

EXAMINERS' REPORT

November 2022 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

- i) A reduced funding level can be caused by
 - ✓ Investment returns
 - ✓ Actual returns lower than assumed at the previous valuation date
 - ✓ Pension increases
 - ✓ Higher than assumed at the previous valuation date
 - ✓ Mortality/Longevity
 - ✓ Fewer pensioners died than assumed since the previous valuation date
 - ✓ Expenses incurred
 - ✓ Were higher than assumed at the previous valuation date
 - ✓ Valuation basis strengthened
 - ✓ Due to a change in economic conditions
 - ✓ For example lower expected future return or
 - ✓ Higher expected future increase
 - ✓ Once off events
 - ✓ Such as a bonus or special increase
 - ✓ Will have caused any surpluses to reduce.
- ii)
 - ✓ Insurance
 - ✓ Can be purchased from a life office
 - ✓ Via a buy out (outsourcing)
 - ✓ Which will eliminate all liability from the fund
 - ✓ Or a buy in
 - ✓ In which case the fund is the policyholder a
 - ✓ And retains credit associated with the insurer
 - ✓ Derivatives
 - ✓ Such as a longevity swap
 - ✓ Can be used as a form of reinsurance
 - ✓ In which case the longevity risk is transferred
 - ✓ From the fund to the swap provider
 - ✓ This is only partial reinsurance
 - ✓ Since the fund maintains other risks associated with the pensioners
 - ✓ Such as investment and inflation risk
 - ✓ And also accepts credit risk associated with the swap provider.

Examiner comments: It was clear that certain candidates were not planning their answers before starting to type them. As a result, they were led astray by certain implications of the question wording. The specifics of the question did lead one to the conclusion that the fund is cashflow-negative. However, this would not necessarily reduce solvency in part i. These candidates tended to over-emphasise points related to the asset value as opposed to demonstrating an understanding of liability-side factors, despite the obvious clue in part ii.

When the question was set, the examiners did not anticipate any points relating to active members. However, while the wording precluded active members currently (or at the last valuation), it was possible that some active members retired during the valuation period. Given the ambiguity in the question, well-argued points relating to active members were allowed.

Part ii was largely bookwork and most candidates scored well. However, a lack of planning showed in some attempts where tangential points were put first as opposed to the straight-forward bookwork items.

QUESTION 2

i)

- ✓ Wealthy actuarians are likely to need high levels of retirement savings to see them through retirement.
- ✓ Poorer actuarians who die during their working lifetimes would need death benefits to support their families and
- ✓ have no real need of retirement benefits.
- ✓ Those who avoid the disease would need moderate levels of retirement savings to see them through a shorter retirement period.
- ✓ They may have a greater need for death benefits in retirement

ii)

- ✓ Mutuality: When contributions are paid according to risk
- ✓ and benefits are paid either in accordance with need (e.g. a health benefit scheme or means-tested retirement benefit scheme)
- ✓ or in accordance with an agreed schedule of benefits.
- ✓ Solidarity: When contributions are not related to risk, but rather shared equally or paid according to ability,
- ✓ and benefits are paid either in accordance with need (e.g. a health benefit scheme or means-tested retirement benefit scheme) or in accordance with an agreed schedule of benefits. i.e. the same benefit design as mutuality

iii) Sponsor risks {MAX 7}

- ✓ There is the risk that mortality rates are heavier than anticipated / More death claims than anticipated
- ✓ There is the risk that there are more death benefits paid at the minimum amount and
- ✓ Fewer paid at the maximum amount than anticipated in pricing
- ✓ This reduces the cross-subsidy from the wealthy to the poor which may reduce the sustainability of the rates.
- ✓ If the scheme is funded
- ✓ The state will face investment risk/ investment returns lower than what was anticipated in pricing.
- ✓ The risk that benefits do not meet the needs of the populace
- ✓ Resulting in political dissatisfaction
- ✓ Wage inflation may be higher than anticipated resulting in relatively high benefits relative to premiums.
- ✓ Alternatively, there may be fraudulent behaviour resulting in employers increasing the salary just before a claim is expected/
- ✓ The state may not have good data on which to base the pricing
- ✓ Or the expertise to run the scheme given that it is new.
- ✓ There may be counterparty failure e.g. a reinsurer
- ✓ Expenses may be higher than anticipated.
- ✓ May be subject to operational risks such as fraud and mismanagement.
- ✓ Also regulatory risk and arbitrage

