

## **EXAMINERS' REPORT**

*Specimen Paper 1*

### **Subject F108 — *Health, Social, and Employee Benefits* Fellowship Principles**

#### **INTRODUCTION**

The attached report has been prepared by a group of actuaries with experience in the subject area as well as experience as examiners and principal examiners. In many cases, the report reflects the published examiners' reports from the original F101 and F104 examinations. The solutions provided are an indication of the points sought by the examiners and should not be taken as model solutions. We have chosen to show detailed mark allocations as we would have applied them as we believe this will help candidates to see how the new principles in the new syllabus can be used to generate marks. Unless otherwise indicated, each bullet represents a  $\frac{1}{2}$  mark. Lines of text without bullets would not gain credit.

## QUESTION 1

i.

- Adequacy
- Affordability
- Sustainability
- Robustness
- Minimise labour market distortions
- Contribute to investment to support economic growth

ii.

- An ageing population is characterised by lighter mortality, particularly for the elderly, and declining fertility.
- This means the number of pregnant women seeking medical care would reduce
- And the number of young children would reduce
- Which would have the effect of reducing benefit outgo for these groups.
- However, the number of elderly would increase and
- Their total benefit outgo would increase
- The overall effect would depend on the relative change in the sizes of the three population groups.
- And the size of the average cost per person.
- Generally the elderly and very young children have the highest costs.

iii.

- Under a PAYG model, the government effectively borrows from future generations to pay its benefits
- If the government uses the fund to fund infrastructure instead of using debt to do this, Economic growth will follow
- The size of the effect really depends on the size of the fund
- And what it is invested in
- Invested offshore– won't make a difference
- Similarly if saved locally as opposed to invested
- But then again, keeping money aside to create the fund means government cannot spend this
- And may use debt to finance other expenditure
- Resulting in a zero net gain

iv.

- 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.

## QUESTION 2

i.

- Collect data from other sources to estimate costs...
- ...for example from professional/governmental bodies, other countries, reinsurers
- ...will need to adjust to be relevant to the market the product is in
- Ensure clear definitions of illnesses used and specified...
- Consider implementing benefit caps to limit claims per case...
- ...which will limit maximum liability
- ...offer cash benefits and not indemnity
- Benchmark premiums against competitors with similar products in the market
- Build in margins to pricing and reserving...
- ...should be commensurate with the level of uncertainty
- Avoid offering guarantees
- Consider reinsurance that can help limit the retained risk
- Ensure adequate capital reserves set aside...
- ...beyond any minimum solvency requirements
- Frequent experience review to compare how experience is actually emerging compared to expected...
- Consider if premium reviews can be done more regularly
- Ensure adequate underwriting is in place
- Validate claims before they are paid... or consider claims preauthorization

ii.

- $\text{incidence rate} = 0.00953 + 0.00640 + 0.01020 + 0.00584 - 0.05 * 0.00640 = 0.03165$
- $\text{incidence rate after survival period} = (1 - 0.0141) * 0.03165 = 0.031204$
- $\text{expected claims cost} = 0.031204 * 542\,700\,000 = 16\,934\,267$  or 16.9 million
- An extra half mark is available for having the correct method even if there was a calculation error that was carried

iii.

- Profit loading
- Administration expense loading
- Loading for commission and marketing expense
- Reinsurance loading
- Solvency capital requirement loading
- Contingency margin
- Loading for investment fees and costs
- Other expenses such as consultant fees and legal fees

### QUESTION 3

i.

Main benefit comparisons would include:

In-Hospital

- Types of admissions covered
- Co-pay amounts
- Exclusions

Out-of-Hospital

- Chronic Medication
  - number of chronic conditions covered
- Acute Medication
- GP visits
- Optical and dental
- Specialist visits
- And any limits per treatment e.g. limit per GP visit.
- For all in- and out-of-hospital consider the overall rand amount of cover for the period

*[Maximum of 2.5 for examples of out-of-hospital examples.]*

ii.

