

# **EXAMINERS' REPORT**

*June 2017 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.

- Lump sum
- Pension paid to spouse
  - o Flat pension or increasing from year to year
  - o Increases with inflation or specified percentage or ad hoc
- Pension paid to children
  - o Could also increase or not
  - o There could be a specified ending age
  - o Or it could depend on educational attainment
  - o Often paid to a maximum number of children
- Subsidies
  - o Housing or education
- The amount could be
  - o A fixed amount
  - o Related to salary
  - o Related to years of service
  - o Related to contributions (*Accepted this point even though the design that was explained for part ii or iii would not make this a sensible option*)
- Could be a combination of the above

ii.

The primary risk to the state is the scheme costs more than expected, either due to the average value per death claims being higher than anticipated or the number of death claims being higher than anticipated (or both). In the long-term this may result in the scheme being unsustainable while in the short-term it may lead to financing risk as this is a PAYG scheme.

Mortality risk (repeated point)

No information is given as to how the benefit is calculated for a worker. If it is not the same value for each worker then the mortality risk relates not only to how many people die but which workers within the group. Claim numbers may be higher than anticipated if:

- the original mortality rates used in the fund design were too light (i.e. model risk),
- a catastrophe
- or through random variation, this effect will be greater if there is only a small eligible group.

Benefit cost risk

The benefit cost may be higher than anticipated: for example

- if spouses' pensions are paid and mortality is lighter than anticipated
- If child pensions are paid and there are more children than anticipated

#### Financing risk (repeated point)

If the benefit values cannot be changed during the year, the scheme may need to suspend payments during the year if experience is worse than anticipated as benefit outgo cannot exceed income in a pure pay-as-you-go scheme. Both reducing benefits or slowing down payments carries political risk/reputational risk for the government. However, financing this scheme by budget reallocations will have knock-on effects elsewhere.

#### Excess asset risk

However, if claims experience is more favourable than anticipated the scheme would either

- have a surplus (which it should not strictly have as a PAYG scheme) and hence run investment risks and operational risks associated with having funds without proper controls in place; or
- have to adjust benefits upwards which may create unrealistic expectations as to the benefit size which may be unsustainable leading to political risk when the benefits are cut again.

#### Data risk

The revenue is financed from general tax revenue but membership is set based on minimum wage and formal/informal employment status. The scheme contribution rate may be very difficult to price for as the number of potential members as well as their age and gender information (or any other rating factors) may not be available. It is extremely unlikely that there is an appropriate mortality table available.

#### Contribution risk

There may be limits as to how much flexibility can be applied within the fiscus or if taxation can be varied overall if the scheme costs are materially different to what was anticipated.

#### Expense risk

Expenses may be higher than anticipated in nominal terms if inflation is higher than anticipated or in real terms if the costs of running the scheme were not fully anticipated.

#### Inflation risk

A further inflationary risk might be introduced if the benefits are linked to inflation, particularly as the tax revenue growth is likely to lag inflation.

#### Political/reputational risk

The benefits may not be valued by the population – particularly if there is considerable benefit uncertainty.

There may be operational risks such as fraud

Adverse selection risk, if employers push wages above minimum wage to include sickly workers (although very unlikely); and

Regulatory risk, based on how oversight is to be applied.

iii. They can reduce the risks through fund design e.g.

- Data risk:
  - Change the eligibility criterion to tax payers or force workers to register for the scheme and contribute towards it directly.
  - But this may not meet the government's coverage objectives
- Mortality risk:
  - pay everyone the same benefit
  - But one size of benefit is unlikely to be appropriate for all workers
- Financing risk:
  - make the benefit relatively small
  - Costs of administration may become very large relative to the benefit

The risks could be shared e.g.

- Insurance of the full benefit
- Catastrophe cover
- But for both counter-party risk is introduced and it will increase costs

If they choose to retain the risk and self-insure then they may wish to use a funded method of financing or use at least have a working balance.

- Ensure an appropriate investment strategy is then in place for any reserve or working balance
- And that there is proper governance around any excess assets
- This avoids the need to constantly adjust the contributions or benefits.
- But this introduces investment risk
- And political temptation to dig in to excess funds
- Opportunity cost

They can diversify the risk by offering some sort of survivor benefit as well alternatively they can avoid the risk by not offering the scheme at all but neither fits with the government objectives.

