. On part (ii) the application to the situation at hand was often lacking with the discussions being very generic. While part of a good answer, many spent way too much time on data governance as opposed to other more practical suggestions to address the main issue posed.

(i)

- the data are inaccurate or incomplete
- the data are not credible due to being of insufficient volume, particularly for the estimation of extreme outcomes
- the data are not sufficiently relevant to the intended purpose
- past data may not reflect what will happen in the future
- chosen data groups may not be optimal
- the data are not available in an appropriate form for the intended purpose.

(ii)

Proposal form

- The proposal form needs to be designed to collect data at an appropriate level, …
- … including data that although not used currently may be needed in the future
- Proposal form must be clear and unambiguous, so the proposer gives correct information
- It should have inputs that are quantitative as far as possible.

Input of data onto the system

- The system should have inputs in the same order as the proposal form …
- … and ensure that the data capturer does not need to interpret the information.
- Data capturers inputting the information should be well trained.
- Where input fields can be inferred from other data, the system should pre-populate them …
- ... (e.g., date of birth and gender can both be inferred from the ID number)
- Financial incentives could perhaps be offered for accuracy of input.
- The data system should have validation checks …
- checks on blank entry fields
- sensible entry values
- The insurer may send the policyholder a copy of the key information…
- … and ask them to verify that it is correct.

Claims form

- The claims form should also be clear and unambiguous …
- … and link to the proposal form, so that cross-checking of information can be carried out.

Other features of a good data system

- The system should be capable of storing information, …

– … so that historical data is available for future pricing exercises.
– The system should be robust and flexible.
– The system should be secure
– Only certain individuals are allowed to amend the data on the system.
– Checks of movement analyses should be carried out regularly
– Checks of changes in policy details should be carried out regularly

QUESTION 5

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

Part (i) required candidates to discuss the operational requirements of the critical illness pricing model. Most candidates were able to score some marks, however a number of candidates discussed the process of building the pricing model or how to function/run the pricing model. These points were not what was being asked. Candidates who performed well were able to make application to the situation and include relevant and well-explained justifications for each of their overarching points.

Part (ii) required candidates to ***list*** *relevant features for expanding into a new country. This question required candidates to think breadth rather than depth in their answers. Candidates who performed poorly were unable to generate enough distinct ideas. Many wasting time elaborating on single ideas.*

(i)

– ***The model being used should be adequately documented****...*
– …so that key assumptions made are understood…
– …and so that other team members can also run the model

– ***The workings of the model should be easy to appreciate and communicate****…*
– …and the results displayed / outputted clearly,…
– …e.g. a simple table of incidence rates by age in this case…
– ….that can easily be uploaded to the quotation system.

– ***The model should exhibit sensible joint behaviour of variables****…*
– …so that when assumptions around the incidence of some diseases are changed, other correlated diseases might change automatically
– …e.g. heart attack and CABG surgery might be correlated.
– This is particularly important given the flexibility clients have in choosing benefits.

– ***The outputs of the model should be capable for independent verification for reasonableness****.*
– One can expect peer reviews of the basis from time to time.

- ***The model must not be overly complex or time-consuming and expensive to run.***
- In this case it is clear that results are required in real time.

- ***The model should be capable of development and refinement.***
- Given the innovative nature of DeltaLife, we can expect new CI insured conditions/events to be added over time.
- Implementation should also be such that these changes do not take unnecessarily long.

- ***There should be methods in place to facilitate the testing of the model…***
- …e.g. automatic testing of thousands of scenarios to make sure results are sensible and as expected.

(ii)

- Legislation and regulation
- State benefits
- Tax
- Accounting standards
- Risk management requirements, capital and solvency
- Corporate governance
- Current product/provider landscape
- Potential for competitive advantage
- Cultural and social trends
- Demographics
- Technology availability/trends
- Investment market
- Economic outlook
- Disposable income
- Environmental issues that could ultimate impact population health
- Treatment trends/ Healthcare system
- Barriers to entry e.g., language barriers, high initial expenses, poor infrastructure or resources
- Distribution channels
- Availability of staff resources/skills

QUESTION 6

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

Part (i) was a straightforward bookwork question, but disappointingly answered, considering that the answer is directly from the notes. In part (ii) many students failed to apply their knowledge to this question and demonstrated a poor understanding of the basics of DB and DC funds. Better candidates could make more than one suggestion of how to address the needs of the various stakeholders.

