

EXAMINERS' REPORT

June 2023 examinations

Subject F104 — *Retirement and Related Benefits* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principal Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners and should not be taken as model solutions.

QUESTION 1

- The fund's liability profile
 - i.e. currency, nature , uncertainty and term of the liabilities
- The funding position
 - Surplus or deficit
 - Relative size
- The size of the fund (in terms of assets)
 - And whether increasing, decreasing or static
 - Also important relative to size of sponsor
- Expected cashflows
 - In and out
- Attitudes of the parties involved towards risk
 - Sponsor typically bears most of the risk
 - But possible members bear some risk e.g. reflected in pension increases
- Nature of sponsor
 - E.g. local or multinational where different accounting considerations
 - And HR practices may apply
 - Or public vs private entity
- Financial strength of sponsor
 - Affects risk appetite as a deficit must be reflected on the balance sheet

Examiner comment: This was a straight-forward bookwork question on which most candidates scored well. However, the term “size” could mean various things. Size of the assets under management or membership count, for example. Some candidates were very unclear about the sense in which this term was used which made their points very unclear.

QUESTION 2

- Stage 1: Decline in mortality
 - Reduction in mortality at all ages
 - Particularly infant mortality
 - Possibly due to medical advances or other efficiencies.
 - More infants survive to childhood
 - Average age of population drops.
- Stage 2: Decline in fertility
 - Related to the decline in infant mortality
 - Parents more confident that children will survive to adulthood
 - Fertility rates decline
 - Population continues to grow but at reduced rate.
 - Proportion of elderly people begins to increase
 - Enhanced by reduced old age mortality.
- Stage 3: Mortality and fertility in balance

- Mortality and fertility fall into balance again
- But at lower levels than before.
- Natural rate of population growth is zero.
- Retired population increases while
- Working population decreases.

Examiner comment: This question was not well answered considering that it was a book work question. Most candidates failed to achieve more than 50% of the total marks.

QUESTION 3

i.

$$PUAL = \frac{P \times S}{A} \times \left(\frac{1+e}{1+i} \right)^{R-x} \times a'_R$$

$$CUAL = \frac{P \times S}{A} \times \left(\frac{1}{1+i} \right)^{(R-x)} \times a'_R$$

$$PUAL = (1+e)^{(R-x)} \times CUAL$$

Where

- P = past service
- S = Salary at valuation date
- R = retirement age
- x = current age
- 1/A = accrual rate
- e = salary inflation (real)*
- i = real investment return*
- a'_R is the annuity factor
- representing the expected present value of a pension of 1 payable from age R
- with all relevant reversionary annuities and increases

ii.

- If $i > e > 0$,
- the $PUAL > CUAL$
- But the high-low rule to which the student refers only works for a stable SCRs.
- And doesn't apply in this case as both SCRs are expected to increase over time
- The SCR for the CUM has a portion for service accruing during the control period
- and for the revaluation of the CUAL for salary inflation during the control period
- For very low values of liabilities
- e.g. young members
- New fund
- The $PUSCR > CUSCR$

- And vice versa

Examiner comment: There were plenty of marks available in part i. Some candidates made their lives a little complicated by using the revalued CUM but they were not penalized for going this route. A few candidates seemed completely unaware of the High-Low rule alluded to in part ii.

QUESTION 4

i.

- Legislation / Certain elements of employment may be prescribed by legislation
 - For example maximum working hours or minimum leave days.
 - A change in legislation with respect to hours worked or travel time (for example) may make a work from home policy more cost efficient.
- Tax/There may be tax incentives available to employers for offering certain employment benefits
 - Work from home policies may contribute to wellness programs for which the employer receives a tax benefit.
- Recruitment and retention of staff/Offering non-financial benefits may assist the employer in the recruitment and retention of preferred staff members
 - For example staff who are ore comfortable with virtual work environments
 - And can be hired anywhere across the globe
- Rewarding good behaviour/Employers may incentivize staff by providing monetary or non-monetary rewards
 - The option to work from home may serve to support recruitment processes or incentivize staff members.
- Managing employee retirement
 - Employees may be encouraged to retire or to work past retirement date.
 - For example valuable employees nearing retirement might compromise on extending their service if they are able to work from home.
- Controlling externalities
 - The employer may use the work from home policy to relieve stress for staff members that live far from the office.
 - If people are often missing meetings du o commuting, removing this uncertainty could improve productivity.
 - Less time travelling reduces risk to the employee
 - and could improve their mental health to the benefit of the employer.
- Cost cutting
 - For example reduced overheads created by hot-desking

ii.

- There is a lack of supervision when working from home
- And employees may abuse this policy.
- Communication may be difficult
- There might be a reduction in productivity levels
- which could take time to detect.