*Although an unusual scenario, many candidates failed to gain easy marks, particularly in part ii. Better candidates identified that this was a death benefit and hence needed different treatment to the more familiar pay-as-you-go retirement scheme although many still gave very little detail on the mortality or financing risks. In this question, it was important to note that those financing the benefit were taxpayers and those eligible were workers earning above the minimum wage and hence the "demographic" risk in this system related to shifts in the size and composition of these two groups. In part iii, it was apparent that some candidates had either not purchased the new notes or had failed to learn the risk management techniques set out in them.*

## QUESTION 2

### i. World Bank Model

#### Pillar 0

Pillar 0 benefits are non-contributory and provided by the state. This means they are funded from general taxation. These benefits are generally aimed at providing only a minimum amount to alleviate poverty. The benefit may be universal (paid to everyone in a certain group, called a “demogrant”) or means-tested.

The SRS pension of \$100 per month is not related to earnings. It is non-contributory, universal and funded from taxation.

#### Pillar 1

This is a contributory, mandatory pillar operated by the state. This means that benefits are funded from contributions rather than from general taxation and that everyone in a specified group (mostly working adults) is required to contribute. Contributions are linked, to some extent, to earnings. The expectation is that every individual’s benefits from this pillar will to some extent be related to the individual’s lifetime contribution. The benefits are generally financed through pay-as-you-go or there can be some partial funding.

The WR pension of 0.5% of salaries per year of contributions has the characteristics of a Pillar 1 benefit. It is contributory, pensions are related to contributions, and it is PAYG.

#### Pillar 2

This is a contributory, mandatory pillar which is generally privately operated and defined contribution in nature. Membership is mandatory for most working individuals, and the benefits can be provided by many private vehicles with a multitude of design options. This pillar is funded, since the contributions are invested in financial and other assets, which finance investment in the economy and which generate income and economic growth.

There is no Pillar 2 benefit.

#### Pillar 3

Pillar 3 is a voluntary benefit. The design of pillar 3 benefits tends to be quite flexible as it is intended to allow individuals to tailor benefits to their own needs given the rigidities of pillars 0 to 2.

The WR pension of 0.5% of salaries per year of contributions has the characteristics of a Pillar 1 benefit. It is contributory, pensions are related to contributions, and it is PAYG.

## Pillar 4

Pillar 4 is termed the non-financial pillar as it covers access to informal support such as through the family, formal social programmes such as for housing, access to financial markets and nonfinancial assets such as home ownership.

There is no specific reference to any Pillar 4 benefits.

- ii. The employer pension funds will now become a Pillar 2 benefit.
- iii. Since not all workers have an employer pension right now, and all will after the change, this means that for the employed population, total pension savings will increase, but at the expense of lower current take home pay.

It is likely that most people are not saving enough, therefore this will be in their interest.

Employer funds may be better and more efficient than insurer products, which would be good for workers (hopefully lower costs etc).

Pillar 2 provides the opportunity for individuals and organisations to tailor retirement benefits to individual needs, and allows for innovation and development of retirement products. Having more funds may therefore improve the products available.

However, if employers have to provide funds even if they are small, the provision may be expensive and inefficient.

Since these funds are funded, the change may also play a role in encouraging economic growth by increasing the capital available for investment in the economy. This has the long-run effect of raising worker productivity and hence wages.

There is no prescription of the level of benefits in the private employer funds. This may be a problem since:

- Individuals may cancel private products because they believe that they have sufficient employer cover
- Employers who did not want to provide before now have to – they may not be motivated to set up efficient vehicles.

The change may lead to a reduced volume in private individual provision, which may lead to loss of efficiencies and innovation in that sector.

*Candidates did well in this question because of part (i), which was pure bookwork and for the most part well learnt. Few candidates were able to assess whether mandation by the employer makes a system mandatory in terms of the World Bank Model, but overall candidates did well. In question (iii), the basic points were well covered but answers lacked depth.*

### QUESTION 3

i. Arguments for excluding labourers:

- It may allow the employer to reward groups providing services that are deemed to be the most valuable to the company.
- It may allow benefits offered to be tailored to specific needs. For example, disability, death and medical benefits may be viewed as a necessity for some types of manual workers but be lower for office workers.
- Workers may belong to a different fund, e.g. a union fund, better suited to their needs.
- It may be administratively difficult to pay benefits to labourers (tracking, bank accounts, fees).
- It may not be cost efficient to provide benefits to low income workers (fees may be high relative to salaries).
- Some benefits may be more expensive for that group and raise costs overall (unwanted cross-subsidies).
- agricultural labourers tend to be seasonal workers which is difficult to account for in a DB type environment.

