

Actuarial Society of South Africa

October 2017

Subject A301 — 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.

GENERAL COMMENTS

This paper was significantly better handled by students than Paper 1.

QUESTION 1

Examiner's comments:

This was a bookwork question. Part i was not particularly well answered. Many students wrote a list of capital management tools or of sources of capital rather than defining the broader concept of capital management. This could be from misreading the question and wanting to write down the lists that have been studied. Others incorrectly described the process of capital project appraisal.

Part ii was well answered. A handful of students did not read the question carefully and answered from the perspective of a financial institution not an individual.

i.

Capital management involves ensuring that a provider has sufficient solvency and cashflow to enable both its existing liabilities and future growth aspirations to be met in all reasonably foreseeable circumstances. It also often involves maximising the reported profits of the provider.

ii.

- To cover unexpected expenses like car repairs, health costs that weren't provided for, etc.
- Might wish to build up capital, to save for a large future expense, such as a holiday or a child's marriage.

Many examples were valid but needed to cover both unexpected and future cashflows.

QUESTION 2

Examiner's comments:

A reasonably easy book work question that students struggled to earn full marks. Some students did not seem to understand what a derivative is. In part (i) and (ii) most students did not earn full marks as they did not cover all aspects of the answer.

i.

A derivative is a financial instrument whose value is dependent on – or derived from – the value of another underlying asset.

ii.

Although both are used to control, the difference is that:

- hedging is typically used to reduce risk
- whereas speculation is typically used to increase risk in order to enhance returns

iii.

Both a long and short position implies that the investor has economic exposure to the instrument, the difference is:

- A long position in an asset means having a *positive* economic exposure to that asset.
- A short position in an asset means having a *negative* economic exposure to that asset

[Alternative responses that illustrate the concept well were also rewarded.]

QUESTION 3

Examiner's comments:

This question was answered well by most of the candidates.

- Existing and future policyholders – their interests should be protected and hence considered.
- Shareholders/Board of directors – the merger will have an impact on their shareholding (and hence right to future profits). How will the respective shareholders be treated equitable?
- Employees of both companies – will the merger have any impact on their employment? Will there be any redundancies?
- Competitors in the industry – will this transaction materially affect the competitor landscape? Can this potentially result in reduced levels of competition?
- Regulator – Are there any regulatory requirements that should be considered as part of the merger transaction? Competition commission, as example, need to be consulted.
- Reinsurers – the treaties might have terms and conditions that reinsurer needs to be consulted or agree to a merger

[Any valid well-motivated alternative reason was also be awarded marks. Note that only major stakeholders should be considered.]

QUESTION 4

Examiner's comments:

Part (i) and (ii) (bookwork) were well answered. Candidates were able to score a few marks for part (iii) by suggesting higher returns and diversification, but many missed the opportunity to discuss credit rating and downgrades of SA government debt. A surprising number of candidates did not read the question carefully and discussed currency mismatch/depreciation which was not applicable as the bonds were still denominated in ZAR.

i

Investment trusts

Unit trusts

Local companies with overseas subsidiaries

Local companies which export significantly

Direct investment overseas in bonds, property or other investments (excluding equities because question clearly stated excluding equities)

Derivatives based on overseas assets

Locally listed ETF based on an offshore index

ii

1. Believe they can get greater returns overseas than locally
2. Diversification
3. To match foreign currency liabilities

iii

Diversification away from SA government

- Default risk is entirely linked to SA government credit risk
- Recent downgrades have increased risk of default
- Moving some investments to SA Rand denominated bonds lowers their exposure to SA government

Local regulator might have required it (though unlikely because it means regulator which is appointed by SA government has lost faith in credit risk of SA government)

Overseas rand denominated bonds may be priced more attractively compared to those listed locally - due to higher required returns of overseas investors

QUESTION 5

Examiner's comments:

Most candidates were thrown off by the word "discuss" and elaborated on 3 points (expecting these to each carry 1 mark) as opposed to providing 6 distinct points.

- i. *This was answered reasonably well by most candidates. However, an astonishing number of candidates seem to not be aware that:*
 - a. *Financials of entities in the same reporting jurisdiction are prepared using the same accounting standards*
 - b. *Tax is payable before the distribution of dividends*

ii. *Bookwork question which was answered reasonably well by most candidates*

i.

