EXAMINERS' REPORT

November 2021 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)

- ✓ Adequacy
  - Are the benefit systems able to prevent old age poverty to everyone in the population?
  - Do they provide for reliable lifetime consumption smoothing to the majority of the population?
- ✓ Affordability:
  - Are the systems within the society's or individuals financing capacity
- ✓ Sustainability:
  - Are the systems capable of remaining financially sound over the foreseeable time horizon?
  - Can future generations sustain the system
- ✓ Robustness: are the systems capable of withstanding major economic shocks
  - Also demographic shocks
  - And political shocks

(ii)

- ✓ Pension insurance: pillar 1
  - Because it is contributory it cannot be pillar 0
  - Benefit is linked to lifetime contribution
- ✓ Pension saving: Pillar 2
  - It's contributory and mandatory and DC so must be pillar 2
  - It's unusual for the government to administer
- ✓ Voluntary pension: Pillar 3
  - Because it is voluntary and run by the private sector.

Examiner comments: This was a bookwork question which was naturally well done by candidates who knew their bookwork well.

QUESTION 2

- ✓ *Terminal funding is where a single lump sum payment is made*
- ✓ *Whenever a benefit starts to be paid*
- ✓ *The lump sum payment is sufficient to provide all future benefit outgo.*
- ✓ *This is latest point at which contributions can be made.*

- ✓ *With Terminal Funding the contributions are paid earlier than with PAYG*
- ✓ *which is the typical approach for financing state benefits.*
- ✓ *However, these benefits are payable for a limited period of time*
- ✓ *And may be more predicable to capitalize when a claim arises*
- ✓ *Since they have a low dependency on mortality and other risks.*
- ✓ *The funding approach will require lump sums be drawn from income tax*
- ✓ *Which does generate some short term investment opportunity*
- ✓ *but may create some liquidity risk for the state.*
- ✓ Higher opportunity cost for the state
- ✓ Although this depends on the term of the payment
- ✓ The fact that contributions are made in advance theoretically increases the security of the benefits
- ✓ However, it does increase the temptation for the funds to be used for something else.
- ✓ The cashflows for both PAYG and TF will be uniform if the incidence of unemployment is stable throughout the year
- ✓ However, unemployment can be seasonal e.g. fruit pickers
- ✓ In which case, TF will lead to far less stable cashflows
- ✓ Both have the disadvantage of requiring cashflow into the scheme at the precise time tax income is dropping.

Examiner comments: This question was not well done. The concept of Terminal Funding is not well understood across candidates. Even in instances where the answers were well structured, the candidates failed to generate enough points.

QUESTION 3

(i)

- ✓ Decide on a period of investigation recent enough to be relevant
- ✓ And not so long as to reduce the credibility of the data
- ✓ Require salary information from all members active throughout the period of investigation.
- ✓ Data can be grouped by factors likely to influence salary growth
- ✓ E.g. age and gender
- ✓ But medium size of the fund may limit the number of criteria that can be used to segment the data
- ✓ Take average salary in group at end of the period and divide by average salary in group at beginning of period.
- ✓ Cost of living and productivity increases can be stripped out
- ✓ These figures may be available from the employer
- ✓ Divide (1+actual) by (1+ productivity + COLA) -1 to get approximate promotional increases
- ✓ Would then take the actual promotional rates and divide by expected promotional rates to see where adjustments are required
- ✓ Given the medium size of the fund, would probably modify a standard adjustment
- ✓ The productivity plus COLA element should also be compared to what was expected.
- ✓ An analysis in real terms may indicate that the productivity adjustment is consistently higher or lower than anticipated.

(ii)

- ✓ Timing: Accounting and statutory valuations may be performed on different effective dates.
- ✓ And accounting valuations are typically done annually as opposed to every three years.
- ✓ Valuations are performed for different purposes: with a stat val the emphasis is on proving solvency to the regulator while an accounting valuation is about ensuring the employer's obligation to the fund is not understated. P
- ✓ Different valuation methods may be prescribed (eg AAM vs PUM)
- ✓ Control periods may be different
- ✓ The definition of prudence
- ✓ And required level of prudence may be different (or talk about different assumptions)
- ✓ Professional guidance may be different
- ✓ Regulation e.g. wrt to prescribed assumptions may be different
- ✓ These valuations may be performed by different actuaries
- ✓ May be a professional requirement
- ✓ Different actuaries may apply their judgment in various ways leading to a different result.

Examiner comments: This question was not well done. For part (i) candidates often failed to answer the question that was being asked. In part (ii) candidates were unable to generate enough points to gain marks.