Arguments against:

- It may be viewed as discriminatory, particularly if union support is not obtained.
- Retirement funds are long-term vehicles whereas the demand for various skills may change over the short-term.
- The fund may benefit in the short term from reduced administration costs due to economies of scale if membership were to double
- Manual labourers are least likely to be able to make their own arrangements for retirement savings due to low earnings and education levels.

ii. Contribution rate

The fund contribution rate consists of contributions towards retirement, death benefits, and expenses.

- The contribution rate towards retirement is calculated using various assumptions
  - o Mortality – the mortality of the new group of members is likely to be higher, due to those workers having lower education, lower living conditions and as a result poor health. This will extend to pre and post retirement mortality. Higher mortality means fewer members survive to retirement, and pensioners live for shorter. Therefore the contribution rate towards retirement should reduce.
  - o Investment returns – The investment strategy is unlikely to change very much, as outlined above, so it is likely that investment return assumptions are unchanged in the short term. In the longer term, the fund may adjust its strategy

which will cause the contribution rate to increase (if returns are expected to be lower) or vice versa.

- Salary increases – The new group would likely experience lower salary increases. This would mean lower salary growth assumptions, both for the base rate of increase and for any salary scales. This would mean that contribution rates are reduced.
- Withdrawal rates – the new members are likely to have higher turnover, which means that more withdrawal benefits are paid and fewer retirement benefits. If withdrawals result in a surplus, this would reduce retirement contributions. This would be the case also if members become deferred on withdrawal and benefits are revalued at a lower rate than inflation in deferral.
- The death benefit contribution will be affected by the increased mortality rate, and are likely to increase
  - This is irrespective of whether benefits are insured or paid from the fund
- Fund expenses:
  - In general, the larger number of members is likely to result in economies of scale which will reduce expenses (e.g. some expenses are fixed in total; and administration costs may be lower for funds with greater membership)
  - But if expenses are charged as a proportion of salary, the salaries are likely to decrease on average; this could mean a higher expense allowance
  - It is unclear what the net effect would be
- Average age: If the labourers are young this will lower the funds average age which will likely lead to a reduction in the contribution rate.

On the whole, it is unclear what the effect would be. If retirement benefits are the main determinants of the cost, it is likely that overall the contribution rate would fall.

*This question was reasonably well answered by most candidates. Better candidates worked methodically through the elements that would affect the contribution rates in part (ii). Poorer candidates did not write enough, failed to answer the question being asked and repeated points.*

## QUESTION 4

### i. Assets

- A level annuity is a fixed liability, therefore assets with nominal returns would be appropriate
- The term of the annuity is equal to the life expectation of the investors which at retirement is likely to be around 15-25 years
- Therefore bonds of similar term would be most suitable
- If bonds of sufficiently long term are not available then a portfolio with a similar duration can be constructed
- The cashflow needs of the portfolio will need to be taken into account – what happens when people retire? Do they take their money out of the fund to purchase annuity? if so, then the net cashflow may be negative (more switching out than in) in which case liquidity will need to be accounted for through money market instruments
- The currency is likely to be local
- Any regulatory restrictions would need to be taken into account

### ii.

Advantages	Disadvantages
Requires no action from the member	
Less expensive than full choice	More expensive than a one-size fits all strategy✓
Members who would want a level life annuity at NRA will be in a matched position at NRA	Members who would want any other type of annuity will be mismatched.
	Similarly any member who retires early may have too much equity exposure
	And any member retiring after NRA may have inadequate real growth on their fund credit.
	Does not cater for any cash lump sum that the member may be able to take.
Slow phase-out means the member is less exposed to timing risk.	

- ### iii.
- Customised defaults are default investment strategies that are customised to individual members based on objectively verifiable characteristics, such as age, size of accumulated credit, income, years of service, class of membership, or contribution rate.

iv.