(i)

Possible disclosures requirements

- Membership summary…
- …along with membership movements
- Assumptions used in the valuation
- Actuarial method used
- Values of liabilities accruing over the year
- Increase in past service liabilities over the year
- Investment return achieved on assets over the year
- Surplus / deficit in fund
- Changes in surplus / deficit over the year…
- …along with some analysis of surplus.
- Expense breakdown
- Benefit cost over the year of any directors

(ii)

- Transfer all the existing liabilities to MaxCorp
  - MaxCorp may also have a similar mix of DC/DB benefits.
  - All retired DB members' benefit obligations can be transferred to MaxCorp's fund…
  - …along with the associated assets backing these liabilities.
  - The approach for any shortfalls in funding for existing MiniCo DB benefits would need to be agreed
  - Active members accumulated DC assets can also be transferred to MaxCorp's fund, …
  - …but some consideration would need to be given to whether the investment options are similar to the ones available at MiniCo's scheme.
- A transfer of funds to MiniCo's beneficiaries
  - Unlikely that regulations would allow the DB members to just receive a capital value of their benefits…
  - …or the DC members to just receive their accumulated savings in the scheme.
  - A more likely scenario is that the benefits are quantified and then MiniCo and MaxCorp assist the members to place the funds with an insurance company.
  - It may also be an option to convert the accrued benefits of DB members that have not retired yet to a lump sum…
  - …and transfer the lump sum to MaxCorp's fund (or a financial services company for preservation).
- Transfer liabilities to an insurance company to guarantee the benefits.
  - This would be an option to consider for the liabilities of active pensioners receiving DB benefits.
  - If not fully funded at present, it may present an unexpected expense to the sponsor.
  - It would be important to make sure that benefits guaranteed by the insurance company are closely aligned to what the member would have enjoyed at MiniCo.
  - Given that the life office would need to make a profit and service capital, it may also be more expensive than just keeping the liability.

- MiniCo's scheme can also simply be closed to new members…
  - …although this is only a temporary option as it would still take a long time for the scheme to come to an end this way.
  - It might be a worthwhile option to consider while exploring available options…
  - …or where existing options present poor value.

QUESTION 7

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

This question was not handled well by the majority of candidates, with candidates struggling to generate a variety of distinct ideas and to clearly articulate why the proposal would save the government money. Most candidates missed the fact that option 2 was intended for people to contribute longer to the fund as opposed to excluding more people from the fund.

Means-testing of benefits

- This change will reduce the cost of State benefit provision…
- … since some higher income people will no longer be eligible for the benefits.
- How many people are affected will depend upon the stringency of the means-testing.
- Such a change may be viewed as fair, i.e. it helps redistribute wealth…
- …however, some members of the population will be aggrieved if they have paid contributions but receive little or no benefit payment.
- People who have been prudent and set aside private pension income will be penalised…
- … and it may therefore discourage people from making their own provision.
- Means-testing involves more complicated administration and increases costs…
- …e.g., identifying individuals that hide other sources of income to qualify.
- It also puts some people off applying for the means-tested benefits.
- Means-testing can be seen as degrading (as it is an indicator of low income), which again discourages people from applying.
- The change will lead to inconsistent treatment across generations …
- …as current wealthy pensioners will receive higher benefits than future retirees who are affected by means-testing.

Longer contribution period

- A longer contribution period means individuals contribute for longer…
- … and individuals may be more likely to retire later, and hence receive benefits for a shorter period of time.
- Such a change needs to be considered against the demographics of the country …
- … to ascertain whether it is reasonable to expect people to contribute for 30 years.
- Certain groups in the population may not be able to contribute for this period of time, for example:
- people who pursue higher education
- people who take career breaks (e.g., maternity leave, carers)
- people in occupations that typically have a low retirement age (e.g., the armed forces).
- The government may consider regulation to allow individuals to buy missing years of contributions in order to qualify for a full State pension.

- Such a change will need to be phased in over a period of time, as it is unreasonable to expect those currently close to retirement to meet such a requirement.
- Increasing retirement age seems appropriate if average age at death is increasing
- Would prevent people from working for the minimum required duration of 20 years and retiring early

Consumer price inflation increases

- This should reduce the cost of pension provision…
- … since consumer price inflation is usually lower than salary inflation.
- The reduction in costs will occur gradually over many years.
- The significance of the effect depends upon the gap between salary and price inflation.
- There is a rationale to increasing pensions with consumer prices, since such increases should maintain the pensioners' purchasing power …

… however, the standard of living provided by the pension will be eroded compared to that of the working population.

- This proposal is likely to receive less backlash from the public than the other proposals

QUESTION 8

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

Candidates did well on this question with many making good application to the setting in their answers. Poorer students insisted on addressing each risk with an insurance product or would failed to identify sufficient distinct risks.