- Staff may work in public leading to risks associated with confidentiality
- Working from home requires a home-work set up
- Employees are likely to expect the employer to cover costs associated with the policy.
- And there may be IT costs
- If only selected employees are given permission to work from home, this may be seen as favoritism,
- Which may negatively affect the employers reputation.
- Once the policy is implemented, it may be difficult to retract if it doesn't work.
- With some people out of the office there is reduced interaction between employees
- This may stifle the working environment
- In particular training of junior staff is difficult
- And onboarding new staff is likely to be a problem.
- This may make it difficult to attract and retain new staff

Examiner comment: Candidates scored reasonably well on average. Better candidates applied their minds in the first part of the question which assisted in the answering of part (ii) as well.

QUESTION 5

i.

- The employer has requested the valuation, most likely to assess the financial impact of the change in the employer's financial statements.
- But they could equally be concerned with the realistic cost for planning purposes
- Or how their contribution rates may change on a statutory basis
- Thus the results may need to be shown using different bases and methods
- For a realistic cost estimate, margins should be avoided.
- And sensitivity testing of the result may have value
- An assumption is required regarding the proportion of employees that will take up the option and at what stage in the 5-year period
- Financially sophisticated employees may realise that they receive an implicit enhancement by retiring early
- And could select against the fund.
- Under these circumstances it might be prudent to assume all members retire at the earliest opportunity.
- Short-term effect should be considered
- Introducing the option may lead to a number of immediate early retirements
- Probably assume all members between 60 and 65 retire immediately.

- It must be clarified whether retirement after age 60 will be considered late retirement
- And whether actuarial neutrality will be applied to the benefits in those circumstances.
- Professional guidance should be consulted.
- Any legislative limitations or otherwise must be reported on
- And tax treatment of early retirement benefits must be clearly explained.
- Employment contracts should be reviewed in the process.
- Some employees might be disgruntled by the change
- Especially if retirement income does not fully replace pre-retirement income.
- The administration associated with the option could be complex
- And may introduce additional costs into the fund.
- Would want to show the solvency position before and after the change at the same date.
- Impossible to show immediate implementation.
- Any changes to the investment strategy that might be needed to compensate for immediate retirements
- Or earlier retirements on average than before

ii.

Lump sum in advance	Book reserve
• Designed to be sufficient to meet all future outgo • Entire payment made immediately • Reduce employer balance sheet assets • Payment may or may not be sufficient • Depending on actual versus expected experience.	• No explicit funds set aside • Provision in company accounts • I.e. accounting for costs • Assets held in some physical form • Partially funded book reserve in this case. • Actual benefit payments managed on an ongoing basis.

Examiner comment: Responses to the question were mixed. Some candidates touched on points applicable to part i in part ii. Part iii was well done.

QUESTION 6

i.

- Need to consider any professional guidance about conduct generally
- And around providing advice specifically
- And any regulations
- E.g. FAIS in the South African context
- Your friend would need to be made aware of any conflicts of interest
- Which can be direct e.g. commission
- Or indirect E.g. if you work for a company selling pension products where your bonus will be affected by overall company performance
- Your friend may need to be reminded that you are an actuarial student as opposed to a qualified actuary
- Let alone a practicing certificate holder
- If your friend is unhappy with your advice or it has negative financial consequences
- Would they be able to complain to your professional body
- Would there be access to compensation e.g. through professional indemnity cover
- A lot will depend on the capacity in which you frame the advice e.g. personal or through the employer.

ii.

- The practice of automatically enrolling eligible members
- in funds where participation is voluntary.
- Members may opt out if they do not wish to participate.

iii.

- Retirement age:
 - Friend has no set retirement age so which fund provides flexibility?
- Contributions
 - Timing: regular or ad-hoc
 - Amount: how much flexibility is allowed?
 - And how is the contribution rate calculated?
 - Particularly as your friend does not have a regular salary
 - Is the NCF restricted to a covered earnings band?
- Expense charges
 - How are expenses recovered on the two funds
 - Charging structures often involve a cross-subsidy e.g. from higher income earners to lower income earners
 - Compare absolute level of charges now
 - And how these may develop into the future
- Investment options
 - Availability of choice
 - Which would allow her to tailor the investment choice to take account of other assets e.g. her practice.
 - Whether the NCF offers a suitable default if she feels unable to choose