Economic growth and National Savings {MAX 7}

- ✓ Risk that the 2% contribution rate reduces savings in other areas
- ✓ If the savings were previously invested in capital markets
- ✓ And are either not invested now (because the scheme is PAYG) or not invested in infrastructure or capital markets
- ✓ Economic growth may decline
- ✓ Which could worsen inequality and hence the death benefits.

iv)

- ✓ Product regulation
 - ✓ Could include sell-side regulation around employer schemes
 - ✓ For example minimum contributions to retirement and death benefits
- ✓ Market conduct regulation
 - ✓ If members are to make choices, regulations may set down guidance for creating a default.
 - ✓ They might also specify minimum levels of education or disclosure that must be offered to individuals before they make their election.
 - ✓ If members are to seek advice, their advisors are likely to be subject to fit and proper requirements.
- ✓ Prudential regulation
 - ✓ Consideration of regulation applying to pension funds, life insurers and reinsurers may need to be required to prevent regulatory arbitrage.
 - ✓ Easing solvency requirements could allow benefits to be offered more cheaply but with reduced security.

Examiner comments: Part i was very easy although many candidates over-wrote for 2 marks. Some candidates did not know their bookwork for part ii. Many candidates did well in part iii but simply assumed it was funded despite this not being specified. In the question wording before part iv, it wasn't clear what the "members" were members of but no candidates seemed troubled by this. The question clearly precluded compulsion by the state and needed to deal with regulatory interventions as opposed to other interventions by the state. A number of candidates missed that this was a question about regulation.

QUESTION 3

- ✓ Need to check whether such a proposal is legally acceptable
 - ✓ From the members perspective
 - ✓ And whether their consent to the changes will be required
 - ✓ And whether the regulator will approve of changes required
 - ✓ To the fund rules
 - ✓ Or the benefits
- ✓ The tax treatment of the different benefit types will need to be determined
 - ✓ And approved by the tax authority
 - ✓ Differing tax treatments of the two portions can be used to
 - ✓ Encourage or discourage access
 - ✓ Depending on the circumstances
- ✓ The proposal might seem like a favourable option
 - ✓ Since access to savings can be used to supplement reduced earnings
 - ✓ But would need to consider if access granted indefinitely
 - ✓ Even after recession ends

- ✓ And salaries are set back to normal.
- ✓ And whether new entrants into the fund would have similar treatment
- ✓ The current funding level of the fund should be considered
 - ✓ Any surpluses should be applied first to subsidise member needs
 - ✓ If the fund is in a deficit
 - ✓ Security of member benefits is at greater risk
 - ✓ And immediate access could be a viable option
- ✓ The motivations of the employer should be considered
 - ✓ The proposal is a change to the benefit structure
 - ✓ Which, if reduces retirement benefits
 - ✓ Allows the sponsor potentially lower future contributions
 - ✓ Or access to fund surplus (legislation allowing).
- ✓ How the split will be determined needs to be clarified
 - ✓ For example, will the accessible portion be based on accumulated contributions to the fund per member
 - ✓ Or a portion of the EPV of the retirement benefit?
 - ✓ In either case it will be necessary to prepare for reduced benefits at retirement.
- ✓ Younger members who most need salary supplementation are likely to not get enough
 - ✓ Since they have lower accrued benefits (shorter service)
 - ✓ However they will have a longer period to make up savings lost via access
- ✓ Members closer to retirement will be less affected
 - ✓ Since they are likely to be able to access a cash portion at retirement anyway.
- ✓ Member communication will be critical
 - ✓ Especially if future retirement benefits are to be reduced
 - ✓ And the impact on other fund benefits (death and disability)
 - ✓ Will need to be determined and clarified.
- ✓ If implemented the administration systems would need to manage the change
 - ✓ Correct splitting of member benefits
 - ✓ And maintenance of accessible balance over time
- ✓ The additional expenses associate with change in benefit structure must be considered
 - ✓ For example additional admin requirements
 - ✓ Involvement of other service providers (actuaries, consultants etc)
- ✓ Any social security safety nets should be considered
 - ✓ Pre and post retirement
 - ✓ State granted retirement benefits can guide the level of savings that become accessible
 - ✓ And any special subsidies offered by the state during a recession should be considered.
- ✓ The employer will need to consider the impact on the future contribution rates
 - ✓ Especially if they pay balance of cost contributions
 - ✓ And the defined benefit structure remains unchanged
 - ✓ Making up savings accessed later on will be unaffordable
 - ✓ And will generate inequitable cross subsidies
 - ✓ Between members who accessed less of their savings (more responsible)
 - ✓ To members who accessed more of their savings.
- ✓ Implications for the investment strategy will need to be considered
 - ✓ Greater liquidity levels required
 - ✓ May depress future potential investment earnings
 - ✓ And exacerbate the benefit security issues.
- ✓ Pensioners may also want access to lump sum portions of their savings
 - ✓ Which generates similar issues to those described above.