1. Company A actually earned more premium.
2. Company A paid less commission.
3. Company A had less operating expenses.
4. The income earned on investments was more for Company A.
5. Company A's effective tax rate was lower due to the nature of some of the income.
6. The claims incurred may have been much more for B than for A. (the question mentioned "pay", which can be interpreted as excluding IBNR).
7. Company A may have released reserves.
8. Company A may have had a reinsurance result that was better than Company B's which would improve the net result.
9. Company A may have had profit from other activities or Company B might have had a loss from other activities
10. Company A might account for DAC (deferred acquisition expenses) differently
11. Company A might have a less prudent reserving basis than Company B
12. Company A might have received higher salvages and third party recoveries

ii

Reduce claims frequency:

- Better underwriting of new business.
- Stricter claims underwriting to make sure only valid claims are paid.
- Cancelling in-force business that are expected to deteriorate over time.
- Using risk reducing mechanisms such as no claims discount systems; telematics to track driving etc
- Policy excesses

Reduce claims amount

- Reinsurance for large individual losses and / or catastrophes.
- Increasing / introducing excesses
- Removing / limiting cover
- Reducing the value / availability of any guarantees on the product.

QUESTION 6

Examiner's comments:

This question was surprisingly poorly answered. Many candidates did not apply the criteria for insurability to the specific scenarios. Often candidates listed all the criteria at the start of the question and then simply stated that the risk is insurable or otherwise without applying the criteria or explaining their reasoning. Other candidates focused mainly on the top 3 criteria (insurable interest, financially quantifiable and commensurate payout) for each risk without considering the other ideal criteria for insurability - resulting in very generic, repetitive arguments for or against. Candidates that took the time to think through each scenario, and methodologically considered the main and the ideal criteria tended to score well by making well-reasoned arguments for or against insurability.

i.

- meets criteria of being quantifiable; payout linked to financial loss suffered, low probability, independence
- however fails the criteria of pooling
- should be able to calculate the theoretical premium to cover the risk as the probabilities are calculable
- probably isn't insurable since it is a singular risk yet despite this, similar risks have been insured previously

Marks were awarded if candidates gave a reasoned argument was it was insurable.

ii.

- probability of the event is quite low; few people get hole ones in their lifetimes
- could be open to moral hazard – who is going to establish a person did achieve a hole in one
 - data is most likely publicly available to enable pricing
- is insurable as it meets the rest of the criteria for insurability

iii.

- probability of the event is relatively high depending on the definition of flight delay
- independence of risk could be compromised because (for example) weather could cause delay to many flights simultaneously
- statistical data is available
- not in policyholders control
- possible to insure but might be pricey depending on the definition of flight delay

iv.

- moral hazard risk for self-employed people (if it is in their own control)
- could be concerned about the non-independence of risks
- probability could be quite high at certain times/certain areas
- otherwise it meets the risk of the criteria
- possible to insure it

v.

- probability of the event is high for women of child bearing age
- moral hazard or anti-selection could take place if a person planning to fall pregnant takes out the policy but this can be managed by requiring a minimum waiting period (or something similar)
- it does meet the rest of the criteria to be insurable though
- could address the first two issues through appropriate product design

QUESTION 7

Examiner's comments:

The question was a combination of bookwork and application. Most students did well in part (i) of the question which was bookwork. They were some students who did not earn marks on this part which is a sign they may not have fully gone through their notes.

Most of the students struggled to earn marks on part (ii) of the question. This was mainly because they did not focus on contrasting the two investment opportunities. Students emphasised on aspects that were the same for the two investment opportunities. This a question that requires a student to apply their bookwork to a scenario in the question and to focus on what the question requires.

i.

Property that is most attractive to investors is called "prime". Prime property would score high on all of the following factors:

- Location
- age and condition
- quality of tenant
- the number of comparable properties available to determine the rent at rent review and for valuation purposes
- lease structure
- size

ii.

Cashflow pattern

A: The cashflow pattern will require a large investment (similar to B), but then a stream of inflows will be expected from the date of completion. However, at the same time, maintenance and related costs will be incurred as ownership will remain with the developer.

B: The initial outlay might be similar to A, but once development is complete, then a large inflow should be expected upon sale of the units. All cashflows will then cease.

Marketability

A: Since this project is commissioned by the future tenant, marketability should be less of a concern, at least initially. One should consider the potential duration of the lease agreement with the financial company: If there is a chance of an end-date, then one should consider the marketability of the property in future – will there be similarly large companies that need a head office? The structure and lay-out of the building might also affect this – can it be divided into smaller segments and hence rented to multiple tenants? Or does the structure only allow a single (and hence very large) tenant? The uniqueness of the property might also affect the marketability, especially given the fact that this was commissioned by a specific financial company.

B: Since this is developed in an ‘older and established neighbourhood’ it can affect the marketability either positive or negative – an established neighbourhood should affect it positively, but how ‘old’ the area is might work in the opposite direction. However, the fact that there are 100 units might improve the overall marketability as it reduces the ‘concentration risk’ that might be prevalent for a single-unit property.