You could break up the hospital costs as follows:

- Hospital cost = admission rate \* length of stay (LOS) \* cost per day.
- An increase in any of these factors would increase the hospital costs
- Although it is possible that some elements are driving up costs while others are counteracting this
- Analysing the change in the admission rate will show if more people have been admitted for certain admission categories over time.
- Analysing the length of stay will show if patients stay longer in hospital over time. If this is the case, it will also place further pressure on hospital cost increases.
- The cost per day metric will be very useful to see how large the increase in unit costs (e.g. ward fees) were
- relative to CPI.
- This could be performed by **major admission category**
- for each of the three years so you can look at the change in costs for each admission category.
- Consider risk profile of covered population
- For example, higher chronicity *[maximum of 1 example]*
- This could also be done by **province/major hospital** group/major hospital etc to see if a certain area has a proportionally higher increase than other areas.

iii.

- ***Per diem arrangement***
  - A set rate is agreed per day (i.e. per diem) for all services provided by the hospital.
  - The per diem structure may be split into types of admissions,

- for example, general admissions, surgical admissions, maternity etc.
- In certain instances complicated cases will be “carved out” of the per diem arrangements and will be charged on a fee-for-service basis.
- (This protects the hospital in terms of extraordinary high cost cases and assists the scheme in obtaining better rates where the possibility of high cost cases has not been factored into the per diem rate.)
- But MedCo then retains the risk associated with these complex ‘carved out’ cases
- The per diem structure reduces the hospital’s incentive (and hence the risk to MedCo) to over-service the patient and
- encourages the hospital to improve its profitability by managing its cost efficiencies.)
- The main risks transferred by the funder are price risk & intensity risk.
- Intensity risk: the risk that more services are needed around the bed than expected.
- Incidence risk for insurer remains – more cases than expected.
- There is an incentive for hospitals to delay discharging patients to earn higher fees.
- This risk could be managed by: matching the per diem payments more closely with hospital costs
- (eg higher amount for first day for surgical admissions) and
- focussing on discharge planning so that the insurer monitors that patients are discharged at the appropriate time.
- **Fixed fee per case/global fee arrangements**
  - Hospitals are paid a fixed amount per admission
  - Fixed fee amounts may be differentiated by medical speciality, eg orthopaedic or neurology.
  - A global fee arrangement is a special case where the fee is fixed per procedure e.g. knee replacement
  - Fixed fee reimbursement may be combined with per diems, where per-diems are used for more common treatments and per-case amount for unusual cases
  - The main risks transferred for the funder are price risk, intensity risk and severity risk.
  - Severity risk – If the condition of a patient is more severe than anticipated, the funder will need to bear the cost of additional treatment.
  - Negotiating a global fee for certain conditions or procedures (irrespective of the severity or recovery period) will transfer this risk from the funder to the provider.
  - There is an incentive for the hospital to discharge the patient and then re-admit the patient to earn more fees.
  - This can be managed by linking related admissions together.

*[Not likely that hospital will want to take on full risk for profile, e.g. capitation arrangements would not likely be considered in the hospital setting.]*

iv.

- On a disease management programme, all registered members with a chronic disease (e.g. diabetes) are actively monitored.
- It is more cost effective for chronic sufferers to manage their condition out of hospital in order to avoid a hospitalisation event, which is generally expensive.
- I.e. Short term increases in out-of-hospital costs such as medicines, pathology tests and GPs visits would result in savings in the aggregate given the large and volatile costs related to hospital admissions for poorly managed chronic conditions.
- The out-of-hospital costs also tend to be less volatile which results in less volatile claims experience for MedCo
- Enrollees can be flagged for poor disease management (eg adverse blood test results).
- These members can be contacted by the managed care provider and education on their disease provided,
- a support line given as well as reminders sent to them.
- Alternatively, an app can be made available
- Possibly linked to wearables to provide real time reminders
- Enhanced predictive modelling can then also be applied for stratification purposes and claims projection purposes.

#### QUESTION 4

i.

- The employer is taking on the longevity risk
- And investment risk of the pensioners
- Although to a small extent since the level of guarantee is low
- Liability related to the low level of guarantee will need to be reflected on the employer's balance sheet.
- Which effectively ties up capital for the employer which creates an opportunity cost
- The system may be administratively complex
- Which could end up costing more to the employer in terms of money and time for trustees.
- To the extent that the annual pension increase is a reasonable benefit expectation
- The employer may be taking on inflation risk too
- There might be some legislative restrictions involved in letting pensioners take on some of their own risk.

ii.