Examiner comments: This question was not well done. Most candidates were not able to get much more than 50%. In general, the answers were not long enough to score many points and candidates did not think deeply enough about the issues at stake. Most candidates were able to identify the most important stakeholders.

QUESTION 4

i)

- ✓ Redistribution:
 - ✓ To reduce systematic inequality
 - ✓ By redistributing from wealthy to poor
 - ✓ And hence creating greater social cohesion.{Max 1.5}
- ✓ Market failures: eg due to:
 - ✓ Behavioural biases
 - ✓ Externalities
 - ✓ Asymmetric information
 - ✓ Imperfect competition{Max 2.5}
- ✓ Efficiency:
 - ✓ Standardisation and economies of scale may trump competition{Max 1}
- ✓ Inertia:
 - ✓ Could simply be inherited from a previous government{Max 1}
- ✓ External pressures
 - ✓ E.g. from aid donors
 - ✓ Or international agreements such as the millennium development goals{Max 1}
- ✓ Moral hazard or vested interests
 - ✓ E.g. political reasons{Max 1}

ii)

- ✓ In JIT-funding, no pre-funding occurs until an external event
 - ✓ E.g. a credit downgrade
 - ✓ Which jeopardises the security of the fund
 - ✓ Occurs and then the benefit scheme must be fully funded.
 - ✓ With regular contributions, regular amounts are set aside for each member
 - ✓ And hence the fund is built up in anticipation of the benefit event occurring.
- {Max 3}

Advantages to the state of JIT:

- ✓ Effectively allows the state to run a PAYG system until the trigger event occurs
- ✓ This has the lowest opportunity cost for the state
 - ✓ As money collected can be used for other state expenditure
 - ✓ Including infrastructure projects which may increase GDP growth
- ✓ From a security point of view, the state does not need to worry about safeguarding the fund
 - ✓ Because there isn't one

Advantages to the state of Regular contributions:

- ✓ Contributions to the scheme are more stable
 - ✓ With JIT, may need to come up with funds at a time where the state may have very little liquidity
 - ✓ Or ability to raise financing
- ✓ Liquidity is often easier to manage with regular contributions
 - ✓ Particularly as in the PAYG scheme member contributions will drop when benefit claims are higher.
- ✓ Politically, this may appeal to the electorate more
 - ✓ As greater benefit security
- ✓ From a sustainability perspective, there may be a temptation to make the UIB benefits more generous under JIT
 - ✓ Which then may become difficult to fund if there is an economic downturn and unemployment rises.

Arguments that could go either way:

- ✓ Realism:
 - ✓ The realism of Reg cont depends on the funding method adopted.
 - ✓ PAYG could be reasonably realistic given that this is a short-term benefit
 - ✓ But the JIT payment could be very unrealistic
 - ✓ The State is perhaps not so worried about realism
 - ✓ Or accounting
 - ✓ due to the fact they report on an expenditure basis.
- ✓ Flexibility
 - ✓ JIT has no flexibility – once the trigger event occurs the payment must occur.
 - ✓ However, before that point the state has a lot of flexibility
 - ✓ There is usually a little flexibility under reg cont but this depends on the precise method
- ✓ JIT has a Less steep learning curve:
 - ✓ Until trigger event occurs, will run like a PAYG scheme – which the state is used to
 - ✓ No need for investment expertise
 - ✓ But this disappears once the benefit event occurs
 - ✓ Also a big risk, the state may under-estimate the probability of the trigger event occurring
 - ✓ And hence may not have appropriate contingency plans in place.
- ✓ Regulation and tax
 - ✓ The state can arrange to suit themselves.

