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

Examiner's comments:

Students did fairly well on this question especially if they followed a structure and explained the three broad differences between the two bond types. Those that did not follow a structure struggled to score marks. A few of the students appeared to not have understood the question as they spend time on similarities. This was a simple bookwork question which a lot of the students should have done well on.

- The major difference (which affects all other differences) is that the issuer is materially different – government bonds are issued by governments of countries versus corporate bonds are issued by corporate entities.
- <u>Security</u> – corporate bonds are generally much less secure than government bonds. The level of security depends upon the type of debt security considered, the company that has issued the bond and the term of the bond.
- <u>Marketability</u> – corporate bonds are typically much less marketable than government bonds, primarily because the size of issue is smaller.
- <u>Yields</u> – The gross redemption yields on corporate bonds are higher than for similar government bonds, compensating for the lower marketability and the perceived additional default risk. The lowest yield margins will be for larger issues from companies with high credit ratings.

QUESTION 2

Examiner's comments:

i. *This was a straightforward bookwork question which the majority of candidates scored highly on.*
ii. *Most candidates failed to identify the distinct major implications (as required in the question) before elaborating on the impact on shareholders.*

i.

- a clear definition of the aim of the project which reflects the needs of the customer
- full planning
- thorough risk analysis
- monitoring of development
- measurement of performance and quality standards
- thorough testing at all stages
- care in managing different strands of the project to ensure that there are no unnecessary delays in one part of the project which depends on the outcome of another (critical path analysis)
- to move along at the appropriate pace so that the right things are done at the right time
- stable but challenging relationships with suppliers of external components of the project
- a supportive environment
- excellent communications between those involved

- positive conflict management, which uses conflict as a source of ideas and a tool for development
- a schedule of what needs to be considered at each milestone review point

ii.

- Financial implications - If the product is not successfully launched, then shareholders would have invested significant monies with no to little potential of a reasonable return on investment.
- Reputational implications - A failed delivery could also result in reputational impact or risk if the product is below the standard that the market will expect.
- Risk implications - If the project is not well managed, then the project might introduce unwanted risk in the shareholders' portfolio – various risks (operational, implementation, pricing risk, product risk, etc.) can possibly be introduced if the project is not delivered successfully.
- Both the last two aspects (reputational and an increase in risk) can again result in further potential financial implications.

QUESTION 3

Examiner's comments:

Question was bookwork and fairly answered overall. The most common mistakes included:

- *Only describing some of the regimes, e.g. statutory and self-regulation, missing all the marks for the other regimes, e.g. unregulated/mixed/voluntary codes.*

- *Making too few or too generic comments on the respective/relative advantages and disadvantages*

- *Some candidates explained the various "forms" (prescriptive, outcomes-based or freedom of action) the regulation can take as opposed to the regulatory "regimes" and as a result lost a lot of marks.*

Unregulated markets
- Works effectively in markets where only professionals operate
- Also effective in markets which are pure commodities and products are sold purely on price
- Disadvantage is that there is no sanction if abuse occurs

Voluntary codes of conduct
- Rules set by those with most knowledge of industry
- Lower cost of regulation
- Limited sanction if the code is breached, which may encourage violation

Self-regulation
- Rules set by those with most knowledge of industry
- Should respond rapidly to market needs
- Regulator may be seen as too close to industry, and not looking to protect consumers, leading to reduced confidence

Statutory regulation

Less open to abuse and should lead to improved public confidence

More costly and inflexible than self-regulation

Rules imposed by bureaucrats may not work in the real world, thereby defeating the purpose

Mixed regimes

These tend to operate in the real world, with a mixture of codes of conduct, self-regulation and statutory regulation working side-by-side

Regulations developed by private sector tend to be adopted as statutory regulation by government

QUESTION 4

Examiner's comments:

In part (i) a number of students appeared to have not read the question given their answers. It was critical for a student to list the key issue, briefly describe it and articulate the possible solution. In some instances, students just mentioned the issue and went straight to the solution. Some of the solutions students proposed would have resulted in costs and several students failed to identify this and consider net return after costs. Some just mentioned use a currency swap with clearly stating its role in hedging the portfolio. Most students scored well in part (ii) though a few missed easy marks.

i.