- The valuation reflected in the employer's balance sheet is the accounting valuation.
- And usually reflects the level of surplus only that can be accessed by the employer.
- The two valuations also apply different assumptions when valuing any defined benefit type of liabilities
- Like the in-fund pension liability.
- And any surplus in the in-fund annuity will mostly likely all or largely belong to the pensioners
- Since they are exposed to the major part of the investment and longevity risk
- Accounting and statutory valuations may have different prescribed methods
- It's possible the valuations may have different effective dates.

iii.

- The trustee is likely to be employed by the employer or be paid for their services by the employer.
- Either way they have a vested interest in keeping the employer happy.
- The trustee is looking to see a higher surplus value in the employer's financial statements
- Which would make the employer appear financially healthier overall
- And could impact incentives (such as bonuses) that employees may be entitled to.
- The trustee is conflicted to the extent that they would prefer to see a change in the method or assumptions in the valuation that would improve the level of surplus that can be reflected in the employer's balance sheet.
- This may not be in the best interests of members and pensioners
- For example, if their benefit security is reduced.

iv.

- Following two different strategies in the two different asset pools will make most sense
- The trustees should consider the current investment strategy in place.
- And required adjustments after segregation
- The costs involved in segregating the pensioner and active member assets should be considered. There are immediate and ongoing costs to the suggested change that should be considered
- For example. segregating assets would require the setting up of two separate portfolios (immediate cost)
- And there would be transactions across the portfolios when members retire (ongoing costs) which weren't there before.
- The trustees would need to consider whether to keep the current investment managers
- Or whether to seek out investment managers that may be more appropriate after separating the active and pensioner portfolios.
- Any change in investment strategy may impact on the fund's actuarial valuation
- In particular relating to the pensioner pool in this case
- The trustees should be clear on how the valuation result may change before making a decision.
- The trustees should consider administrative implications of any investment change
- And whether the current administrator has the know-how to manage the fund through the change
- And thereafter.
- For the active member assets the trustees should consider possibly being more aggressive in the investment strategy
- Since the current strategy is likely to be more conservative to protect pensioner interests.
- The trustees may want to set a target for income replacement at retirement
- And use stochastic or other modelling to determine an optimal strategy for the active members.
- For the pensioner assets the trustees should consider the ability and willingness of the sponsor to uphold their promise (even though it is small)
- And consider pension increases that pensioners may be expecting in the future.
- Any investments that mitigate longevity risk should be considered

- And it is likely that high levels of investment liquidity should be maintained
- Since contributions will flow into the active member pool.
- All legislative and tax implications should be considered.
- Surpluses will be easier to manage if kept in separate pools.
- The trustees should also consider how the change will be communicated to members
- and their likely reaction to it (particularly if they are employees of the sponsor)
- They also need to consider the desired level of matching in each portfolio
- And whether they have the governance budget to manage two separate strategies

## QUESTION 5

i.

- Redistribution
  - From one group to another in line with stated government policy
- Market Failure
  - If left to itself, the free market could not provide the necessary benefits to everyone
- Efficiency
  - Government may be cheaper due to economies of scale
  - Or because they don't exist to make a profit
- Inertia
  - If a benefit has been provided previously, public opinion may make it difficult to remove
- External Pressure
  - E.g. from donor agencies,
  - Banks e.g. World Bank, IMF, ILO
- Moral Hazard and vested interests
  - It may be politically helpful to introduce a benefit
  - Particularly if this is a cultural expectation
  - Certain politicians may enjoy having particular "benefit departments" they are in charge of (Ego).

*[An alternative answer based on the notes structure in Chapter 22 could read as follows:*

- *Redistribution – of costs*
  - *Across generations, income levels and health statuses*
  - *To protect disadvantaged segments of the population*
- *Market failures*
  - *Behavioural biases*
  - *Externalities*
  - *Asymmetric information*
  - *Imperfect competition*
- *Efficiency*
- *External pressure*
- *Social culture or political promises*
  - *National expectation of state provision*

- *Political promises*
- *Specific concerns in healthcare – safeguard productive and healthy workforce which feed into GDP]*

ii.