QUESTION 4

(i)

Basic notional DC – longevity risk, risk mitigation

- ✓ Risk of pensioners living longer than anticipated
- ✓ Particularly those with larger retirement benefits
- ✓ It is possible that this risk is passed on to the active members
- ✓ If government has some latitude in terms of defining the return
- ✓ Or if the index used to accumulate notional contributions is somehow linked to longevity.
- ✓ But neither of these are very likely
- ✓ And would come with reputational risk if members felt this cross subsidy was unfair.

OMO – longevity risk and risk mitigation

- ✓ Some members may choose the OMO which means fewer people on whom the longevity risk is retained.
- ✓ This does have a disadvantage in that it reduces the pensioner risk pool and can thus result in more volatile experience
- ✓ In addition, there may well be antiselection
- ✓ in that unhealthy lives who are able to get better annuity rates in the open market are likely to leave leaving a relatively healthy pensioner pool and worsening the longevity risk.
- ✓ If the fund annuity is quite simple, it may attract less financially sophisticated members
- ✓ While more financially sophisticated members who already have brokers would be willing to shop around.
- ✓ The commission-saving may be most highly valued by those receiving a small pension.
- ✓ These factors may result in lower income earners choosing the fund annuity option
- ✓ These are likely to be people with shorter life expectancy
- ✓ And smaller pensions.

(ii)

- ✓ Initially there would be a contraction among adults,
- ✓ Particularly at higher ages
- ✓ This may serve to make the population pyramid “peak” lower but flatter.
- ✓ As today’s children become adults, the pyramid will contract in further at the adult ages
- ✓ both because of the disease and the fact that there are fewer adults to begin with.
- ✓ Net emigration is likely to increase as people try to escape the disease.
- ✓ Typically this means working age people may leave.
- ✓ The above two factors mean lower numbers of young adults which may pull the upper portion of the population pyramid to be more triangle shaped than cap shaped.
- ✓ Disease may stimulate fertility because generational wealth has been passed on so people can afford more children
- ✓ But likely to be short-lived
- ✓ But bad news and uncertainty may result in decreased fertility.

- ✓ If fertility decreases, then there will be a further contraction at age 0 which may be sustained for a while.
- ✓ If fertility increases, the bottom of the pyramid may widen again until one has a more stable (triangular) population shape.
- ✓ However, overtime as the effect of the disease weakens, the population pyramid is likely to revert to its old shape.

Examiner comments: This question was particularly poorly answered. In part (i) candidates seemed to struggle to understand the concept of an in-fund annuity and its implications in a DC fund. For part (ii) candidates failed to articulate clearly the expected changes to the shape of the population pyramid.

QUESTION 5

(i)

- ✓ Both are accrued benefits methods
- ✓ Which target a standard level of funding
- ✓ With the SCR being set to maintain this target over the control period.
- ✓ The actuarial liability for both methods takes into account all benefits accrued at the valuation date
- ✓ But the PUAL is based on projected final earnings (at retirement date)
- ✓ Whereas the CUAL is based on current earnings.
- ✓ The SCR takes into account service accruing over the control period in both methods
- ✓ However the PUSCR consistently references projected final earnings
- ✓ Compared to the CUSCR references projected earnings only to the end of the control period.
- ✓ The CUSCR also includes a contribution in respect of accrued benefits
- ✓ Multiplied by the percentage increase over the control period
- ✓ This is not needed in the PUSCR.

(ii)

- ✓ The Current Unit Method will produce an SCR that is lower than that corresponding to the Projected Unit Method
- ✓ This is favourable to the employer who may be unable to afford the current level of contributions.
- ✓ The actuarial liability under the CUM is always lower than that corresponding to the PUM
- ✓ The fund is fully funded
- ✓ Which means a surplus will arise as a result of changing the method.
- ✓ This is favourable to the employer because the surplus in a DB fund is likely to reflect on the employer's balance sheet
- ✓ And give the illusion that their financial position has improved.

(iii)

- ✓ After changing to the CUM, the contribution rate will immediately be lower than before
- ✓ However the liability will also be lower than before
- ✓ And a surplus will arise as a result (since fully funded on PUM).
- ✓ Therefore the new contribution rate (MCR), taking into account the surplus will be even lower than the CUSCR at first.
- ✓ The MCR can be expected to increase gradually as the surplus is used up.
- ✓ Eventually they MCR will be equal to the CUSCR
- ✓ When the fund is fully funded on the CUAL.
- ✓ Since the fund is closed to new members, the CUSCR will increase dramatically
- ✓ As the average age of the membership increases over time.
- ✓ The CUSCR will ultimately be greater than the PUSCR at a later stage.