Security

A: Since the tenant will be a ‘large financial company’, the security of the income should not be a major risk. One should consider the risk of obsolescence in future although this is unlikely to be a major risk.

B: For this project, security should be less of a concern as the developer will sell the properties in a fairly short period of time.

Yield

It can be argued that project A is potentially more risk than project B given the uniqueness, indivisibility and duration of the investment (although the location might negate this to some extent). One might therefore expect that project A delivers a higher yield than project. *[This can potentially be argued the other way around as well]*

Expenses

A: The additional expenses (as compared to B) will be the maintenance expenses incurred after the property has been developed since the property developer will remain the owner. Additional insurance costs might also be required during the lifetime of the property.

B: The only potential additional costs will be the transfer costs incurred during the selling of the units.

Term

Naturally the term of project A will be materially longer than the term of project B – this typically increases the risk of project A.

QUESTION 8

Examiner's comments:

- i. Students did not generate sufficient points for this question. Obvious points were not stated. Many students went into the details of reinsurance which did not answer the question and thus did not receive marks.*
- ii. This question was very poorly answered. Students focused on ARTs and wasted time describing them, particularly the ones which were not relevant. Very few students addressed all the risks particularly operational risk or how to manage the exposure.*

i.

- Claims paid out will increase due to loss of property - Buildings and contents insurance property
- Potentially motor vehicles damaged too
- Business policies may have business interruption / consequential loss cover...
- ...which will lead to large claims if the building/contents were destroyed...
- ...which means that repairs / reconstruction will take a long time to complete.
- Catastrophic large losses due to the non-independence of the risks / concentration risk
- Large claims volumes and amounts can cause a strain on liquidity
- Will likely reduce the profits that they will make in that year...
- ...which may affect their share price and/or dividends...
- ...and potentially their ability to raise finance etc.
- Operationally they will have a very large number of claims
- Which will introduce an admin strain on the claims processes
- Which may potentially lead to service delivery issues / failures...
- ...not just to affected clients, but also clients elsewhere in the country
- Policyholders may be facing an increase in premiums
- The cost of reinsurance may be expected to increase
- Could threaten the solvency of the company

ii.

- Can potentially try to have excess free capital available at any point in time...
- ...to make sure that its solvency position is not compromised.
- It can potentially arrange a line of credit upfront...
- ...or some other form of post loss funding.
- Securitisation of that catastrophe risk is an option.
- Operationally, it can put in place contingency plans in place...
- ...to deal with the increased demand for claims administration

In terms of managing the exposure:

- It can monitor the concentration risk in the book...
- ...by tracking the number of policies/buildings exposed in a certain area.
- They can focus on achieving as much diversification of risk in terms of location as possible.
- In very high risk areas, it may introduce additional risk management requirements...
- ...in an attempt to minimize the damage caused by a fire or other CAT type event.
- It may also try and limit the consequential damage losses covered, perhaps by applying a maximum turnover or profit reimbursement.

QUESTION 9

Examiner's comments:

i.

Many members merely gave general points about member risks and did not consider the specific benefits mentioned in the question.

ii.

Question gives a structure to answer – method, then data then assumptions. Many did not follow this and went into a lot of detail on irrelevant issues e.g. choice of model.

A number of candidates clearly did not read the question carefully.

Many failed to apply their theoretical knowledge to the specifics in this question. There was lots of theory from the notes not being applied to the 3 benefits in question.

Many candidates did not know the difference between data and assumptions.

i.

Pensioner

- Inflation eroding the value of the R5,000 benefit...
- ...unless the trustees make the appropriate amendments to the benefit amount to allow for inflation
- Four annual visits not being enough and not having any other funding.
- ACME not paying the benefits on time or running out of funds altogether.
- The max 4 GP benefit may prove insufficient late in life when more frequent medical intervention may be required.
- The fact that the arrangements may be reviewed may indicate that the contribution amount may also be reviewed for active members that introduce the risk that contributions can escalate beyond what is affordable.
- Members could be retrenched/dismissed/die before retirement age and would thus forfeit the benefit to which they have already contributed.

ii.