Bias	Example
Myopia	A young individual may be blinkered by current economic conditions and not take account of the fact that they have a long investment horizon.
Loss aversion/Prospect Theory	People may invest too conservatively
Sunk cost fallacy	People may remain invested for longer than optimal in a loss making investment waiting for its fortunes to change.
Procrastination	People may put off making an investment change that is in their best interests.
Availability heuristic	People may recall well publicized good or poor performance of a particular investment as opposed to considering all the facts.
Hindsight bias	People will look for reasons to confirm their investment decisions.
Framing effects	How choices are presented to members will influence their decisions
Complexity/paralysis	Members are unlikely to make any choice if the options are too numerous or complicated
Inertia	People may simply never opt out of the default (make sure a different point to procrastination)

*Part i was poorly answered with few candidates knowing how to describe an investment strategy and what (other than the nature of the liabilities) to consider. iii was well answered with most candidates being reasonably familiar with behavioural biases and coming up with reasonable (if sometimes generic) examples. The overall performance was good since the question was skewed towards bookwork due to the 10 marks available in iii and iv.*

## QUESTION 5

i.

- Detailed listing of the members that have transferred in as a result of the acquisition.
- The benefit structure of the two schemes
- and any adjustments that may have been made to align the two benefit structures.
- The level of assets that were transferred in respect of the liability of the new members.
- The basis that was used to calculate the transfer value.
- Any communication that was provided to transferring members in respect of their post-acquisition benefits.
- The investment strategy that was applied to the transfer value.
- The rules of the scheme to which the transferring members belonged to prior to acquisition.
- The latest valuation report of the scheme to which the transferring members belonged to prior to acquisition to establish
- Member expectations in terms of salary progression, post-retirement benefits and death benefits.

ii.

- The discount rate used to determine the TV is lower, therefore if pension increases are the same the post-retirement discount rate used to determine the TV will be lower, resulting in a higher annuity factor.
- The higher annuity factor may have made some allowance for expenses specific to the group of individuals being transferred.
- The higher annuity factor may have been derived due to the application of margins for prudence when calculating the transfer value.
- The higher annuity factor may have been applied as a way to enhance benefits in respect of transferring members.

iii. This is the original member liability and TV calculated based on updated information and current valuation basis:

- Updated original member liability

$$\begin{aligned} &= 17 * 25 * \left(\frac{1}{45}\right) * \left(\frac{1.08}{1.12}\right)^{(65-47)} * 10.569 \\ &= R51,870 \text{ million} \end{aligned}$$

- Updated transfer value liability

$$\begin{aligned} &28 * \left(\frac{1.11}{1.085}\right)^{(65-38)} * \left(\frac{1.08}{1.12}\right)^{(65-38)} * \frac{10.569}{12.26} \\ &= R16,725 \text{ million} \end{aligned}$$

- Total liability =  $51,87 + 16,725 = R68,595$  million
- Surplus level =  $(57 + 28) - 68,595 = R16,405$  million

iv.

- Previous surplus =  $50 - 44,581 = R5,419$  million
- Interest on prior surplus =  $5,419 * [(1.1)^2 - 1] = R1,137$  million
- Investment item: Actual less expected assets  
 $= 85 - [50 * (1.1)^2 + 6,479 * (1.1) + 28] = - R10,627$  million
- Salary increase item: Expected liability less actual liability  
 $= 51,87 * [(1.07)^2 * (25/22) - 1] = R0,39$  million ✓
- Basis change item:  
 Original member liability =  $51,87 * [(1.12/1.1)^{18} * (1.07/1.08)^{18} - 1] = R8,811$  million  
 Transferred members =  $28 - 16,725 = R11,275$  million  
 Total basis change =  $8,811 + 11,275 = R20,086$  million
- Closing surplus =
 

5,419	
Plus	1,137
Less	10,627
Plus	0,39
Plus	<u>20,086</u>
=	16,405 million (as per iv above)

*Answers to parts (i) and (ii) were weaker than expected. Students failed to pick up obvious points in part (i) – details of membership like name, age, salary etc were not awarded marks separately since the mark allocation was low in total. For part (ii) candidates failed to recognise and use the information given in the question.*