Examiner comments: This question had better performance than most of the others. This is mainly because all but 1 candidate got full marks for part (i) and the early points for part (ii) were also book work. Application was well done where candidates organized the advantages and disadvantages of the two types well.

QUESTION 5

i)

- ✓ A hybrid scheme
- ✓ Minimum benefit guarantee is DB in nature/based on accrual of service
- ✓ Defined contribution fund with a DB underpin
- ✓ If the DC benefit is projected to exceed the DB underpin, then the liability behaves like a DC liability

- ✓ Otherwise it behaves like a DB fund
- ✓ I.e. sponsor bears risks of shortfall and may need to make additional contributions
- ✓ Actual design reflects desire to integrate with state benefits

ii) State [Max 4]

- ✓ Provides social security to retiring members
- ✓ Acting as a safety net for members that haven't saved enough
- ✓ And preventing extreme poverty in old age
- ✓ May also encourage private savings for retirement
- ✓ Particularly if the flat benefit is low
- ✓ Which is likely given that it is not means tested

Employer [MAX 4]

- ✓ Sponsor to the scheme
- ✓ By facilitating/requiring access to the scheme for employees
- ✓ And involvement in the overall management of the scheme.
- ✓ Make good any deficits that arise
- ✓ Relative to the defined benefit minimum liability
- ✓ Be accountable to regulators and tax authorities
- ✓ With respect to reflection of "on-balance-sheet" valuation results
- ✓ Attract and retain staff
- ✓ Paternalism

Trustees [MAX 4]

- ✓ Entrusted with overall scheme management
- ✓ Including procuring of expert advisors
- ✓ Managing/monitoring the investment strategy and performance.
- ✓ Monitoring of funding levels
- ✓ Relative to promised minimum defined benefit
- ✓ Prioritising minimum benefit security
- ✓ By acting to achieve maximum investment return (DC requirement)
- ✓ At lowest acceptable risk level.

Members [MAX 4]

- ✓ Mainly benefit recipients
- ✓ And contributors to the fund
- ✓ But can also become trustees to the fund
- ✓ Should keep pace with own retirement outcomes
- ✓ Specifically since the minimum benefit offering is likely to be low

iii)

- ✓ Accounting basis liability is likely to be lower
- ✓ Than the discontinuance basis
- ✓ Since accounting basis will use more realistic
- ✓ And best estimate assumptions
- ✓ To calculate the expected present value of the state pension.
- ✓ The discontinuance basis will apply more conservative assumptions
- ✓ Closely aligned with an insurance basis
- ✓ To determine the cost of securing the minimum benefits with an insurer
- ✓ In the event that the fund is discontinued.

iv)

- ✓ There are a number of important distinctions between a DC and hybrid plan which makes the statement not necessarily true.
- ✓ In a DC fund the members bear the investment risk, while in the hybrid fund this is shared between the member and sponsor.
- ✓ The members and sponsors may have different risk appetites
- ✓ With members generally being more risk averse.
- ✓ This may result in a lower-risk and lower-return strategy
- ✓ being more appropriate for members.
- ✓ In the hybrid, the benefit amount is defined in terms of the state pension
- ✓ And the assumption underlying its expected present value.
- ✓ In a DC fund the benefit depends on actual investment returns earned.
- ✓ The min benefit level means there mis scope for a more volatile investment strategy to b pursued
- ✓ Where members bear the upside risk
- ✓ In addition, the DC fund may be established with the objective of meeting a certain replacement ratio for members on retirement.
- ✓ The objective function may thus be completely different and hence a completely different investment strategy could be determined.
- ✓ ✓ However, it is possible that the fund had a matched investment strategy and that the expectations with respect to the state pension and investment volatility are suitable for the members' goals and risk appetite in which case the statement could be true.