- *There is currency risk (ZAR devalues) in that the event is local (mostly ZAR) and the prize pool is in USD*
  - Use a currency derivative (e.g., future or option)
  - Buy the USD now.
- *Security risk at the venue*
  - Employ event security personnel.
  - Screen spectators at entry
- *Risk that some players may cancel at last minute due to personal circumstances*
  - Have a number of other top players on standby
- *Risk that some players may not arrive in time due to travel delays*
  - Contractually agree on arriving a day or two earlier
  - Have an alternative schedule available for contingencies such as this.
- *Sponsorships withdrawing*
  - Legal experts to draw up agreements
  - Efforts to get more sponsorships than the minimum requirement.
- *Legal liability for spectators' or players' death/injury*
  - Use liability cover from an insurer.
- *Loss or damage to assets at the event (e.g., screens, servers etc.)*
  - General insurance product for the property.
- *Cyber-attack on the event*
  - Use cyber insurance from an insurer.
- *Cancellation of event due to pandemic/earthquake*

    - Event cancellation insurance can help.
- *Fewer spectators than expected*
    - Sell tickets well in advance
    - Incentivise with lucrative competitions
- *More spectators than expected*
    - Sell tickets well in advance to know numbers
    - Build in some margin when considering the venue to use.
- *Risk of interruption in power supply*
    - Have back-up generators on hand (or available on pre-arranged terms)

QUESTION 9

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

Part (i) was easy bookwork mark although only a few students scored full marks. Good examples were given, but in some cases were not T-Sure specific and some were not public liability, which didn't get any marks. Part (ii) saw most students providing the requirements of insurable risks, but many still fail to demonstrate that they know what it means. Part (iii) was poorly answered. This question was an application of bookwork and students were ill-prepared for a discussion on business risks. Students who structured their answers logically generally scored better. Students often mentioned withdrawal risks which is not as relevant for short-term products as in life insurance. Instead, low persistency (renewal) risk would be more of a concern. The question also did not require a discussion on investment risks.

(i)

Description

- Public liability indemnifies the insured…
- …against legal liabilities…
- …arising from some form of negligence…
- …that resulted in death/injury to a third party,…
- …or damage to property belonging to a third party,…
- …other than those liabilities covered by other liability insurance products (e.g. product liability or professional indemnity).
- In many cases, legal costs will also be covered.

Examples

- Client being attacked and injured by a wild animal while on a game drive or walk
- Client becoming seriously ill after getting food poisoning at a restaurant.
- Client's car being damaged by animals while parked at a lodge
- Client being injured/killed during an activity e.g. teambuilding
- A fire spreading starting on the insured lodge and causing damage to a neighbouring property.

(ii)

Policyholder must have an interest in the risk being insured

- It can be expected that T-Sure's clients have a strong interest to avoid events where they can be sued…
- …as this will be disastrous for their business reputation…
- …which is especially critical given the hospitality sector in which they operate where clients have a lot of choice of where to stay/eat/travel.

Risk must be of a financial and reasonably quantifiable nature

- In the event of a claim it is generally expected that the policyholder will be legally liable to make some sort of *financial compensation* to a third party.

Amount in the event of a claim must bear some relationship to the financial loss incurred

- The claim and actual loss to T-Sure is closely aligned, since…
- …T-Sure will typically pay the actual legal liability incurred by the policyholder…
- …and perhaps associated legal costs.

(iii)

Underwriting risk

- Risk that the underwriting process is inadequate leading to inappropriate premiums being charged
- Given that T-Sure is new to this type of product, they might not have the data or expertise to underwrite properly.
- This might also lead to anti-selection risk…
- …for example, applications by clients who know their facilities present greater risk than implied by T-Sure's premium.

Insurance risk

- There is a risk that the *claims frequency is higher than expected*.
- This might be due to inadequate data when pricing…,
- …an ambiguous contract wording, …
- …or a change in the legal system leading to more court awards in favour of the client.
- There might be more moral hazard than expected

- There is also the risk that *claims severity is higher than expected*
- Perhaps as a result of a large single claim, …
- … e.g., a wealthy foreign tourist dying at an insured's facility
- Unexpected aggregation of claims may also happen, …
- … e.g., many clients being exposed to a harmful substance at the same lodge.
- Claims volatility might be more than anticipated.

- Development expenses might be larger than expected.
- The expenses of selling and managing the product might be larger than expected.

Since it is likely that reinsurance would be required on this product:

- Risk that reinsurance terms might be poor value for money
- There is a risk that the product is not reinsured properly…
- …and retained risks are more than expected.

Financing risk

- There is a risk that this expansion ends up generating a poor return for the shareholders…
- …when compared against other alternatives such as other products or acquisitions.
- This should be important to management, given their desire to grow.

Exposure risk

- Risk of insufficient sales volumes…

- …leading to fixed expenses not being recovered.
- This may be due to an uncompetitive product,
- …or downward pressure on price to competition…
- …or a general downturn in the market.
- Too much business might also be sold…
- …resulting in more exposure to this type of risk than budgeted for…
- …as well as strain on service levels.
- Persistency (renewals) might be too low