(iv)

- ✓ The CUM offers the lowest level of benefit security of all the funding methods
- ✓ This creates a solvency risk to the fund
- ✓ Especially since the employer is in financial distress
- ✓ And unlikely able to make good any deficits that arise in the fund.
- ✓ The CUM may not be legal (given low security levels)
- ✓ And the fund could lose its tax compliance status.
- ✓ The actuarial liability under the CUM is less than under the PUM
- ✓ And benefits previously communicated to members will have decreased significantly
- ✓ If there are large scale retrenchments, the employer and fund could face complaints from members as a result.
- ✓ If any benefits paid are on the PUM basis, the fund could go into deficit
- ✓ The CUM also offers little flexibility due to the low benefit security
- ✓ If the employer's financial position worsens, even more drastic action may be needed.
- ✓ The surplus that arises on the change from PUM to CUM is artificial
- ✓ But will have real solvency implications for the fund if removed.

Examiner comments: Overall the performance in this question was poor especially considering that there was a bookwork component. Most candidates did not consider the change in the liability that would be caused by the change in the method and so did not mention the effect on the MCR.

QUESTION 6

(i)

- ✓ To encourage employees to take long stretches of leave
  - ✓ Which leads to happier and healthier employees
  - ✓ Greater efficiency in the workplace
  - ✓ And fewer unplanned days of absenteeism due to illness
  - ✓ Reduces workplace fraud.
- ✓ This policy may be viewed favourably by prospective employees
  - ✓ Which will help the employer to attract and retain good staff.
- ✓ The employer may be obliged to pay leave out when an employee leaves
  - ✓ Limiting the number of days outstanding enables the employer to better plan for the cost of exiting employees
  - ✓ And to keep the cost low by limiting the outstanding days of leave.
- ✓ Outstanding leave days are likely to be reflected as a liability on the balance sheet of the employer
  - ✓ This policy places a cap on the balance sheet liability at any point in time
  - ✓ Which is favourable for the financial position of the employer.

(ii)

- ✓ Should consider whether this suggestion is within the bounds of the labour laws.
- ✓ Employment contracts should be consulted
  - ✓ to ensure there are no limitations in place with respect to retirement contributions and/or leave allowances.
- ✓ The employer should try get a sense of the employee's reaction to such a change
  - ✓ Since there will be an impact on the employer's reputation with employees
  - ✓ And potential ability to attract and retain staff members.
- ✓ The tax implications of trading one employee benefit for another should be considered
  - ✓ Specifically if there are limits to the tax breaks that can be received on retirement fund contributions.
- ✓ The trustees of the retirement fund will need to be consulted
  - ✓ To determine if this is a policy they are in agreement with
  - ✓ And whether the rules of the retirement fund will allow for it.
- ✓ The type of fund (DB or DC) and how the conversion will be implemented should be considered
  - ✓ Additional contributions in a DB fund could create the need for complex calculations more regularly
  - ✓ Which will increase the overall costs of the fund.
- ✓ The admin capabilities of the employer payroll
  - ✓ And the retirement fund systems should be considered
  - ✓ To ensure that the systems communicate well with one another
  - ✓ And no drastic upgrades are required to implement the policy.

Examiner comments: The level of marks was more consistent across candidates for this question. However too few relevant points could be generated to achieve an overall good result.

QUESTION 7

(i)

- ✓ Need to check that the current strategy complies with prevailing legislation
- ✓ And the investment policy statement of the fund.
- ✓ The nature of the assets should be real overall
- ✓ Since the scheme provides final salary benefits to active members
- ✓ And inflation linked increases to pensioners.
- ✓ The investment strategy should take into account the liquidity needs of the scheme
- ✓ Which may be low
- ✓ since the fund is open and has a number of actively contributing members.
- ✓ The funding level of the scheme should be considered when reviewing the strategy
- ✓ Since there is likely to have been movement in the funding level since the time that the strategy was established.
- ✓ The funding level will most likely dictate whether the current investment strategy can be made more or less aggressive.
- ✓ The costs associated with the current strategy should be reviewed
- ✓ To the extent that a similar strategy could be established at a lower cost.
- ✓ But also considering any transitional costs from the old to the new strategy
- ✓ Any tax implications of the current strategy should be quantified
- ✓ To determine whether the strategy can be made more tax efficient.
- ✓ The risk appetite of the trustees as well as
- ✓ The strength of the sponsor covenant should be considered.
- ✓ Any changes in the composition of the board or the strength of sponsor covenant may require a change in the strategy.
- ✓ The future of the fund should be taken into account
- ✓ If no major events (such as converting to defined contribution) are planned then the strategy may remain suitable.
- ✓ The impact of any changes in the liability valuation method and/or assumptions
- ✓ For example if the bonus pensions are incorporated into the liability
- ✓ The funding level will change and potentially create a need for investment strategy to change.
- ✓ Softer items such as socially responsible investing should also be considered.