- Death benefits
 - Size of the death benefit from each policy
 - Relative to her need
 - Whether the NCF benefit would have waiting periods
 - Or exclusions not in force on the existing policy
 - Cost
 - You wouldn't expect underwriting for the NCF but she is likely to have had it on her personal policy
 - So if in better health than average, expect the NCF benefit to cost more per mille
 - Form of the death benefits relative to her needs
 - Her current arrangement pays a lump sum
 - But it is possible the NCF pays an annuity
 - Which could be inflation-linked etc
- Retirement benefits
 - Expected level of benefits from each arrangement given contribution rates, charges and the investments
 - Form: lump sum vs annuity
 - Pillar 1 funds are often redistributive
 - Any minimum benefits?
- Other benefits:
 - What happens to her existing retirement arrangement if she stops contributing?
 - Is withdrawal possible from either fund?
 - What are the lapse options on her term assurance?
 - Any bonuses or similar on the private term assurance
- Integration
 - Are there any benefit offsets to be aware of if she remains members of both?
 - Can she change her mind and opt into the NCF at a later stage?
- Cross subsidies
 - Understand the circumstances where she will be "giving" or "receiving"
- Penalties
 - E.g. on withdrawal
- Guarantees
 - E.g. guaranteed investment products

Examiner comment: In part i, most candidates focused heavily on the South African environment and stated often-incorrect "facts" about it as opposed to considering the various issues. As a result, a lot of candidates got stuck on the issue of whether you are allowed to give advice rather than other professionalism issues such as conflicts of interest, communication and right of recourse. For the avoidance of doubt, students are bound by actuarial professional standards too! Part ii was straightforward bookwork. Part iii again required candidates to think of principles as opposed to making up details about either arrangement. Candidates who used the product design bookwork list as a structure did better. Surprisingly few candidates made any mention of the friend's work, the fact there is no employer and her earnings are likely to be volatile.

QUESTION 7

i.

- There is a significant inflation risk associated with the default annuity
- Since there is no allowance for increases of any type.
- The default is an “opt out” which means if no choice is made people land up in the default
- Generally, less financially sophisticated members are less likely to make a choice
- and may end up in an inappropriate product as a result.
- The annuity is “one-size-fits-all” approach
- And doesn’t allow for common features of retirees
- Such as contingent spouse benefits
- And guarantee periods.
- The annuity is secured with a single specific insurer
- That could take advantage of the captive market
- By setting high annuity prices or
- That could fail and leave retirees destitute.
- The appropriateness would also depend on the credit-worthiness of the insurer.
- However, the product does offer longevity protection.

ii.

- Increased nominal bond yields
 - Reducing the annuity factor
 - And increasing post retirement income (all else equal).
- Higher investment returns earned on assets
 - Than assumed in the previous projection calculations.
 - Overall asset levels will be higher
 - Enhancing projected assets available to purchase income at retirement.
- Lower actual salary increases
 - Than assumed in the previous projection calculations.
- Or Lower assumed salary increases in current projections
 - Resulting in lower salary at retirement date.
 - All else equal capital available can purchase the same level of income at retirement
 - Which will be a higher proportion of final salary
 - If salary increases are reduced.
- Expenses lower than expected
 - And assets not directed towards expenses can be invested.
 - Positive investment returns and the compound interest effect
 - Will increase overall assets available at retirement date.
- Change in legislation or tax regime
 - For example elimination of tax on return
 - Or introduction of mandatory employer contributions
 - Will serve to increase assets available at retirement.
- Transfer in from prior employer fund
 - Which will have a bulk effect if part of an employer transfer

- And could greatly enhance level of assets per member.
- Voluntary additional contributions by a significant proportion of members

iii.

- At the very least the strategy should be evaluated against regulatory requirements
- More aggressive investments at younger ages are not inappropriate
- Since the objective is for returns to keep up with salary inflation
- Which is generally higher than inflation at younger ages.
- Equities and property typically achieve high real returns over the long term
- However the market values are subject to high levels of volatility.
- This could be alarming to members if they are receiving statements on a regular basis
- Or if they are allowed cash withdrawal benefits.
- As members age, a slow in salary increases can be expected.
- Investing in increasing proportions of nominal assets, such as bonds, is a better match.
- However, this is not true for all members,
- For example executives probably require a longer term of aggressiveness
- Closer to retirement investment primarily in bonds is a good match to the default strategy
- Provided bonds are of appropriate durations.
- With complete matching, market volatility becomes irrelevant,
- And retirees are not subjected to the vagaries of the annuity market.
- Some members will opt out of the default strategy
- And the lifestage model may not be suitable for their retirement plans.
- For example, members retiring into drawdown products could benefit from a more aggressive approach up to retirement and thereafter.
- Switching in a lifestage model is often automated
- And could occur at inopportune times
- Resulting in opportunity costs that members cannot control.
- Regular switching of investments could also result in frictional costs
- Which will naturally reduce the overall return potential.

Examiner comment: Answers were weak in general. Candidates don't seem to have a clear understanding of the difference between a guaranteed annuity and a guaranteed period. In general, answers were repetitive and not specific to the context of the question.

QUESTION 8

i.