The calculation will work by:

- Calculating the expected future cashflows...
- ...allowing for all decrements, such as death...
- ...and resignation.
- ...and discounting them to the present day / date of calculation

One would need to know an employee's:

- Current salary
- Date joined or number of years' service
- Retirement age or date of retirement
- Current age
- Gender

Assumptions required

- Probability of reaching retirement...
- ...which requires both an assumption on mortality pre-retirement...
- ...as well as the probability of resignation in any given year.
- These assumptions may or may not be related to the past years' service/current salary/job grade
- One would then need to calculate the probability of receiving each retirement benefit payment...
- ...which would require an annuitant mortality assumption.
- Probability of needing glasses/contact lenses
- The timing of the GP benefit is uncertain within each year...
- ...but for prudence one can assume it happens at the start of each year in retirement...
- ...or alternatively spread evenly throughout the year at the start of each quarter.
- The amount of the GP benefit can be estimated by taking current GP rates per visit...
- ...and escalating it with inflation...
- ...taking note of the fact that this inflation may well be different to regular consumer price inflation.
- The glasses benefit is fixed in nominal terms and the same survival probabilities as for the GP benefit can be used.
- The five-yearly bonus may require a view on CPI in the period post retirement...
- ...or alternatively can be discounted using a real rate of interest.
- An interest rate assumption would be required...
- ...to discount the benefits to the date of retirement...
- ...and then again back to the date of calculation.
- A term structure of interest rates may be used.
- Salary inflation from current to retirement date

QUESTION 10

Examiner's comments:

Part (i) was generally well answered, but a quite a few students failed to identify that the employer is the insured, not the employee.

Part (ii) was reasonably well answered, with students giving some thought to what might constitute rating / risk factors doing better.

Part (iii) was poorly answered with many students struggling to outline a sensible list of things required to review the claims reserves. The wording of the information in the question clearly indicated that we are looking at reported, but not paid as well as incurred but not reported claims. Just using the information/data required for a basic chain ladder type analysis would have been quite a few of the available marks. Some students also tried to review reserves from an insured's point of view, which makes no sense. Also many students focussed on differences between future premiums and future claims, similar to life insurance reserving. This is not a life insurance product and hence no credit was given here. Past premiums are much more useful in these types of reserving exercises.

Part (iv) saw most students identifying statutory/regulatory reporting as a typical purpose to calculate reserves. The most obvious other reason was for annual financial statements, but credit was also given for pricing and setting capital and/or investment strategy. Valuation for mergers and acquisitions was given some credit, but this is not really something that happens more frequently than the other reasons given and was hence only given partial credit.

i.

- The insurance indemnifies the insured against the legal liability
- ...to compensate an employee or their estate...
- ...for bodily injury, disease or death suffered...
- ...owing to negligence of the employer in the course of employment
- As well as accidents, perils include exposure to harmful substances or harmful working conditions.

Examples of claim:

- Exposure to asbestosis
- Lack of certain safety measures on site
- Accidental exposure to nuclear materials etc.

ii.

- The nature of a potential client's business would be a major consideration...
- ...especially when it comes to what types of perils cover would be required for.
- For example, the risks associated with a client running a chemical manufacturing process, will be substantially more/different than a company that does only administrative type work.
- The broker would need to take into account the number of employees...
- ...since more employees generally give rise to more exposure / chance of something going wrong.
- The total payroll / average pay etc. would also need to be taken into account...
- ...since that would also give a measure of exposure / liability in the event of a claim.
- The broker would also need to take into account what the client's ability is to pay for the cover...
- ... and may need to reduce limits / exclude cover if the client cannot afford the initial proposal.
- Of course, the broker would need to take into account any cover provided by the state...
- ...as well as existing cover that may be in place for the client.
- Broker would also need to take into account any requirements / prescriptions for the way brokers must provide advice.

iii.

- Data on past claims including:
 - When the exposure / accident occurred
 - Date of claim notification
 - Any initial estimate of the outstanding claim
 - Any subsequent re-estimations of the claim amount and the dates thereof
 - Date of claims settlement
 - Amount at which claim was settled

- Data on past exposure:
 - Premium volumes per year
 - Policy counts per year

- Information required:
 - Current method used to calculate provisions
 - Results of previous reserving exercises
 - Financial reports may possibly be useful
 - Underwriting information on anything that may have caused a change in exposure
 - ...e.g. a change in process or a change in scope of cover.

- Other assumptions:
 - Ultimate expected loss ratio per year
 - Development factors to develop most recent claims amount to “ultimate”
 - Inflation rates...
 - ...which may perhaps be different to CPI, e.g. “court inflation”
 - Discount rates (if expected PV’s need to be calculated).

iv.

Published accounts

- Legislation and accounting principles will provide guidance as to how the accounts/reserves should be prepared.
- Typical matters to be considered include preparing the reports on a going concern basis...
- ...and/or whether the reports require a true and fair view.
- Consideration need to be given as to whether the claims reserves need to be on a best estimate or some other basis.
- Our assumptions / results may need to be adjusted in accordance with the prescription / guidance here.
- It is likely that the internal accounts calculation would form a starting point for this calculation

Demonstrating supervisory solvency

- The regulator may prescribe a specific method or rules on the calculation of reserves...
- ...which may be different to what they use for the published or internal accounts.
- The expectation may be that the requirement is a more prudent one...
- ...and hence some of the assumptions or margins may need changing.