<u>Adverse currency movements</u>

- Investing overseas means that investors with domestic liabilities are accepting a mismatch, at least in the short term. Furthermore, currency movements lead to extra volatility of the total returns.
- These problems can sometimes be wholly or partially overcome by hedging the exchange risk.

<u>Expenses and expertise</u>

- The cost of the increased expertise required might be prohibitive. This arises because there are extra variables to analyse (e.g. overseas economies and currencies), and more work is required to overcome the problems with information. It is also necessary to appoint an overseas custodian.
- This can only be mitigated if there is in-house expertise available, otherwise the cost is likely to be incurred.

<u>Taxation</u>

- Taxation varies from country to country. It may not be possible to recover withholding taxes imposed on overseas investments.
- It is unlikely that this can be mitigated.

ii.
- current market valuation
- possibility of high economic growth rate

- currency stability and strength
- level of marketability
- degree of political stability
- market regulation
- restrictions on foreign investment
- range of companies available
- communication problems
- availability and quality of information

QUESTION 5

Examiner's comments:

i. *This question was generally well answered.*
ii. *Those candidates who applied the standard underwriting process to the unique situation presented in the question tended to score well. Many candidates stated the standard list of data sources and/or underwriting process for new insurers without application and as a result did not score well.*

i.

- *Development expenses are incurred before any premium income is generated.* Example: setting up the IT infrastructure to administer the business.
- *Benefits might be due before sufficient premiums have been received.* Example: A big claim might be incurred before enough premiums have been received.
- *Hold a cushion against unexpected events.* Example: Not being able to write business due to a system crash or incurring unexpected costs in recovering from such a system crash.
- *Meet statutory capital requirements.* Example: reserves will need to be set up on a prudent, statutory basis, which are in excess of the expected future outgo. Capital will be required to purchase these assets.
- *Invest more freely*. Example, AirLnL might want to invest in other technology assets which may not be matching their liability profile exactly, requiring additional capital.
- *Achieve strategic aims.* Example: AirLnL might have a pipeline of new products, e.g. CI that they want to develop.
- *Smooth reported profits.* Example: If their products are with profits, they might want to still declare bonuses, even in years where profits are low.
- *Sell products with guarantees.* Example: AirLnL might want to guarantee premium rates for the first 10 years, which will require capital in the event of guaranteed premium rates proving to bo insufficient.
- *Demonstrate financial strength to customers and advisors.* Example: Many insurance companies report on the excess of capital over and above the statutory minimum, giving peace of mind to intermediaries and clients that they will be around to pay the claims.

ii.

They need to collect information to understand the following:

- The client's current health condition
- Lifestyle of the client
- Their financial situation for financial underwriting

- Bank account information can assist to get an idea of the income of the person…
  - …which can be compared to the amount of insurance requested to avoid overinsurance.
  - This can also potentially give an indication of where the person is employed…
  - …which is useful if extra premiums might be required for risky occupations (or cover needs to be declined).

- Social media accounts can be helpful to:
  - understand the person's academic qualifications
  - recognize high risk behaviour e.g. smoking, drinking, late nights on the road
  - give credit for safety/health conscious behaviour e.g. exercise.
  - Knowing where they stay and whether they travel a lot.

- Medical information/records can be used to:
  - Identify past medical events that might affect the client's mortality e.g. a heart attack.
  - Results of any recent medical tests, e.g. weight, to give an indication of current health.
  - Might also be able to see what medication the client is using.

- Other sources to consider might include:
  - Gym memberships for data on fitness
  - Traffic department for information on past driving behaviour
  - Government records to see things like whether there are any dependents e.g. spouse or kids.
  - Police records to give indication of criminal record.
  - Credit rating agencies give indication of creditworthiness which might be useful to anticipate affordability and likelihood of cancellation early on in the policy lifetime.