(ii)

- ✓ This benefit design element creates a minimum pension for all pensioners
    - ✓ Regardless of their salaries at retirement date
    - ✓ Or years of service in the fund.
    - ✓ This could create moral hazard
    - ✓ Assuming no compulsory preservation,
    - ✓ If employees resign to access their retirement fund money shortly before retirement And then rejoin the fund to secure the minimum pension.
- ✓ The benefit increases the liability burden on the employer
    - ✓ Since contribution rates will need to reflect the minimum pension requirement.
- ✓ The benefit is not sensible since
    - ✓ If the state benefit is means-tested, lower earning pensioners will be topped up anyway

- ✓ At the cost of the state, rather than the employer.
- ✓ If the state benefit is universal then no in-fund top up is really required.

✓ The system is further complicated if contingent lives receive a reduced pension on the death of a principal pensioner

- ✓ Since the top up would then potentially not be once off
- ✓ And would be difficult to predict and build into contribution rates.

Examiner comments: Candidates failed to generate sufficient relevant points in this question which was a trend throughout the paper.

QUESTION 8

(i)

- ✓ Top-Down
  - Considers a target replacement ratio: income just after retirement to income just before retirement
  - May be net or gross of various things, what is important is that the denominator and numerator are consistent.
  - The replacement ratio after retirement is typically less than 100% because
  - Tax rates may decrease with age
  - Saving for retirement is no longer required in retirement
  - Expenses associated with going to work fall away
  - May have paid off mortgage
- ✓ Bottom-up
  - Create a post-retirement budget
  - Which may include desired savings
  - This budget will then need to be projected to expected date of death
  - Taking into account inflation
  - And changing consumption patterns.
  - Could use a shortcut approach where the budget is drawn up for certain items and then grossed up for full expenditure.

(ii)

- ✓ Children are still going to be minors when Darsh retires -> Living costs
- ✓ May wish to pursue tertiary studies
- ✓ Income needs in retirement increased for the first few years before they can drop off
- ✓ May also require increased life cover while Darsh still has dependents
- ✓ And disability income cover pre-retirement
- ✓ Life cover may be provided by the retirement fund before retirement
- ✓ But may need to purchase additional cover privately for increased financial responsibilities
- ✓ This could still be used post-retirement.
- ✓ Living annuity could provide the income pattern required
- ✓ As well as reducing the need for costly life insurance post-retirement
- ✓ But it does expose Darsh to longevity risk
- ✓ Life annuity could remove this
- ✓ With a guaranteed period
- ✓ Or high spouse's reversion % on the annuity reducing the need for life insurance
- ✓ Any amount taken in cash at retirement may be used to provide the desired income profile
- ✓ But will need to consider tax implications
- ✓ And regulatory restrictions.
- ✓ His consumption would increase pre-retirement resulting in less capacity to save pre-retirement.
- ✓ Unless he is able to cut down on other expenses

(iii)

- ✓ Contribute more to the occupational fund, if an option
- ✓ Increase pensionable salary as a % of total pay, if possible.
- ✓ Retire later

- ✓ Or phase over to retirement
- ✓ If flexible benefits available, cut back on other benefits e.g. leave so more is available for retirement funding
- ✓ Reducing risk cover (if possible) could also increase retirement funding,
- ✓ Particularly if risk cover offered within the fund
- ✓ But need to consider risk benefit needs and relative cost of group and individual cover

(iv)

- ✓ Darsh will want to set some objective function:
- ✓ E.g. A<L at retirement is less than 99.5%
- ✓ Darsh will first need to decide on certain key parameters like retirement age (timeline)
- ✓ And contribution rate
- ✓ As well as to ascertain the non-investment expenses
- ✓ Essentially will want to project Darsh's retirement savings to retirement and compare them to the capital required at retirement to meet Darsh's financial needs.
- ✓ Should consider Darsh's retirement savings from all sources which may include savings outside of this fund
- ✓ E.g. retirement annuity or preservation fund.
- ✓ Decrements like death and disability can be ignored if appropriate insurance in place
- ✓ Investment return will be modelled stochastically
- ✓ Which will affect not only the asset projection but the discount rate used for the liabilities.
- ✓ Initial investment strategy may be used as a starting point.
- ✓ Model rerun many times to get a distribution of funding positions.
- ✓ Revise investment strategy based on results
- ✓ E.g. increase growth assets if A<L.
- ✓ And investment options available within the fund.
- ✓ And need to consider regulatory constraints.
- ✓ If none of the options provide a satisfactory outcome may need to adjust the objective function
- ✓ Or other decisions e.g. retirement age
- ✓ Compare numerous options that meet the objective criteria, test thoroughly for robustness
- ✓ Select investment strategy based on robustness and practicality.

Examiner comments: This question was not well done. Most candidates wrote a lot of irrelevant points without answering the question. Poor planning was often apparent.