EXAMINATION

April 2005

Subject ST1 — Health and Care
Specialist Technical

EXAMINERS' REPORT

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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Chairman of the Board of Examiners

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1 Benefits typically available on a PMI plan include:

- Hospital costs
- In patient costs such as accommodation/private room, nursing care, operating theatre, diagnostic procedures, surgical dressings, drugs
- In-patient physiotherapy
- Day patient costs
- Accommodation/private room for parent accompanying a child
- Specialist fees
- Surgeons' and anaesthetists' fees for in-patient or day-care
- Physicians' fees
- Outpatient fees/costs such as specialist consultations, diagnostic tests (radiology, pathology), physiotherapy
- Radio/chemotherapy/scans
- Additional benefits such as private ambulance, recuperative care
- Cash for treatment in state system

Benefits may be offered on an indemnity basis or there may be limits to payments or excesses
Applies only to acute conditions

The question asked for a description of the benefits typically available under a UK PMI plan, not for an explanation of the purpose of PMI, which some candidates gave. Many candidates failed to record enough points to gain many marks on this question.

2 (i) Event A may lead to the following:

Loss of income and possibly capital in funding the cost of medical treatment
Hardship to the individual and to persons who are financially independent
Hardship/loss of income to those who have to provide personal care
If extreme, the event could give rise to a catastrophic loss of capital

Event B may lead to the following:

A requirement for capital to fund the costs of institutional care whilst elderly, if the sickness or disability is sufficiently disabling
A requirement for income over a long period. This might have been taken care of by a pension.
Without insurance, assets may be depleted due to living a long time in care
There may be costs involved in making adaptations to the home
The individual plus any dependants would be affected together with any providers of personal care

(ii) A suitable product to cover event A would be medical expenses insurance which gave the correct level of cover in the domestic context. This would provide benefits to cover all medical expenses, including primary and secondary care.

This would be a traditional non-profit (short term) contract with an element of inflation-proofing since the policy provides indemnity benefits.

A suitable product to cover event B would be long term care insurance which pays care fees to elderly in an institutional care facility until death. Long term care insurance would cover the cost of long term care arising through permanent disability where individuals are unable to perform specific activities of daily living.

This could have an inflation-proofing element and be either a traditional non-profit or unit-linked contract. Full inflation-proofing is unlikely because of cost.

If the individual is already in failing health, a special enhanced annuity may be available taking into account the current poor state of health.

This question was generally well answered, although not all candidates appreciated that hardship could apply to everyone, not just the poor or old. Few candidates mentioned loss of income from employment as a possible consequence of event A. Credit up to full marks was given where a candidate discussed one product which covered both events A and B.

3 Income Protection

The main risk relates to sickness transfer probabilities in the underlying multiple state model - claim inception and claim termination rates.

Other major risks include:
Anti-selection risk
Withdrawal risk - selective withdrawals
Financial risk on withdrawals where asset share is negative

Critical Illness

The main risk relates to the rates of diagnosis of the critical illness specified in the contract.

Other major risks include:
Anti-selection risk
Selective withdrawals
Financial risk on withdrawals where asset share is negative

Private Medical Insurance

The benefit payments are generally determined by individuals over whom the company has no control (eg increases in fees, increases in cost of treatment).
Claim frequency bound up in GP referrals.
Where the State offers free healthcare, there may be risks arising from lack of sales and inability to cover expenses which could lead to insolvency
Risk of a single large claim (eg US treatment) or a single incident leading to accumulation of claims (eg workforce)

Long Term Care

The main risk relates to transfer probabilities in the underlying multiple state model and to claim inception probabilities and transfer probabilities between claim states.

Other major risks include:
Investment risk
Expense risk
Withdrawal risk - selective withdrawals
Financial loss from withdrawal when asset share is negative
Marketing/reputation risk since policyholders expectations may not be met

This question was generally well answered.

4 (i) An immediate needs annuity can be used to pay care fees on behalf of the care home/nursing home/retirement home resident. The annuity provides financial protection both for the care home/nursing home/retirement home resident if he/she lives longer than expected and the estate of the individual. It also provides financial protection to the dependants of the individual in that they will not be required to fund the care home/nursing home/retirement fees if the individual lives longer than expected.

(ii) Assumptions for the pricing basis include:

Mortality

It is necessary to construct the likely experience of the policy. Reinsurance data might be available
Underwriting criteria. The effects of changes to past and future underwriting criteria/strategy need to be considered
Add prudential margin - since survival reduces profits, assume variations in mortality experience

Expenses

Own data are not available; so compare with existing products.
Assign costs according to policy type/class, initial/ renewal, fixed and variable, whether per policy or a percentage of premiums.
Include prudent inflation assumption
Allowance for fixed expense contribution depends on future new business (so consider future sales volume).