*All candidates calculated the new liability for original members in part (i) although some were unable to calculate the new liability in respect of the transfer value. Some candidates excluded the 28 million transfer value in the assets. Candidates lacked confidence in completing the analysis of surplus. Many missed obvious items like the return on previous surplus and investment return items. Most wasted time by calculating contribution rates and contribution surpluses even though contributions were not significant to the question in any way. Information given in the question to lead candidates to the appropriate AOS items was ignored.*

## QUESTION 6

- i. The CUAL does not take into account future salary growth while the PUAL calculates the liability allowing for salary growth until retirement. For this reason, the CUAL would be lower than the PUAL (which is equal to the AAAL) when all are calculated on the same basis, in a discontinuance valuation the actuary is required to use the conservative assumptions that an insurer would use on a buy-out. It is thus expected that the CUAL in the discontinuance basis will be higher than for statutory returns, although the extent depends on the strength of the statutory basis.
- ii. In a defined benefit fund, the employer is ultimately responsible for any shortfall on the fund either as a going concern or on discontinuance. How this is disclosed in company accounts or to the regulator does not change the ultimate liability the employer will face if the fund discontinues. This should be useful information to an employer. It is true that accounting disclosures or statutory valuations on this basis might prompt more action by the employer, using a discontinuance valuation for these purposes is inappropriately prudent and may trigger undesirable consequences, for example placing undue burdens on employers who were able to sustain their DB funds as going concerns but could not find a deficit on the discontinuance basis. It is also likely to be inconsistent with international accounting standards. If statutory valuations are freely available, then shareholders are likely to find out the extent of the CUAL in any event, which may bring pressure to bear on employers to honour their commitments to their funds. Similarly, unions may pressure employers into improving the funding level in order to protect member interest. Once trustees are aware of any shortfall on the discontinuance basis, chances are that they will begin to move to gain assurances from the employer on the strength of the employer covenant and take remedial action where the covenant is found to be weak.

### iii. **Worker benefits**

Workers who lose their job will appreciate receiving a benefit

Lump sum may be useful to reskill or invest in a company

May not be fair if workers are let go before bankruptcy (possibly to save costs)

The benefit is relatively generous for longer serving members but it is very small for employees serving for a year or less

Arguably the need of the workers is the same regardless of duration of employment, so maybe a flat benefit would be better

### **Economic effects**

Onerous benefit to provide for companies

The cost of the benefit may increase the incidence of bankruptcy which is counterproductive

Funding for this benefit in full may lock up funds which could be used in the economy

### **Company effects**

Companies which do become bankrupt may not have sufficient assets to pay out benefit unless there was funding set aside for it

Companies may be less willing to employ labourers to avoid this benefit (this is unlikely though)

Or may be discouraged from retaining staff (for example use seasonal labourers or contractors)

The liability for the company is immediately high because workers immediately qualify for the benefit based on past service – this means that the financial positions of companies will be immediately affected, and financial positions will deteriorate.

### **Government perspective**

The benefit is funded by employers so it is low cost for the government.

The goal of the government is to ensure a basic standard of living for citizens which this supports.

The government would also like to relieve the burden on the state. Depending on the structure of any government benefits, this may help a little. But for example

Unemployment Benefits would still be drawn so the direct effect on state benefits may be minor.

The government will need to ensure that companies are paying out the new benefit and if it is funded, that all companies are funding for it appropriately.

This will result in costs for government.

iv. The state can:

Provide benefits directly or through its own agencies. In this case, the state could offer a state benefit which is payable to workers who lose their jobs in this way. The benefit can be funded through contributions (say by employers or workers) or taxes.

Compel benefit provision by private agencies to all or some of the population – for example by making it compulsory for workers to take out some form of insurance against unemployment and related risks.

Incentivise voluntary benefit provision by private agencies to some or all of the population, for example by making contributions towards unemployment related products free of tax.

Regulating public or private bodies providing benefits, and those bodies with custody of funds, in an attempt to ensure security for promises made or expectations created. For example by dictating how benefits must be funded.

*Better candidates scored well in part i although some of the weaker candidates failed to discuss the different basis that would be used for a discontinuance valuation. Part ii was generally poorly done with most candidates failing to raise enough distinct points. Part iii allowed for a broad range of answers and many candidates scored well. Part iv was mainly bookwork and some candidates scored well although there was evidence of significant time pressure in many cases.*

## **END OF EXAMINERS' REPORT**