Examiner comments: Many candidates struggled to generate more than 2 marks worth for part i. There were plenty of marks available for parts ii and iii and well-prepared candidates did well. Candidates did an average job on part iv but many failed to address risk appetite issues.

QUESTION 6

i)

- ✓
$$\text{Funding level} = \frac{\text{total assets}}{\text{total liabilities}}$$
- ✓ ✓ Pensioner liabilities = average annual pension * a_{78} * 300
- ✓ = 100 000 * 9.503 * 300
- ✓ = 285 090 000
- ✓ ✓ Active liabilities = $P * S * \frac{1}{A} * \left(\frac{1+e}{1+i} \right)^{R-x} * a_{65} * 10$
- ✓ = $\left[27 * 250\,000 * (12 * 0.1666667\%) * \left(\frac{1+7.5\%}{1+10.0\%} \right)^5 * 15.270 \right] * 10$
- ✓ = 18376067
- ✓
$$\text{Funding level} = \frac{340\,000}{18376067 + 285090\,000}$$
- ✓ = 112.0%

ii)

$$\begin{aligned}
 \checkmark \quad \checkmark \quad PUSCR &= \frac{n * S * \frac{1}{A} * \left(\frac{1+e}{1+i} \right)^{R-x} * a_{65}}{S * a_{\overline{n}|}} \quad \text{where } n=1 \\
 &= \frac{18376067}{27} \\
 &= 27.86\% \\
 \checkmark \quad \checkmark \quad AASCR &= \frac{(R-x) * S * \frac{1}{A} * \left(\frac{1+e}{1+i} \right)^{R-x} * a_{65}}{S * a_{\overline{R-x}|}} \\
 &= \frac{18376067 * 5}{27} \quad \checkmark \quad \text{where } a_{\overline{5}|} = 4.66925 \\
 &= 29.15\%
 \end{aligned}$$

iii)

- ✓ The fund consists of a significantly higher number of pensioners
- ✓ Suggesting that it is closed to active members
- ✓ In which case the Attained Age Method is more appropriate
- ✓ Since the fund does not have new entrants
- ✓ To keep the balance of membership stable
- ✓ Which is required for a stable SCR under the Projected Unit Method

iv) Investment strategy considerations

- ✓ Nature of liability
 - ✓ Real in nature
 - ✓ Since pensioners will expect pension increases
 - ✓ That align in some way with inflation
 - ✓ And active members expect salary
 - ✓ Increases
 - ✓ Investments should therefore focus on earning real return
 - ✓ From assets such as equities, property and/or index linked bonds
- ✓ Term of liability
 - ✓ Medium-long term liability
 - ✓ Since the bulk of the fund is pensioners
 - ✓ Term matching can be achieved with medium to long term bonds
 - ✓ And indefinite holdings such as listed equities
- ✓ Currency of liability
 - ✓ Not specified but most likely to be local currency denominated
 - ✓ Dictating mainly local currency investments
 - ✓ To avoid unnecessary currency risk
- ✓ Liquidity needs
 - ✓ Mainly pensioners with few contributors
 - ✓ Net outflow fund with high liquidity needs
 - ✓ Assets should be highly liquid and marketable

- ✓ Risk appetite
 - ✓ Likely to be low considering the large number of pensioners
 - ✓ Sponsor covenant may dictate whether the strategy can be more aggressive
 - ✓ But trustees are likely to err on the side of caution
 - ✓ However there is a surplus in the fund
 - ✓ Which may increase the risk appetite overall.
- ✓ Size of the fund
 - ✓ Not very big
 - ✓ Separate mandate/multi-manager allocation unlikely
 - ✓ Likely to use collective investment scheme to invest

Other general factors to be considered include

- ^ Expenses
- ^ Diversification
- ^ Future of fund (pensioner outsource)

Examiner comments: The first set of calculations were done reasonably well although the majority of candidates used a monthly (rather than annual) accrual in calculating the active member liability. The calculation of contribution rates was poor, and most candidates did not have the confidence to make a decent attempt.

Part (iv) should have been straight forward, but many candidates struggled to come up with sufficiently relevant points – points related to funding level and sponsor covenant were not accepted.