Interest

Depends on future investment strategy (which assets are invested in and extent of matching assets and liabilities)
As non-profit likely to be fixed interest assets
Take a view as to likely returns from fixed interest assets

Add prudential margin: depends on extent of reinvestment income (as a proportion of total future income and profit), as this is much more uncertain

Taxation

Make allowance for future tax incidence at current and/or expected rates

Other factors

Solvency margin and reserving basis
Risk discount rate and profit criteria
Competitors' rates
Sensitivity analyses and realignments

In general, this question was reasonably answered, although not all candidates appeared to have knowledge of an immediate needs annuity. In part (i) few candidates mentioned the value of a LTC policy to a nursing home providing security about future payments.

5 (i) Lives aged 40 next so require independent rate for age 39.5 exact

For accelerated critical illness, claim rate = $i_x + (1 – k_x)\, q_x$

Age 39: Dependent rate = 2.3 + (1 - .55) * 1.1 = 2.795
Independent rate = 2.795 * (1-.1*.5) = 2.655

Age 40: Dependent rate = 2.4 + (1 - .56) * 1.2 = 2.928
Independent rate = 2.928 * (1 - .1*.5) = 2.782

Expected claim cost = (2.655+2.782)/2 * £63,000 = £171,265.50

(ii) Need to include claims where the first of either death or critical illness occurred within 2005. Date of notification and date of settlement are irrelevant.

Hence claims amount = £35,000 + £42,000 + £71,000 = £148,000

Actual/expected = 148,000/171265.5 = 86.4%

(iii) Would need to allow for claims which have been incurred but not reported.

(iv) For stand alone critical illness contracts the rate is i_x * probability survive 28 days (stand alone contracts require a survival period, typically 28 days).

Age 39: Dependent rate = 2.3 * .9
Independent rate = 2.3 * .9 * .95

Age 40: Dependent rate = 2.4 *.9
Independent rate = 2.4 *.9 * .95

Age 40 next rate = 2.35 * .9 * .95 = 2.009

Expected claim cost = £63,000 * 2.009 = £126,583

Actual claims to include = £35,000

Actual/Expected = 28%

So result would be much better if all of the plans were stand alone CI contracts

Whilst many candidates realised that lives were aged 39.5 at the start of the year, they often failed to make the appropriate adjustments to the q_x values. Some candidates also missed the point concerning lapse rates and failed to convert the independent rates into dependent rates. Many candidates failed to choose the correct claims in part (ii). In part (iv), although candidates generally realised that stand alone contracts have a survival period (otherwise it is an accelerated CI plan), many did not recalculate the expected claims. Credit was given for alternative approaches to answering parts (i) and (iv), if appropriate.

6 (i) Need to choose model points that are representative of the new portfolio. May be able to use model points from a previous profitability assessment (perhaps provided by the portfolio seller) and then update this to allow for new business and exits (lapses, maturities).

Need to check appropriateness of model points. May be able to do this by, for example, calculating supervisory reserves using the model portfolio and comparing this with the actual published portfolio supervisory reserves.

For each model point cash flows would be projected allowing for reserving and solvency margin requirements on the basis of a set of base values for the parameters in the model.

The net projected cash flows will then be discounted at a rate of interest, the risk discount rate, that allows for:

the return required by the company, and
the level of statistical risk attaching to the cash flows under the contract.

Need to consider cost of any options and guarantees.

The level of statistical risk could be assessed:

- in some situations analytically, by considering the variances of the individual parameter values used
- by using sensitivity analysis with deterministically assessed variations in the parameter values
- by using stochastic models for some, or all, of the parameter values

Scaling up the results of each model point and totalling these will give the expected profit.

(ii) The experience will differ because of variations in the product design. In particular:

the definition of disability
the level of guarantees included in the contract
the scope of policy exclusions
the maximum replacement ratio
treatment of any additional benefits
maximum policy duration

The new portfolio may have been underwritten using a different philosophy. Differences may include:

classification by occupation class
availability of deferred periods
use of individual medical exclusions or application of extra premiums
application of changes in disability definition
maximum replacement ratio offered and the treatment of multiple policies

The new portfolio may cover a different profile of lives and the mix by age, sex, occupation class, mix between employed and self employed, level of benefit, cease age, increasing/level benefits may be very different.

There may be a difference in the split between personal cover (including mortgage cover) and business cover.

Historic lapses and the treatment of past claims may also have an impact on the existing portfolio mix.

Differences in level of expertise

Premium rates may be higher resulting in greater lapses from healthy lives

Any change in the ownership of a block of business may generate additional lapses which could be anti-selective.

In general this question was not well answered, with candidates often failing to provide sufficient points to gain many marks. In part (ii), it was not always appreciated that if the company purchases the portfolio, there would be no differences arising from future claims handling etc since this would be carried out by the purchasing company for both portfolios.

7 Morbidity/Mortality

Analysis of the company's experience over a 3–5 year period - long enough to have reliable data and short enough to be homogeneous. This would be done for males and females separately. Allowance would be made for any changes in underwriting standards.