The Entry Age Method:

- Expressed as a percentage of earnings is
  - The present value of all future benefits
  - For a member joining at the assumed entry age
  - By reference to projected final earnings
  - Divided by the present value of the total projected earnings
  - Throughout the member's expected membership
  - The aim of the EAM is to produce a stable contribution rate from date of entry to date of retirement.
  - And to still meet the EA savings target
  - provided assumptions are borne out in practice.
- 
- Which is useful if the government sets the tax with respect to some targeted income replacement goal,
  - And wants to charge a predictable tax for citizens who join the work force at the assumed entry age.
  - However, on introducing the tax, people closer to retirement age will end up not contributing enough,
  - Since they have less time to save
  - Although it is possible that older people will have some private savings at their disposal.
  - The EASCR is a fixed rate which is too high in the early years and too low in the later years in terms of liability build-up,
  - It may be politically more popular to charge a rate that starts low at younger ages and gradually increases over time.
  - Younger members of society are more likely to have higher expense levels (debt, families etc)
  - And will be more able to supplement retirement savings in later years after expenses have reduced somewhat.
  - However higher rates at older ages may breach tax allowable maximums
  - This structure is more in line with the PUSCR.
  - In practice the EASCR should fluctuate to accommodate for a modified level depending on actual experience,
  - Regular recalculation of the rate is unlikely to take place on a state benefit (and a DC one)
  - And people may end up saving too little or too much depending on actual outcomes.

iii.

- Solidarity
- As the ability to pay does not influence the availability of the benefit

iv.

- At the point in time when a person qualifies for the benefit, the government sets aside the full reserve to pay for all future care
- This covers both benefit and expense outgo
- This would be calculated as the claims in payment reserve at outset
- This would require assumptions about the mortality and morbidity experience of the individual
- It's possible that detailed information would be available to assist in the setting of these assumptions given that the government knows who this person is.
- But generally the degree of detail known would be poor and fairly broad brush assumptions will need to be used.
- With appropriate margins for uncertainty
- As the benefit is provided in-kind, the government will have control over the year-on-year benefit amount.
- Although the discounted mean term of the payment period is likely to be longer than the medium term budget projections resulting in some uncertainty
- Overall, the state is unlikely to want an overly conservative basis for this calculation.
- As there is an opportunity cost of tying up budget in a fund
- And the state is generally regarded to have a strong enough covenant that benefit security is not overly concerning.

## QUESTION 6

i.

- A type of life insurance arrangement where a group of members
- Who may be defined as a group of people who are members of the same retirement fund
- Are provided with cover for risk events such as death or disability in exchange for premium
- Based on the characteristics of the full group.

ii.

- Group PMI and CI will be seen as a valuable benefit by staff and can be used by an employer as part of the overall benefits package to attract and retain staff.
- As these employers operate in industries with higher than normal risks in terms of health and safety, they may want to ensure that their staff have adequate protection and that they manage their risks accordingly.
- Both products can promote health and wellbeing in the workplace.
- PMI can help to ensure acute medical conditions are treated promptly and assist with a speedy return to work following a medical need.
- PMI may improve the quality of treatment, making employees more satisfied and productive in the long term.
- CI can assist to finance time off work for critical illnesses where extended time is required to recover from an illness or procedure.
- Employers can assist those who may not ordinarily be able to access this cover on their own.
- (e.g. some blue-collar occupations) to have it available.
- It could be a legal requirement for employers to provide such insurance to their staff

- Group cover may have tax advantages over individual insurance cover, depending on the territory.
- The employer can offer the benefit that has a greater perceived value to the employee than its cost to the employer (because of more favourable group underwriting and pricing).
- Pricing is often favourable due to reduced anti-selection and savings on brokerage or commission.
- The employer can pay the whole premium on behalf of the employees which could / be a significant employee benefit and assist to attract and retain staff.
- The employer could share the cost with the employee or facilitate premium collection, both of which offer the employee a benefit, even if only administrative.

*[An alternative structure for this answer would be to use the headings from Section 2 of Chapter 4 of the F108 notes]*

iii.