- The risk is that mortality among the pensioners is lighter than anticipated in the annuity rates
- And spouses live longer than anticipated (in the annuity rates).
- Could arise due to a longevity improving faster than anticipated
- Or model error, e.g. a poor choice of mortality table
- Could be more female pensioner members than anticipated (unisex rates)
- Significant mix risk arising from other factors e.g. (only give credit here if no examples given)
- Average incomes higher than anticipated
- Proportion of smokers or impaired lives lower than anticipated
- Spouses could be younger than anticipated
- Could be more female spouses than anticipated in pricing.
- The publication of the rates 6 months in advance combined with the flexible retirement age can allow for anti-selection
- Particularly among the self-employed
- And higher-income earners who may have more career flexibility
- The risk is exacerbated by the fact that the benefit itself is inflation-linked.
- Even if the number of deaths are as anticipated, it is probable that higher income earners with bigger pensions tend to have better longevity than pensioners with lower benefit amounts.
- Extent to which the fund itself bears this risk will depend on who is actually underwriting it.
- There may be government guarantees
- Or automatic adjustments to benefits to shift the risk back to the members

ii.

- The unisex design allows for redistribution from males to females
- Which may be socially desirable in Gaul
- Because of the anti-selection risk this may simply not be available from the private sector.
- The compulsion and mandation elements help with behavioural biases
- Like myopia or inertia
- The fact that all employed people are part of this scheme can contribute to social solidarity.
- And allow for redistribution within society (although tricky to see how apart from male to female with this design)
- The government may feel they need to intervene to correct market failure.
- E.g. the externalities that can arise if an individual does not have adequate income in retirement

- E.g. some segments of the target population may not be well served by the private sector currently e.g. informal workers
- Consumers may be vulnerable to abuse by private sector pension providers
- Due to asymmetric information
- Particularly at annuity purchase stage
- As this is a once-off and irrevocable decision.
- Competition may be imperfect
- The government may believe they are more efficient than the private sector
- There could have been external pressure
- The inflation-linked benefit prevents declining real incomes which assists in preventing citizens from falling into poverty in extreme old age
- Similarly the spouse's annuity can assist in correcting wealth inequalities between males and females
- And prevent the widowed spouse from falling into poverty
- Which ultimately may help Gaul to manage reduce old age social assistance costs.
- There may have also been vested interests at play.
- There may have been risk-sharing mechanisms built into the design which shifts the longevity risk to the members
- Although this does leave the government with reputational risk

iii.

- First there is a timing issue as this valuation may not be done at the same time as the annual valuation
- So certain information that might be used for checking may not be available
- E.g. audited financial statements
- Secondly the phrasing of the question implies that you are not involved in the regular valuation process
- And while consistent professional standards should apply of all the actuaries are members of the same professional body
- Professional judgement may lead you to make different judgement calls to the other actuaries
- The two valuations are being produced for different purposes
- And hence different professional guidance may apply
- The regular monitoring valuation seems to be for internal/management purposes as opposed to statutory
- And hence is likely to be best estimate
- Whereas the buy-out basis is likely to use the insurer's basis
- A great deal more prudent and with a profit loading.

iv.

Current pensioners

- How will the security of their benefits be affected?
- Relational issue in that levels of trust in government may be different to levels of trust in the private sector

Future pensioners/active members

- Move creates uncertainty as to whether the private sector or state will provide their annuities
- This group may be bearing some of the longevity risk for the current pensioners so their risk will be reduced

Government

- Move to outsource current pensioners may reduce social solidarity
- And is expected to cost more due to profit motive of insurers
- Typically governments fund on a PAYG basis but an outsource will require a lump sum to be payable to the insurer
- May cause liquidity problems

The fund itself (Gaul4U)

- Affect on the assets will depend on the extent to which the pensioner liabilities are prefunded
- But a sudden outflow of assets backing the pension liabilities at an inopportune time may result in shortfall that needs funding.
- And a reduced asset pool may restrict investment opportunities
- If not going to be outsourcing future pensioners, the fund will land up with a rather small pool of pensioners in the short-term
- Leading to volatile claims experience/even more longevity risk
- This depends on the size of the population expected to retire in the short-term

Points around who underwrote the annuity benefit to begin with were also accepted.

Examiner comment: There was plenty of scope in part i to earn credit and those who didn't do well typically went for depth over breadth. The performance in part ii was generally poor. Despite the heavy hint provided by part i, not a single candidate discussed how unisex pricing is redistributive. Better answers used the bookwork structure from the notes but most candidates struggled to apply the theory to the scenario posed. Answers also tended to be quite short, possibly due to time pressure. Many candidates wasted time by stating things that simply were not true or making heroic assumptions e.g. that because other parts of the pension system were not mentioned that they didn't exist. The brevity of the answers suggested that most candidates were running out of time. In part iii, many candidates did not read the question properly and so alleged various purposes for the regular valuation. Most candidates did not generate enough breadth. In part iv, several candidates conflated the role of fund (Gaul4U) and sponsor (government) which was concerning.