Although a market leader in CI, the company is unlikely to have sufficient data to rely solely on its own experience. In addition to own data, could look at:

- industry data (such as CMI reports in the UK)
- data from reinsurer
- published tables
- data from overseas

Published data will probably need adjustment for the particular circumstances of the company and its products

Need to consider trends in experience especially for morbidity

For critical illness, would reconsider illnesses and conditions covered. If sufficient data available, may analyse by specific disease

Rates included in reassurance terms would probably be followed. AIDS projections are available, but only as industry-wide data.

Data needs to be interpreted with care. Deaths from critical illnesses covered will be irrelevant, because a claim will already have been paid. Other deaths release reserves as no benefit is paid. This may be a different situation from the type of policy the data were collected from.

Comparison of the proposed target market and that in the data is important

Almost certainly likely to use the experience to generate an adjustment to a standard table

Investment returns

This should reflect the expected return on the underlying investments (net of expenses)

Expenses

The company should have an analysis of expenses over recent years.

A series of analysis helps to identify trends to use in assessing future rates

Expenses should be split into acquisition, maintenance and claims, and between contract types. For income protection, the expenses may also be split between claims inception and claims maintenance. The level of detail will depend on the size of the company

Need to allow for any specific one-off costs and any expected additional costs (e.g. regulations).

Expenses might also be analysed into those which are contract size related and those that are policy related

If the company's expense investigation does not provide credible data down to the particular contract type, broader averages may have to be adjusted. Probably with input from reassurers

Inflation needs to be allowed for from the date of investigation up to the date the rates will be used and allowance made for any expected trends in future inflation assumptions

Assumptions about new business may be needed for spreading fixed costs

Commission

The rates and structure that the company intends to pay can be loaded directly into the basis

Expense inflation

National data on inflation of prices and earnings

Expected future rates of inflation — possibly measured by the difference in returns on government fixed interest and index-linked securities

The expense inflation rate will be chosen to be consistent with the investment return assumption

Withdrawals

The company should have an analysis of experience available relating either to this contract or to broadly similar contracts

Limited industry aggregate data may be available but will have to be adjusted to meet the particular contract and target market

The analysis may need to be adjusted because it has been affected by unusual economic circumstances over the period the data were collected. Adjustments may also be needed if the intended target market or sales channel are different from those in the data analysed

Analysis by duration

Tax

Suitable assumptions will need to be made taking into account the company's current and future tax position

Profit

Risk discount rate/profit criteria set according to the company's requirements

Other factors

Competitors rate should also be considered
Best estimate assumptions or slightly prudent
Reserving bases
Premium bases may be affected by regulation
Profile of business

This question, which contains quite a lot of bookwork, was generally well answered although candidates did not always provide sufficient points to gain reasonable marks.

8 (i) Protect company from anti-selection

Protect company from seriously impaired lives where it is impossible to assess risk accurately

Identify substandard lives to offer special terms

Identify most suitable approach for substandard lives

Identify most suitable premium for substandard lives

Accurate risk classification to ensure fair rating

Try to ensure experience does not deviate from that assumed in pricing of contracts

(ii) Question on the proposal form completed by the applicant
Reports from medical doctor that the applicant has consulted
Medical examination carried out at the request of the insurer
Specialist medical test carried out on the applicant

(iii) Policyholder offered immediate cover

No formal underwriting at point of acceptance

Blanket exclusion on pre-existing conditions - usually defined as conditions that have received treatment for a specified period prior to application (often 5 years)

Exclusions are waived after a period of time, usually 2–3 years, if policyholder receives no treatment for condition during that time

Past medical history is examined at the time of claim

(iv) Group policies will often have free cover limits - certain level of benefits available without individual underwriting. Those looking for benefits above the limit provide medical information or attend tests

Typically insurer will request that all insured members are actively at work on the day cover commences or a moratorium is applied, where no claim is paid for short period after start of cover for new entrant

Limited insured information. The following data are often not available:
- Numbers of lives
- Individual ages
- Sex
- Benefits

Often the insurer requests a deposit premium. This is adjusted at the end of period when details are available.

Reduction in anti-selection effect as schemes get larger

Premiums charged may be based on the experience of the group as a whole rather than as a result of individual medical underwriting – this would depend on the size and credibility of the scheme

For the largest schemes medical history may be disregarded completely

Flex schemes have similar anti-selective characteristics as individual policies, so may underwrite increases in cover or apply strict limits

Need to consider how to treat new-comers

Need to consider influence of the intermediary. Increased potential for anti selection and limited supply of information due to increased purchaser knowledge

Dependants underwritten differently

Level of underwriting may depend on assumed take-up rates

Differences may be function of distribution methods

Since it was not clear from the wording of the question whether the initial parts were meant to relate to individual or group PMI, credit was given for answers which assumed either. For part (ii), full credit was given if the candidate stated that for group business don't usually underwrite but apply pre-existing exclusions or moratorium. In general parts (i) and (ii) were very well answered. In part (iii), not all candidates understood how moratorium clauses work. Part (iv) was generally poorly answered.