- Insurance intermediaries are independent of the insurance company
- Which means that they may move the client to another insurer if there is a better product /price available in the market
- Intermediaries are usually remunerated by commission from insurer or fee from client
- Which may influence the business being retained if the insurer pays a fair commission and has a good relationship with the broker
- Long standing relationship indicates that broker understands clients needs and can assist the insurer to manage the service delivery to the client
- The brokers may have a good understanding of the industries in which the clients operate and thus assist to support the business
- Brokers may be able to bring new business in the same sectors to the insurer
- Broker able to deal with complicated products which can serve as a useful service to the client and again improve the client experience
- The brokers may be specialists in the PMI / CI markets which can assist with better service delivery and the overall client experience

*[Both valid advantages and disadvantages would be given credit.]*

iv.

- If BigCo moves to self-insurance, they will be promising a defined benefit which will be funded by regular contributions.
- This is likely to create a capital strain within the fund
- It is possible that the fund has surplus in it
- But one would need to consider carefully the source of the surplus
- Particularly as all the staff need the CI cover and not all may have been members of the fund previously.
- The most likely scenario is that BigCo would need to provide this capital.
- Security
  - Benefit security may be better for members through InsureCo
  - As life insurers may be required to have margins for prudence that pension funds are not
  - Although this really does depend on the credit rating of InsureCo relative to BigCo
  - Importantly group risk at an employer is subject to accumulation of risks or catastrophe risks
  - And BigCo may not be able to provide sufficient capital to pay claims should a catastrophe occur.

- Poorer benefit security may create reputational problems for BigCo
- Stability
  - If BigCo is 100% experience rated then in both cases the stability of the risk premium will be influenced by their claims experience alone.
  - If not, then the premium will be far more stable with InsureCo due to the much larger risk pool at the insurer.
  - The other margins that form part of the InsureCo premium will be influenced by the insurance cycle.
  - Which may result in some instability over time
- Sustainability
  - In both cases, the contribution is going to reflect the underlying demographics of the risk pool and are probably equally sustainable
- Realism
  - The self-insured option is likely to give a more realistic estimate of the cost of the CI benefits as it is unaffected by the insurance cycle.
  - It may be difficult to ascertain the appropriate contribution for the benefit without the necessary actuarial skills in this area.
  - These may not be available through the DC funds actuaries.

*[Comments about data availability also accepted although the question does say the employer is very large]*

- Accounting
  - The DB benefit within the DC fund is likely to render this is now a hybrid fund
  - Which may result BigCo having a liability reflected in their own accounts
  - This may create additional costs for BigCo
- Liquidity
  - Coming up with the initial capital may create liquidity problems for BigCo
  - Paying disability benefits could also create liquidity benefits for the fund although this is mitigated to the extent that these are income and not lump sum benefits
- Flexibility
  - The scheme would need to estimate its own premium. This could be a more flexible arrangement than commercially available terms
  - And on average would be expected to be lower than what InsureCo charges.
- Opportunity Cost
  - BigCo needs to consider whether the capital required to move to self-insurance could not be better used elsewhere.
- There may be differences in taxation for both BigCo
  - And employees
- And regulation permitting the risk financing
  - And use of any surplus within the fund

v.

- The available market for the insurer to sell to expands, however the insurer will need to determine who is considered to be in their individual target market
- And whether or not it is confined to those working in the sectors of their group clients
- The insurer could decide to limit eligibility for the individual cover to those employees who leave the employment of their group clients for the purposes of continuity of cover (and client retention) and thus retain similar products

- However, they may consider a broader target market which would be a significant shift from their current business model
- The insurer may want to consider different policy designs to cater for the needs of their individual client target market
- This could lead to a wider range of products and introduce some (more) complexity into the product design and management cycle
- The insurer will need to price the individual products separately, and may need to or decide to use different rating factors
- The pricing would need to reflect differences in risk profile and potential anti-selection of individual policyholders,
- However, be competitive relative to the group contract so that it is marketable
- As individuals would be free to choose their own cover, underwriting will be different as all individual policies will need to be underwritten...
- With more extensive underwriting where the sum at risk is large
- This would apply to financial and/or medical underwriting depending on the type of policy issued
- The insurer would need to review their distribution channels to account for how individuals would want to purchase the products.
- This may be a variety of channels such as direct and tied agents which would be linked with how the products would be marketed
- The administration (policy issuance, claims management, etc) associated with issuing policies will increase as each individual policyholder will own their separate policies
- The insurer would need to consider reinsurance arrangements for the individual products and how this may affect their current reinsurance arrangements