QUESTION 6

Examiner's comments:

(i)

- *Bookwork question which most students scored well on*
- *Withdrawals was taken to mean the same as Surrenders (and different from Lapses)*

(ii)

- *The question required the students to think about the products and apply the theory to a more practical setting*
- *Stronger students scored well*
- *Many students treated this as a "source of risk" rather than "source of surplus" and answered accordingly, which was more in line with a product development question. This was not the*

intention of the question and marks were only awarded where the link to surplus or deficit was made.

- *A disappointingly large number of students stated "investment gains" for non-profit term assurances. These products have small premium and the explicit "non-profit" part should clearly steer away from this line of thought*
- *Poorer attempts put 'morbidity' for term assurance – this is a death only product*
- *A good few students had lapses for immediate annuities – this is not possible with this product*
- *Mortality and Longevity were treated as two sides of the same coin*

i. <u>Sources of Surplus</u>

Mortality/Longevity
Morbidity
Lapses
Surrenders
Investment Income and Gains
Expenses
Commission
Inflation
New business
Miscellaneous

ii. <u>Most important sources</u>

a. Non-profit term assurance
   Mortality - the largest portion of the premium goes to mortality charges, so the result is very sensitive to mortality
   Expenses - there is also a significant expense allowance in the premium
   New business - if new business is lower than expected, there is no room to make up the shortfall in expense allowance
b. With-profit immediate annuities
   Longevity - this is the major risk item in the annuity consideration and is capable of generating large surpluses or deficits over time
   Investment Income - since the policy is with-profit there will be differences between investment income and bonuses
   Inflation - there will be an inflation assumption in the annuity pricing that may not be borne out in practice
c. Unit-linked endowment assurances
   Mortality - due to the large sums at risk in the early years of the contract, there is substantial scope for mortality profits and losses
   Investment Income - since this is an investment contract, variations in investment return will generate profits and losses, particularly in the later years
   New business - unless the business is fully front-end loaded, there can be significant new business strain

QUESTION 7

Examiner's comments:

This was one of the more difficult questions in paper 2, although an almost identical question was fully answered in the core reading. In spite of this, the question was extremely poorly handled by most students who did not appreciate that the transaction envisaged involved a transfer of liabilities (valued on a best estimate basis with margins) and an equal amount of matching assets from PropLife to BuyLife.

Parts i and ii referred specifically to the weighing up of which basis to use, and considerations around how the agreed basis could provide economic benefit to both parties.

Part iii was reasonably well handled by most students.

Surprisingly few students recognised that only reinsurance of the unit-linked portfolio, with administration done by BuyLife , created a similar result, as required by part iv.

i. Appropriate basis for transfer

The transfer will involve both assets and liabilities

The basis used will be very important since a monetary transaction will take place

Need to set a basis that PropLife and BuyLife will view as fair

Best estimate basis with required margins could be viewed as fair to both parties

But this will need to be adjusted to reflect the negotiating strength of the two parties

And the desire by PropLife to off-load the liabilities and by BuyLife to take on the liabilities

ii. Whether to proceed with the transfer

The first reason to proceed with the transfer is if it offers good financial value

For PropLife, the amount it pays to cede the liabilities should be less than the assets backing the liabilities plus what it can save by cancelling the IT contract

For BuyLife, the amount it receives to assume the liabilities must be more than the expected cost of those liabilities

PropLife should be keen to proceed, since

If the transfer does not go ahead, a new administration system will need to be bought,

The cost will need to be spread over the diminishing book of unit-linked business

Other overheads will need to be spread over a smaller number of policies

If PropLife has a conservative basis, with high expense loadings for the IT system, it may reduce its liabilities by more than it reduces its assets. This should improve PropLife's solvency position

BuyLife may also be keen to proceed, if

It offers synergies. BuyLife may have the necessary systems to run the policies more cheaply than PropLife can

It increases the size of its book, getting economies of scale so overheads can be spread more widely

iii. <u>What will the regulator want to see in the agreement</u>

The regulator will want to know the following:

- What is the financial position of both companies after the transfer?
    - what is the impact on excess assets?
    - what is the impact on solvency capital?
    - what is the impact on solvency ratios?
- Have both companies treated customers fairly?
    - Have the terms of the transfer negatively impacted the remaining policyholders in PropLife?
    - Have the transferring policyholders been informed of the transfer in the manner according to legislation, and given the opportunity to object?
    - Have the terms of the transfer negatively impacted the other policyholders of BuyLife?

iv. <u>What can the companies do?</u>

PropLife and BuyLife could enter into an administration and reinsurance arrangement, so that BuyLife administers the policies on behalf of PropLife. PropLife receives the premiums and pays the claims , and transfer the balance of the funds to BuyLife to invest.

QUESTION 8

Examiner's comments:

This question was answered well by most candidates. Candidates that had a clear breakdown of each element of the problem in the first stage ("Specify the problem") and then discussed these in turn in the other stages, performed the best with this question.

Specifying the problem

- At present it appears that the company is bearing the investment and longevity risk associated with the benefit.
- It is clear that the company requires an actuarial calculation to determine the size of the liability for accounting purposes.
- There is however also a requirement to manage the risk associated with this liability, which includes…

- …variability around the amount of the liability…
- …which can affect the company's solvency…
- …as well as the risk of members' needs not being met by the panel of insurers.
- There is also the need to specify what the applicable basis will be for those who elect to take a once-off lump sum.
- The company may also require input on what levers they have available to reduce this liability.

Developing the solution

- It is likely that a discounted cashflow model will be used to calculate the value of the liability.
- This model will require assumptions around annuitant mortality…
- …as well as medical insurance inflation, admin expenses and a discount rate.
- For those still in service, some assumption on their probability of withdrawal before retirement will be required.
- The liability value will be calculated for each member and aggregated.
- There may be a margin for prudence added
- For members electing a lump sum value at retirement, the company may just choose to pay this discounted cashflow value.
- There are some options available to reduce this liability or the variability thereof in future:
- Reduce or remove the percentage subsidy for existing members
- Not offering the subsidy to new employees.
- Paying lump sums to members in lieu of cancelling the subsidy.
- Limiting annual increases in subsidy amounts to CPI and not medical insurance inflation (which might be higher).
- Research will need to be done on the panel of medical insurers to ensure they provide adequate benefits to retired members…
- …perhaps comparing their benefits to those not on the panel to make sure members are not being treated unfairly.
- The financials of the various medical insurers can also be compared to ensure they are financially sound…
- …which might reduce the need for excessive annual increases over time.

Monitoring the experience

- Assumptions for the valuation model needs to reflect up to date expectations of the future experience.
- An analysis of surplus may be useful in this regard.
- The impact of the overall liability on the company's solvency needs to be monitored every year…
- …which may increase/decrease demands for changes to the scheme design.
- Feedback from members on the service levels and suitability of benefit design from the various insurance providers…
- …as well as any emerging news, benefit changes, financial experience of the funds…
- …can feedback into the choice of insurers on the panel every year.

Professionalism

- Actuary would need to make sure all professional guidance in the calculation of these liabilities are adhered to.
- There is potential for conflict of interest between the members' needs and those of the company…
- …and the actuary would need to ensure that she/he acts ethically in this regard.
- For example, the lump sum option can be attractively large to a client…
- …while still being below the actuarial value of the subsidy benefit.

External environment

- The consultant should be aware of similar benefit designs in the industry with associated challenges.
- Awareness of what retirement benefits other companies in the paper industry offer.
- What regulation/legislation applies to altering existing benefits.
- General outlook for medical insurance…
- …as well as any macro-economic, social or political trends that might have an impact on advice e.g. NHI.